THE PROCEEDINGS

OF THE

LOUISIANA ENGINEERING SOCIETY

Published bi-monthly, February, April, June, August, October, December, under the auspices of the Committee on Publication.

Arthur M. Hill, Editor

Subscription, $2.00 per annum Single copy, 35 cents

Address all communications to
ARTHUR M. HILL, Editor, Tulane University,
New Orleans, La.

Entered as second-class matter July 27, 1916, at the Post Office at New Orleans, Louisiana, under the Act of August 24, 1912.

Acceptance for mailing as special rate of postage provided for in section 1105 Act of October 3, 1917, authorized August 1, 1918

LOUISIANA ENGINEERING SOCIETY

Suite 422 St. Charles Hotel

OFFICERS AND BOARD OF DIRECTION

LIONEL J. CUCULLU, *President*, 317 Baronne St., New Orleans, La.
HARRY P. NEWTON, *First Vice-President*, 35 Hibiscus Lane, New Orleans, La.
JOHN A. McNIVEN, *Second Vice-President*, 2 Canal St., New Orleans, La.
JOHN P. FERNANDEZ, *Secretary-Treasurer*, 9011 Apple St., New Orleans, La.

AUSTIN J. MARY, *President*, Baton Rouge Section, 1767 Cedardale Ave.
RAY E. BURGESS, *President*, Lake Charles Section, 3643 South St.
ERNEST M. FREEMAN, *President*, Shreveport Section, 416 Texas-Eastern Bldg.
ROY T. SESSUMS, *President*, Monroe Section, La. Polytechnic Inst., Ruston
MICHAEL C. ABRAHM, 317 Baronne St., New Orleans, La.
ARTHUR M. HILL, 823 Pine St., New Orleans, La.
CHARLES P. KNOST, 4018 Thalia St., New Orleans, La.
H. L. LEHMANN, La. Department of Highways, Baton Rouge, La.
R. MALLARD SEAGO, 1600 S. Peters St., New Orleans, La.

DISTRICT CONTACT REPRESENTATIVES

HIRAM R. MASON, 3rd Dist., Southwestern Louisiana Institute, Lafayette, La.
H. LANE MITCHELL, 4th Dist., City Hall, Shreveport, La.
CALVIN T. WATTS, 5th Dist., Tech Station, Ruston, La.
RICHARD R. L. WARD, 7th Dist., Box 1578, Lake Charles, La.
SOULE BUTLER, 8th Dist., City Hall, Alexandria, La.

BATON ROUGE SECTION OFFICERS FOR 1950

AUSTIN J. MARY, **President**
HENRY LANDRY, **Sec.-Treasurer**, 2222 Cedardale Ave., Baton Rouge, La.

LAKE CHARLES SECTION OFFICERS FOR 1950

RAY E. BURGESS, **President**
VIVIEN E. SICKS, **Sec.-Treasurer**, Route 2, Box 225 Lake Charles, La.

MONROE SECTION OFFICERS FOR 1950

DEAN ROY T. SESSUMS, **President**
CALVIN T. WATTS, **Acting Sec.-Treasurer**, Tech Station, Ruston, La.

SHREVEPORT SECTION OFFICERS FOR 1950

ERNEST M. FREEMAN, **President**
JOHN H. ELLIS, **Sec. Treasurer**, Shreveport, La.

STATE BOARD OF ENGINEERING EXAMINERS

DONALD DERICKSON, President
F. N. BILLINGSLEY, Vice-President
LEO M. ODOM, Secretary
J. J. MUNDINGER, Member
F. F. PILLET, Member

WOMAN'S AUXILIARY, OFFICERS FOR 1949-50

Mrs. Gayle Schneidau, *President*
Mrs. Sargent F. Jones, *First Vice-President*
Mrs. George A. Heft, *Second Vice-President*
Miss Amelie Cade, *Honorary Vice-President*
Mrs. John K. Mayer, *Recording Secretary*
Mrs. Mario G. Zervigon, *Corresponding Secretary*
Mrs. Frank W. Macdonald, *Financial Secretary*
Mrs. John P. Fernandez, *Treasurer*

OFFICERS FOR 1949 OF WOMEN'S AUXILIARY, BATON ROUGE SECTION

MRS. J. CLIFTON HILL, *President*
MRS. GEORGE R. DE LA MATYR, *1st Vice-President*
MRS. B. W. PEGUES, *2nd Vice-President*
MRS. N. E. LANT, *3rd Vice-President*
MRS. B. P. LYONS, *Honorary Vice-President*
MRS. W. B. MATTOX, *Recording Secretary*
MRS. CHARLES PHILLIPS, Jr., *Corresponding Secretary*
MRS. LEO LASALLE, *Financial Secretary*
MRS. GEORGE CLINE, *Treasurer*

Members may obtain key to rooms at hotel desk
All business communications should be addressed to John P. Fernandez, Secretary, P. O. Station 20, New Orleans 15, La.

OFFICERS OF VARIOUS ENGINEERING GROUPS

New Orleans Section, American Institute of Chemical Engineers
Elmo L. Patton, Chairman, 1618 Charlton Drive, New Orleans, La.
Henri J. Molaison, Secty.-Treas., 2100 Robert E. Lee Blvd., New Orleans, La.

New Orleans Section, Society of Plastics Engineers, Inc.
Harold A. Levey, President, 311 Audubon Blvd., N. O. 15.
Paul F. Oswald, Secretary, 123 Lake Ave. (Southport), N. O. 20.

American Institute of Electrical Engineers, New Orleans Section
E. I. Blanchard, Chairman, 433 Metairie Road, N. O. 20.
H. E. Pritchard, Jr., Secretary-Treasurer, 5836 General Haig Street, N. O. 19.

American Institute of Mining and Metallurgical Engineers, Delta Section
Dr. E. N. Dunlap, Chairman, 1818 Canal Building, N. O. 12.
H. M. Krause, Jr., Vice-Chairman, Humble Oil & Refining Co., Canal Bldg., N. O.
Fred E. Simons, Jr., Sec.-Treas., La. Land & Exploration Co., American Bank Bldg., N. O.

American Public Works Association, New Orleans Chapter
Thos. B. Becnel, President, City Engineer's Office.
James S. Janssen, Sec.-Treas., New Orleans Public Service, Inc.

American Society of Civil Engineers, Louisiana Section
Walter H. Scales, President, 550 Canal Bldg., N. O. 12.
B. Dornblatt, Vice-President, P. O. Box 254.
Frank Macdonald, Sec.-Treas., P. O. Station 20, N. O. 18.

American Society of Heating and Ventilating Engineers, Delta Chapter
Ross B. Guest, President, 827 Dryades St., N. O.
Ralph Elizardi, Vice-President, 314 St. Charles St., N. O.
Fritz Gutknecht, 1001 Toulouse St., N. O.
Theodore Offner, Secretary, 1000 South Peters St., N. O. La.

American Society of Mechanical Engineers, New Orleans Section
R. M. Seago, Chairman, New Orleans Public Service, Inc., 1600 S. Peter St., N. O. 13.
Waldemar S. Nelson, Vice-Chairman, 840 Union St., N. O. 12.
Robert L. Nall, Sec.-Treas., c/o Flintkote Co., P. O. Box 1122, N. O. 4.

American Society of Refrigerating Engineerings, N. O. Section
C. S. Crawford, Chairman, Baronne Building, New Orleans, La.
Thomas Stokes, Secretary, 314 St. Charles St., New Orleans, La.

American Society of Safety Engineers, New Orleans Section
Arthur J. Naquin, Chairman.
David W. Moodie, Sec.-Treas., New Orleans Public Service, Market Street Station.

Illuminating Engineering Society, New Orleans Chapter
Hutson Colcock, Chairman, 614 Baronne St., N. O. 12.
Harold Salaun, Vice-Chairman.
Cecil Pasley, Sec.-Treas., La. Power & Light.

Society of American Military Engineers, Louisiana Post
O. M. Jernigan, President, U.S.E.D., Foot of Prytania St., N. O.
Robert E. Hunter, Secretary, U.S.E.D., Foot of Prytania St., N. O.

NOTE—Please advise editor of any changes in officers.

LOUISIANA ENGINEERING SOCIETY
STANDING COMMITTEES FOR 1949

Employment:
Raymond P. Bassich, Chairman
Eugene L. Fithian, Vice-Chair.
George H. Dudley
Waldeck F. Guilbeau
*Allison M. Levy

Entertainments & Outings:
Robert P. Lockett, Jr., Chairman
J. Robert Rombach, Vice-Chairman
F. B. Blackstone
Leo E. Broders
Charles A. Burton
Sydney Ellis, Jr.
Allen H. Jensen
Ole K. Olsen
*Albert L. Soule, III
John D. Taylor

Finance:
Frank W. Macdonald, Chairman
Charles A. Cassagne, Jr., Vice-Chairman
*John W. Allee
Jerome C. Baehr
*Robert F. Bland
*Robert L. Vaccaro

Membership:
Lewis B. Gay, Chairman
Mario R. Guell, Vice-Chairman
Robert T. Brooks
Tom C. David
Louis Duclos
Milton E. Kirkpatrick, Jr.
Bryan J. Lehmann
*Wendel G. Liebe
Edward A. McLellan
Richard F. Muller
Robert W. Vaughan
Wyley D. Poole

Membership Qualifications:
(Anonymous)

Legislative:
C. Glenn Cappel, Chairman
Hubert A. Flanakin, Vice-Chairman
Charles M. Kerr
Leo M. Odom
William H. Rhodes
*John H. Schluter

Professional, Civic and Industrial Affairs:
Reinhard A. Steinmayer, Chairman
Arthur J. Naquin, Vice-Chairman
Ernest M. Freeman
*James E. Hassinger, Jr.
Rudolf Hertzberg
Charles A. Myers
Clayton L. Nairne
Boykin W. Pegues
Leo M. Odom
Lyman C. Reed
Walter H. Scales

Publications:
J. Mason Guillory, Chairman
John V. Dugan, Jr., Vice-Chairman
John D. Haverkamp
James S. Janssen
*Ward C. Purdum

Publicity:
Allen W. Betz, Chairman
L. Villere Cressy, Vice-Chairman
Leo E. Broders
Charles A. Burton
*Roy G. Cappel
Bernard Louviere

Technical Papers:
James S. Janssen, Chairman
Waldemar S. Nelson, Vice-Chairman
Aaron Abramson
Walter E. Blessey
L. Villere Cressy
William J. Drawe, Jr.
A. W. Durning
John S. Gentillich
Milton E. Kirkpatrick, Jr.
Harold A. Levey
Henri J. Molaison
*Robert S. Swayne

Student and Junior Activities:
Orlando W. Stephenson, Jr., Chairman
William E. Owen, Vice-Chairman
J. O. Baker
*Williford J. Evans
Raymond E. Jenkins
*J. Howell Peebles, Jr.

*Junior Member.

President Lionel J. Cucullu

PROCEEDINGS
OF THE
LOUISIANA ENGINEERING SOCIETY

VOL. XXXVI FEBRUARY, 1950 NO. 1

CONTENTS

EDITORIAL NOTES AND COMMENTS

Our New President. Looking at you from the opposite page is Lionel J. Cucullu, our new president of the society. He is well known to the engineers of this section and through his engineering actviities has made friends throughout our nation. He has the qualifications necessary to assure continued progress of our organization. His quiet dignity and understanding attitude have won for him many warm friends.

Our president is a graduate of Louisiana State University. His fields have been sugar chemistry, having been chief chemist at Godchaux Sugars, Inc.; work in electrolysis with New Orleans Sewerage and Water Board; sugar plant design and operation. In 1930 he joined the forces of New Orleans Public Service, and has

advanced with them until at present he is assistant to the chief engineer.

President Cucullu is a former chairman of the New Orleans Section of the American Society of Mechanical Engineers, is now Chairman, Regional Committee on Sections, member of National Medals Committee of the Board of Honors; former Secretary of the National Nominating Committee and Chairman of the National Agenda Committee, all of A. S. M. E. He is a member of Tau Beta Pi, Alpha Chi Sigma.

In L. E. S. he has for many years been active in several capacities. He has held various committee assignments and is a past general chairman of the annual meeting. He has also served as board member, second and first vice-presidents.

In addition to the preceding engineering activities, he is also a member of Scabbard and Blade, New Orleans Chamber of Commerce, United States Chamber of Commerce, American Gas Association, National Association of Manufacturers, New Orleans Electrical Association, and New Orleans Athletic Club. President Cucullu is also active in Scout work, holding among other offices that of District Commissioner, Beauregard District, New Orleans Area Council.

Certainly President Cucullu exemplifies the saying "If you want a job well done, choose a busy man!"

A Message from Our President. In most engineering societies it is proverbial that "the office should seek the man rather than the man seek the office". Assuming that our organization conforms to the general rule—and I believe it usually does—neither my ego nor any logical processes can convince me that the Society has sought to best advantage in obtaining its 53rd president. Nevertheless, I promise to try to compensate for some of the obvious shortcomings with which your president is endowed by bringing to the job a strong desire to learn and a will to work. The able assistance which my fellow officers and directors will doubtless contribute toward the administration of the Society's affairs should be your assurance that some progress can be expected during the year.

Founding of new state sections and cooperation with existing sections will be carried forward during 1950 as one of our chief objectives. It is hoped that new sections can be chartered at Alexandria and Lafayette, thus completing the work to which our past President Herman L. Lehmann has contributed so significantly. There are a few problems, financial and otherwise, in connection with section operations, which we hope to solve in cooperation with them.

The bill concerning the licensing of professional engineers will again be placed before the state legislature through the Louisiana Council of Engineers. Careful study of the factors which have

stymied its enactment into law on previous occasions indicates that most, if not all, of these have been overcome and our efforts this time may be crowned with success.

We hope to complete shortly the transformation of our headquarters room at the St. Charles Hotel from a rarely used, dingy place, to an attractive room which will find widespread usage by our membership,—both local and state members. The hotel has repainted and papered the room, provided air conditioning and promised other improvements. Suitable furnishings should contribute greatly toward the transformation.

Some of the additional activities which I feel should receive a full share of attention during the year include: Cooperation with and participation in student activities; support of civic projects and development of leadership in civic affairs by our membership; an adequate program of activities through active committee planning, including coordination between the general committees and state section committees; continued cooperation with the national engineering societies, Engineers Joint Council, and Engineers Council for Professional Development; stimulation of membership growth; and further study of the possibilities for formation of an Engineers' Club, based on the interest manifested in a recent survey.

I trust that when 1950 has been left behind and your current Board of Direction reports to you on its stewardship, we may be able to record significant progress. I am sure that I can promise you our best efforts toward that end. It is a fitting tribute to the work of past President Lehmann to conclude this message with the hope that 1950, can measure up to the standard set during 1949 under his leadership.

LIONEL J. CUCULLU

Retiring President's Report. Members of the Louisiana Engineering Society, Ladies and Guests. The program provides for a report by the retiring President. Since I must—here it is. Before I enter into the meat of this message I want you to know that I am most grateful for the wholehearted cooperation extended me during the past year by my fellow officers, the various committees, the Editor of our proceedings, individual members and last but not least our Secretary-Treasurer, John P. Fernandez. To all of them I wish to express my most sincere thanks. Your President is well aware of the distinction and honor of being the head of any organization, especially one made up of so many individual groups, but he is also aware of the assistance given him by the entire personnel taking part, making it possible to report a good year. Our profits in any endeavor is in proportion to how much is given of one's self and I feel that much credit is due to the splendid cooperation of workers who have given of their time and talent for the betterment of our society. As we look back to the beginning of our

organization we can see that much has been accomplished through the years, gradually but steadily growing, filling a need and place in our ever expanding profession.

Our membership has increased substantially during the past year, the major increase constituting state members which has the beneficial purpose of extending our association more generally over the entire state.

The secretary has reported to you our financial condition which is very good. Whereas we do not attempt to make any money, it is encouraging that the activities of the society are carried out within the revenue taken in and still have a surplus.

During the year we were very fortunate through the assistance of some of our north Louisiana members, to organize two additional state sections, one in Shreveport and one in Monroe, the Fourth and Fifth Congressional Districts, respectively, who had approximately ten members in each district. Our by-laws require a minimum of fifteen members to petition the Parent Society for a charter; so, these loyal supporters worked very hard in recruiting new members, resulting in a total of seventy charter members in each of the two new sections which are still growing. Mr. Cucullu, First Vice-President and Mr. Fernandez, Secretary-Treasurer, attended "Charter Night" meetings with me at which time it was my privilege to present these charters to the respective sections. In our interpretation these additional sections open the possibilities of greater membership by increased interest. There is more work to be done in organizing additional state sections and I pledge support towards getting these new sections established in Alexandria and Lafayette.

Your officers have kept the council of Engineers active during the year—several meetings called and at the most recent all engineer organizations were unanimous in voting to introduce a Professional Engineers' License Act at the next regular session of the Legislature, this bill to be favorable to the Council of Engineers. Our state is one of two not now licensed. It is a must and I certainly recommend the introduction of such an act and request your full support towards its passage.

You will recall that at the last annual meeting one of our past Presidents, Mr. James M. Todd, suggested that the Society undertake a project in the form of an award to be given to an engineer who had given freely of his time and talent toward some outstanding civic work. This suggestion has been carried out to the extent that all details have been worked out and finally approved by the Board of Direction. There are a few minor details to work out which I pass to my successor. The house committee has worked during the year towards remodeling and equipping the society's room in this hotel with new furniture so that when completed it

will make an excellent room for meetings of small groups such as the Board of Direction or committees.

As we enter the new year I have three definite objectives to recommend and I urge each and every one to lend your support to your officers in these projects.

(1) The officers and members of the Parent Society must work closer with our State Sections. It is hoped that the members of the sections will feel a closer bond to the entire membership. After all these sections are located and were established for the purpose of conducting the affairs of the society in such a way that it would offer the least inconvience toward attending meetings.

(2) We must work as a unit and individually to enhance our position. This can be done by following the Canons of Ethics for Engineers adopted last year and as a citizen that you take an active part in the affairs of the community and state. Do not pass an opportunity to do any civic work, which may be offered you. Your assistance is needed, your efforts appreciated.

(3) Our profession must be advertised in such a manner that it will be appreciated. A lot of work is accomplished by the society working as a unit, but is never brought to light or to the knowledge of others, than its members. We have a definite place to fill and we want others to know that we are eager and ready to serve.

In closing permit me to express my heartfelt thanks to the many members who have given so freely of their time towards the society's benefit this past year, and also, to the large number who have assisted to make this annual meeting what I am sure will be a grand success. I wish to thank the entire membership for their cooperation and tolerance and most of all for having permitted me to serve as President of this organization. This responsibility has meant much to me and I assure you serving in this capacity has been a privilege and a pleasure.

Thank you.

H. L. Lehmann

Our Annual Meeting. An excellent three day meeting featured exhibits, technical sessions, a luncheon, a get-to-gether for the board members and section officers, trips and a popular public lecture at Dixon Hall. These events do not materialize out of the thin air. Their presentation represents hours of work by many faithful members whose only reward is the feeling of accomplishment of a job well done. The responsibility of the 1950 meeting rested with the genial General Chairman John Dugan, and the chairmen and members of the various committees. Our Secretary-Treasurer, John Fernandez, gave the benefit of his experience in past years to add to the prestige and reputation of the society, as well as widening our circle of acquaintances of fellow engineers, both local and out-of-state.

The Terror That Stalketh at Noonday. People of America, wake up!

We need a Paul Revere to thunder at our doors, a Lone Ranger to alert our law-men against this peril . It is real and at our throats, even as we talk of cold war with Russia and keep a hand at our hips to be first on the draw.

This is an insidious enemy, a monster which has grown up from an innocuous infancy among us, nutured on our taxes and coddled by our legislatures. Now it is looming over us, no longer vague and shadowy, but definite in form and already brandishing the chains with which it is ready to enslave Americans forever.

If you think this picture merely a metaphor, melodramatic and fantastic, read John T. Flynn's *The Road Ahead*[*] or the excellent condensation of it in the February *Reader's Digest*. His is only one voice, but I hope that millions of other voices will take up the cry against the creeping ferocity of Socialist Economic Planning which, having already crippled England and destroyed its economy—aided by American money—is even now fastened at America's throat, battening upon her life's blood for the strength it needs to finish its traitorous work.

This is no alarmist outcry. There are incontrovertible facts and figures which prove the terrible truth of it. Every taxpayer in America has already felt for himself the sting of the vampire's teeth and everyone of us is growing weaker every day from the sucking greed of "confiscatory taxes which draw the blood from our very veins." This is the softening process which, backed up by such legislation as the Brannan and the Spence Bills, will, during the next decade, render America a nation totally without freedom.

What can we do about it? Flynn says, first, to recognize the threat to our nation for what it really it: not the promise of a benevolent Welfare State (which will disperse the blessings and bounty of a just Father once it has the omnipotence of the Almighty), but actually for an inhuman Fascist machine which destroys everything that it proposes to foster. Witness the economic fiasco in England today under the so-called Labor Government,—a wrecked system despite the desperate shot-in-the-arm treatment of despised capitalist American dollars.

Second, to stop deprecating our capitalist system or apologizing for it; to begin admitting that with all its faults (because it is, after all, a *human* system,) it is the true source of our great economic abundance and expansion.

Third, hold fast to our traditional liberties and tear down ruthlessly any man, no matter what his position, who dares infringe upon them. Block any proposed "welfare legislation," any addi-

[*] "The Road Ahead," copyright 1949 by John T. Flynn. Published by The Devin-Adair Company, 23 E. 26 St., New York 10, N. Y.

tional government spending to "aid" particular economic or social groups; and, above all, to damn permanently any law designed to give the federal government further control of private industry or enterprise. For this is the stuff upon which the monster, Socialism, feeds, with the freedoms in our Bill of Rights as his tastiest dessert!

Our Front Cover. This month's cover features a plant which converts natural gas into methanol. This material goes into such products as formaldehyde, alcohol denaturants, antifreeze and solvents. The December 1948 issue of "Industrial and Engineering Chemistry" published a complete description of the process. This plant is one of many which are helping the south to assume an ever increasing position of importance in the industrial field.

In This Issue. Two papers on present day problems. The problem of employment opportunities in engineering fields for the June 1950 graduates presents a challenge, according to Cecil Morgan, Vice-President, Esso Standard Oil, our luncheon speaker on January 13. It is generally conceded, however, that an engineering training furnishes an excellent background for many types of work not strictly in the engineering field. For instance, two brothers, as part of their training for missionary work, completed a four-year engineering course as the first step, believing that the technical training would be of great assistance to them in their final posts.

James M. Todd, Past-President of the American Society of Mechanical Engineers, highlighted some problems and proposals in connection with his investigation of the streamlining of our federal government. His comments are interesting and important. Reduction of expenses and the adoption of the Hoover plan will come only upon insistance by the taxpayer. Write to your senator or congressman.

The facts and figures presented in the address are interesting and startling. If you did not have an opportunity to hear Mr. Todd, you will find his comments worthwhile reading.

New Members. The following list introduces us to our fellow engineers who have recently joined the society. We welcome them and hope that they will take an active part in the affairs of their organization. With the formation of additional chapters in the state, more and more members have an opportunity to attend meetings, and enlarge their circle of friends in the engineering profession.

FOR MEMBER

FREDERICK E. CHARLES, Maplewood; age 40. Endorsed: R. E. Burgess, C. A. Jackson, G. B. Walther. University of Colorado, B.S.Ch.E., 1931. U.S. Federal Power Commission, Jr. Engr., 1942. Cities Service Ref. Corp., Field Engr., Jr. Engr., 1942-date.

D. X. ELLETT, Monroe; age 51. Endorsed: A. T. Givens, S. E. Huey, A. D. Williams. University of Illinois, B.S.Arch.Eng., 1923. Holland Tunnel, Jr.

Engr., 1923-24. Kenn-Well Contracting Co., Instrumentman, 1924-25. N. J. State Hwy. Commission, Designer, 1925-26. Thos. Crimmins Const. Co., design and supervision, 1926-32. Northeast Center L.S.U. Jr. College, teaching descriptive geometry and surveying, 1934. Dept. Public Works, Resident Engr., 1934-41. Ford, Bacon & Davis, Chief Surveyor, Res. Engr., 1941-43. Huey & Cage, Engr., 1943-44. Ford, Bacon & Davis, Chief Engr. Monroe Office, 1944-date. Licensed C.E., La., Miss., Ala., Okla., Mich.

ELBERT E. FORD, Monroe; age 46. Endorsed: C. C. Barnard, J. S. Burk, S. E. Huey. University of Texas, 3 yrs. engineering, 1924-5-6; McKinley-Roosevelt Inst., B. S. Petroleum Eng., 1935. U.S. Engr. Dist., N.O., Inspector, 1928-29. Curtis-Wright Flying Service, Kansas City, Mo., Dist. Engr., 1929-31. La. State Planning Comm., Dist. Supervisor, 1936-37. W. Horace Williams Co., construction of Aluminum Plant, Baton Rouge, 1942-44. Creole Petroleum Corp., Caracas, Venezuela, Asst. Chief Engr., 1945-48. Barnard & Burk, Resident Engr., 1948-date. Member S.A.M.E., American Petroleum Inst.

MALCOLM A. GUILLOT, New Orleans; age 28. Endorsed: E. L. Dennis, W. J. Leibe, R. Swayne, Jr. La. State University, B.S.M.E., 1942. Curtis Wright Aircraft Corp., Jr. Engr., 1942-43. Consolidated Vultee Aircraft Corp., Mech. Designer, 1947-48. Stone & Webster Eng. Corp., Mech. Designer, 1948-49. E. L. Dennis Eng. Co., Asst. to Consulting Engr., 1949-date. Member A.S.M.E.

JACK H. JONES, Baton Rouge; age 39. Endorsed: L. W. Harrell, J. E. Jarman, H. L. Lehmann. La. Polytechnic Institute, 1928-29. La. Dept. of Highways, Inspector, Instrumentman, construction, 1929-32. La. Polytechnic Institute, 1932-34. La. Dept. of Highways, Instrumentman, Chief of Party, Soils Engineer, 1934 to date.

S. HENRY KRONTHAL, Bogalusa; age 35. Endorsed: M. R. Guell, L. L. Smith, C. J. Mayeux. Mechanics Institute, N.Y.C., 1934-37, diploma in Architecture. Rutgers University, Refresher Course, 1943. Engaged in structural and construction design; research in electrical precipitation; at present Field Engineer, The Research Corporation.

SAMUEL H. McAFEE, JR., New Orleans; age 27. Endorsed: A. J. Naquin, J. K. Mayer, J. P. Fernandez. Tulane University, B.E., 1944. U.S. Navy, 1943-46. N.O. Public Service Inc., Asst. Equipment Engineer, 1946-date.

HENRY M. MESSINGER, Bastrop; age 37. Endorsed: E. N. Brodnax, S. E. Huey, A. C. Volk. S. E. Huey & Co., Party chief and draftsman, 1942-46. Private surveying 1946-date. Registered Surveyor, La. Associate Member, A.S.C.E., American Congress on Surveying and Mapping.

HORATIO NASH OGDEN, Baton Rouge; age 40. Endorsed: W. A. Bohne, F. A. Hannaman, Jr., F. H. Fox, J. H. O'Neill. Tulane University, B.E. in C.E., 1933. Standard Oil Co. of La., Construction Engr., 1940-41. Stone & Webster Eng. Corp., Resident Engr., 1942. U.S.N.R., Lt. C.E.C., 1943-45. Ethyl Corp., Chief Design Engr., 1946. Ogden & Woodruff, Consulting Engrs., Partner, 1947-date. Licensed C.E., La. Member A.S.C.E.

CARLTON C. SALLEY, Monroe; age 31. Endorsed: J. T. Folk, S. E. Huey, R. T. Sessums. La. Polytechnic Institute, B.S.C.E., 1940. Brown, Bellows & Columbia, Corpus Christi N.A.S., Jr. Engr., 1940. Miss. Steel & Iron Co., Structural Draftsman, 1940-41. La. Dept. of Finance, Specifications Engr., 1941. Ingalls Shipbuilding Corp., Pascagoula, Miss., Purchasing Engr., 1942-43. U.S. Army Corps of Engrs., 1943-46. W. C. .Salley, Contractor, Partner, 1946-date. Member S.A.M.E.

JESSE C. WATSON, Lafayette; age 55. Endorsed: N. E. Lant, E. A. Landry, B. P. Lyons. La. Highway Commission, Instrumentman, Bridge Inspector, Resident Engineer, 1922-41. La. Dept. of Highways, Dist. Construction Engr., Dist. Engr., Asst. State Maintenance Engr., 1941-date.

JOSEPH BERT WELDON, Sulphur; age 33. Endorsed: R. E. Burgess, W. W. Barnes, Jr., G. B. Walther. La. State University, B.S.C.E., Jan. 1949. Presently employed in General Eng. Dept., Cities Service Ref. Corp., Lake Charles.

CHARLES S. WOODRUFF, Baton Rouge; age 38. Endorsed: Wm. H. Bohne, G. T. de la Matyr, D. F. Latimer. Northwestern University, Industrial Engineer B. S., 1935. Swift & Co., Time Study Engr., 1935-37. Standard, Inc., Mech. Engr., 1937-42. Stone & Webster Eng. Corp., Mech. Engr., 1942-45. R. F. Taylor, Consulting Engr., 1946-48. Ogden & Woodruff, Consulting Engrs., 1948-date. Member A.S.H. & V.E.

FOR TRANSFER FROM JUNIOR TO FULL MEMBER

FREDERIC M. CHATRY, New Orleans; age 26. Tulane University, B.E. in E.E., 1945. U.S. Naval Reserve, 1945-46. Corps of Engineers, N.O. District, Hydraulic Engineer, 1946 to date.

ALFRED M. MELANCON, Baton Rouge; age 37. Louisiana State University, B.S.E.E. 1936. AAA, L.S.U. Extension Div., Field Supervisor, 1936-37. Seismic Exploration Co., Houston, Student Operator & Right of Way, 1937-39. Gulf States Utilities Co., Electrical Distribution Engineering, 1939 to date.

ROBERT J. SWAYNE, JR., New Orleans; age 26. Tulane University, B.E. in M.E., 1945. U.S. Navy, 1944-46. Freeport Sulphur Co., Mech. Designer, 1946-47. Fulton Bag & Cotton Mills, Mech. Eng., Asst. Supt., Supt., 1947-date.

FOR JUNIOR MEMBER

HAROLD F. KRAUS, New Orleans; age 28. Endorsed: L. I. Korn, L. J. Lassalle, J. P. Fernandez. Louisiana State University, B.S.E.E., 1947. Fleet Draftsman, C.V.A.C., 1944-45. U.S.C.E.C., Electrical Draftsman, Engineer, 1947-date. Member A.I.E.E.

WILLIAM G. MAYER, Plain Dealing; age 28. Endorsed: F. E. Hogan, R. T. Sessums, R. H. Vaughan. Louisiana Polytechnic Institute, B.S.C.E., June 1949. La. Dept. of Highways, Senior Instrumentman, Aug. 1949-date.

JOHN DONALD MURRY, Ruston; age 22. Endorsed: F. E. Hogan, R. T. Sessums, C. T. Watts, La. Polytechnic Institute, B.S.C.E., 1949. Southern Builders, Inc., Estimator-Engineer, June 1949-date. Licensed C.E., La. Member A.S.C.E., American Concrete Institute.

RICHARD M. SEE, Lake Charles; age 27. Endorsed: G. L. Smith, S. D. Nolan, C. W. Stokes. La. Polytechnic Institute, B.S.M.E., 1947. U.C.L.A., Physics Meteorology, Certificate of Completion, 1943. Cities Service Refining Corp., Draftsman, Jr. Engineer, 1947-date.

RAMON D. SPILMAN, Sulphur; age 28. Endorsed: R. W. Best, R. E. Burgess, G. L. Smith. Southwestern La. Institute, graduate 1948. Gulf States Utilities Co., Asst. Engineer, 6 mos. Cities Service Ref. Corp., Draftsman, Nov. 1948 to date.

EVERETTE E. TONEY, Lake Charles; age 23. Endorsed: R. E. Burgess, S. D. Nolan, G. L. Smith. La. State University, B.S.E.E., 1948. Cities Service Refinery, Draftsman, 1 year.

JOHN L. WANTLAND, Ruston; age 24. Endorsed: B. T. Bogard, H. L. Henry, Jr., R. T. Sessums. University of Oklahoma, B.S.M.E., 1948. University of Wisconsin graduate school, summer 1949. La. Polytechnic Institute, Instructor in Mechanical Engineering since Oct. 1948. Member A.S.M.E., S.A.E., A.S.E.E.

FRANCIS J. WARREN, JR., Baton Rouge; age 24. Endorsed: H. L. Landry, D. F. Latimer, A. M. Melancon. La. State University, B.S.E.E., January 1948. Gulf States Utilities Co., Student Engineer, 1 yr. Industrial Sales Engineer, 1 yr.

FOR TRANSFER FROM STUDENT TO JUNIOR MEMBER

FRED W. THOMASON, graduate of Southwestern Louisiana Institute.

PAPERS AND DISCUSSIONS

DOLLARS AND SENSE*

By James M. Todd

As the second half of the Twentieth Century comes up, and more particularly as the Eighty-first Congress opens its second and final session, we see ourselves caught in a hodgepodge of scientific achievement and irrational conduct; of high ideals and low-grade performances; of industrial aptitude and political confusion. The New Deal affection for an easy way out—for the road to increasing debt—is only leading to more embarrassing complications, and how well we all know it.

The United States is in a favored position, by virtue of tremendous resources, its creative tradition, a period of great inventional progress, rapid growth of the factory system, unprecedented quickening of engineering skill, and war-stimulated productivity developed without the physical destruction of war. We are free from the pinch suffered by other countries. But we had better not push our luck too far.

How many of the new obligations thoughtlessly thrust on "The Government" can be carried without destroying our political system? There is growing concern lest we be slipping into Socialism through the back door, but little is done to keep enterprise free and self-supporting.

The various phases of government controls and planning have been given wide publicity. It boils down to this: The changing and broadening functions of the modern State are part of a developing pattern. Wise decisions, based on experience, must be made as to functions that the State should take over and duties and responsibilities that individuals cannot surrender if liberty is to be maintained.

Determined prosperity hounds have sought comfort in the hope that a rising national income will solve all problems, including that of debt. But it "ain't necessarily so." We had big national income, full employment and great production in 1948, followed by threat of recession in 1949, despite the financial oil poured on by Uncle Sam. There have been deceptive spurts of business during the last 20 years due to artificial financial stimulation without a noticeably improved economy. What is gained by doubling the national income in dollars if the purchasing power of those dollars is simultaneously halved?

* By James M. Todd, member of the Society and Past-President of the American Society of Mechanical Engineers. Presented at a joint meeting of New Orleans Section A.S.M.E. and Louisiana Engineering Society on November 14, 1949.

The outcome is a Tantalus-like performance in which prices, in correspondence with mounting costs, keep rising above the buying capacity of a large segment of the public. In France, people who once earned 1,500 francs a month and out of it bought all the good food they wanted, now earn 100,000 francs a month but eat and live less well.

So the argument for higher wages eventually gets tangled in its own futilities, somewhat like the tax question. Taxes cannot be reduced because the Government spending cannot be curtailed, because the Government must support the national income out of which taxes are paid. Soon or late a vicious circle of that sort must be cut.

All of us have, for a long time, felt the extravagance of Federal spending, and the need of some sort of "reorganization" of our Federal Agencies, particularly looking to economy of administration of those Agencies.

This problem of organization of the Federal Government began officially under President Taft. Mr. Wilson had a try at it. Mr. Harding had a Commission appointed for the purpose (of which Commission Mr. Hoover was a member). Mr. Coolidge attempted to do something about it, and Mr. Hoover himself as President put up a complete program to the Congress. Mr. Roosevelt came in with other Commissions and programs, and Mr. Truman tried it before.

Some progress had been made in the past, but Congress has always been the stumbling block.

The present "Commission" was initiated by The Congress—it is a child of The Congress and not of the Administrative Head of our Government.

The monumental character of the undertaking has fired the imagination of all those interested in proper government. It has inspired the hope that a way might be found to restore order and efficiency in Government, to the end that Government shall continue to be the servant and not the master of the citizens.

Quote N. Y. Times: "The Hoover Plan" will work no miracles. But it does promise definitely to fulfill the hopes of some of us in 'Better Government at a Better Price'. The prompt rallying of public opinion behind that slogan has made a deep and lasting impression on Congress, and is chiefly responsible for the encouraging progress achieved thus far."

The .Commission on Organization of the Executive Branch of the Government will always be known as "The Hoover Commission" because of the quality, integrity, honesty, thoroughness and sincerity of purpose of the Chairman of that Commission.

Mr. Hoover undertook this major assignment while still suffering from an illness brought on by his efforts to feed the world's hun-

gry people. He set out, however, to make this Commission an effective agency of Government.

Instead of hiring an army of so-called experts, he mobilized more than 300 citizens, each an experienced, competent leader in his particular field, to serve the task forces devoted to finding the answer to various special problems. Most of the members of these task forces served their Congress and their country without remuneration—many with contributions from their own personal funds.

In addition there were approximately 200 people engaged in the fact finding processes.

In all, approximately two million dollars was spent, not including the vast amount of donated services. The story developed is one of monumental waste, confusion and bureaucratic empire-building.

In approximately 20 months of study this Commission analyzed the nature, structure, functions, and activities of our sprawling Federal Administration. They prepared 24 task force reports in full detail, issued 19 Commission Reports of approximately 22 million words, making 318 specific findings and recommendations—outlining an orderly pattern of Government, for the better organization of the executive branch. Nothing has been surpressed. No data in the possession of the Commission has been withheld from the people. There has been no evasion of issues, no protective obscurities.

This is typical of the engineer head of this Commission. I believe that his appointment, his handling of this assignment, its acceptance under an opposition party, speaks well for the future of democracy—Our American Way of Life.

In general, and sometimes in specific terms, the Hoover Commission reports describe Federal offices staffed by incompetent, or disgruntled help, plodding away under archiac procedure, at tasks which overlap, or even rival the work done by other agencies; of Government workers in the field bedeviling farmers, veterans and other beneficiaries, with conflicting advice; of faulty planning; loose budgeting; irresponsibility and unfair competition with private business.

The Commission's official existence ended June 12, 1949. Remembering what our First President, George Washington, said: "In proportion as the structure of a government gives force to public opinion, it is essential that public opinion should be enlightened," the Citizens Committee for Reorganization of the Executive Branch of the Government, of which I am a member, was formed as a voluntary, non-partisan, educational movement to keep the facts before the American people.

A potential savings of between three and four billion dollars annually can be made by putting the full report into effect. This was approximately the entire cost of government when Mr. Hoover was President. Four billion dollars means $120.00 for the average American family—$30.00 for every man, woman and child —$1.00 saved out of every $10.00 spent in Government.

This will take time—and determination. An informed citizenship must support this effort. (It has been estimated that half of the recommendations of The Hoover Commission can be put into effect by Presidential order). We must be watchful to prevent unscrupulous political factions from using the findings of this Commission—by half-truths and innuendo—to their own benefit. Already efforts have been made to that end. Congress must enact all told some 10 additional major pieces of legislation to make the recommended reorganization a complete reality.

Our National Budget has expanded from four billion dollars annually under the last Republican Administration to its present level of forty-five billion dollars with Government employees rising from 560,000 to 2,100,000 under the present New Deal Forces. Only 10% of these are in Washington. The rest are all over the world. Government takes $1.00 out of every $5.00 of National income. Government's dept amounts to a mortgage of approximately $7,000.00 on every American family. This is actual—we have promised to pay!

Under Mr. Hoover as President, there were some 50 Government Agencies reporting directly to the President—today there are 85 such agencies reporting to President Truman. (The Civil Service Commission and the Budget Bureau admit 65 only). The Hoover Commission proposes to promptly relieve that pressure, for obviously no one man can properly handle that much detail.

The Commission found that:

> Salaries of the Federal job holders cost the taxpayers $5,650,000,000 in 1948. This cost will be materially increased for 1949 because of recently authorized salary increases. Turnover in Federal employment amounts to 500,000 per year.

In 1931, Federal expenditures were $29.00 per capita. The present fiscal year Government is spending approximately $276.00 for every citizen.

Senator Jos. W. Martin (R-Mass.) said on November 6, "The U. S. is close to real danger. 35¢ of every dollar spent for groceries goes to one of our several branches of government. In England today—gasping for breath—the comparative figure is 40¢."

The Commission suggests that tthe Federal Government could accomplish exactly the same purposes with 10% less personnel—and points out that— with this turnover of 500,000 annually—no

hardship on Government employees by loss of jobs need be introduced to accomplish this economy.

Supervisors in government projects are rated and paid according to the number of workers under them; thus they are encouraged to build up their work forces recklessly and with no regard for the need of additional personnel.

The paper work done on every Government purchase transaction costs more than $10.00 in labor and materials.

Approximately half the several million purchase orders which are issued annually are for less than $10.00 values.

Government records fill 18,000,000 square feet of floor space, which costs $20,000,000.00 per year—with filing equipment to handle these records worth $154,000,000.00. We keep tons of obsolete, useless records and documents in steel cabinets on costly office floors, when they might be stored in cardboard containers in warehouse space for 10% of the present cost.

The current worth of Government personal property in use is not known.

In the Continental United States, the Federal Government has, in storage, military and civilian inventories in excess of $27,000,000,000.00. It has more than 1 million motor vehicles (including military) worth $2,000,000,000.00. It pays out more than $1,000,000,000.00 annually for transportation of property.

In the past 30 years the Federal Government has spent more than $30,000,000,000.00 on the development of transportation facilities.

We spend more than $6,000,000,000.00 per year for new materials, supplies and equipment for the regular activities of Federal, civilian and military agencies.

Federal Agencies engaged in Public Works got $1,300,000,000.00 in appropriations this fiscal year. To complete the works now under construction will require $4,500,000,000.00 additional. Projects authorized by the Congress—but not yet started—will require an additional $7,500,000,000.00.

23,000 persons are working full time in Government personnel offices at a salary cost of $760,000,000.00 per year. These and others working part-time in personnel matters provide a ratio of one personnel worker for every 78 employees. (In many cases this ratio is one to 38).

The Post Office Department, operating under a maze of outmoded laws, had revenues in 1948 of $1,300,000,000.00 with a deficit of $310,000,000.00— or 22% of revenues. Of the 500,000 postal employees, 22,000 are political appointments.

It is estimated that the 1949 Post Office deficit will reach a new high of five hundred million dollars. It costs the Post Office 2½¢ to print and deliver a penny postcard.

The antiquated Postal Accounting System is eight months behind—so no one ever knows the score. The Commission, however, states that two hundred million dollars per year can be trimmed from the Post Office losses.

The Agriculture Department operates as a "loose confederation of Independent Bureaus and Agencies." In one county—of one state—(Georgia) 47 Government employees attached to seven separate field services of the Agriculture Department have been working with 1,500 farmers.

The Federal Budget System is "totally inadequate." Budgeting is a series of Mathematical Mysteries which usually tell what things the money will buy, but very rarely what purpose they will serve. Accounting often lags years behind expenditures and is neither assembled in terms of complete costs nor reveals in terms of performance.

The Secretary of Defense could not hire or fire anyone in the Department except those on his immediate staff; the Secretaries of the Army, Navy and Air Force could go over his head to the President. If military recommendations had been followed, the Defense Budget would be thirty billion dollars this year. This budget request after the services had been informed we could not afford more than fifteen billion dollars for defense.

In 1938 we spent one billion dollars for defense—today we waste that much. Fifteen billion dollars (the defense appropriation for the current fiscal year) is one-third of the whole Federal Budget; it is nearly twice the cost of the whole Government 10 years ago.

Defense alone now costs us $100.00 per person per year (against $2.25 before World War 1 and $8.00 in 1938). Victory by bankruptcy may be the Machiavellian aim of our enemies—burdens such as we are now bearing, if substantially increased, might become intolerable. The advantage of economy, therefore, becomes increasingly important—the premium higher than ever before in our history.

The Veterans' Administration has 15, 432 persons at work handling 7,000,000 insurance policies. This average work load of 450 policies per employee compares with a work load of 1,762 policies per employee in private industry. Veterans' insurance death claims take four times as long to be paid as similar claims with private companies.

Thirty Government Agencies are busy lending, guaranteeing, or issuing loans. The total involved in their investments, commitments loans and insurance amounts to one hundred forty-six billion dollars.

Government Agencies are engaged in wasteful conflicts and competition for labor and materials for public works programs .

In Public Welfare, more than 40 agencies are spending two billion dollars a year on medical service, competing for doctors and funds, operating under diverse policies and trying to give various degrees of medical care to 24 million persons—one-sixth of the population.

$2,500,000,000.00 a year is spent on education—mostly for veterans.

On June 30, 1948, Government hospitals had room for 255,000 patients—with only 155,000 patients on hand—only medical personnel enough to treat 120,000. At the same time, the Veterans' Administration was demanding 38,000 more beds at an additional cost of $280,000,000.00. Let it be said for President Truman that he ordered a 16,000 bed cut-back in the V. A. program—but the House over-rode him and voted funds to continue the hospital building program at full blast.

The over-all picture of Government business operations is one of utter confusion. The Government conducts more than 100 business enterprises including producing, distributing and selling electricity and fertilizers; operating ships and railways; buying and selling farm products ;smelting and selling minerals.

Some Government agencies charge less interest on their loans than the Treasury must pay for the money which it borrows.

Some invest their surplus in Govenrment securities, thus compelling the Government to pay interest on its own investments. Some have excessive accumulations of surplus.

These are a few of the findings of the Commission.

In the light of these facts one might ask "What remedies are prescribed?" The answer would be that generally the Hoover Commission recommended the application of the simple principles of good management. Their recommendations, however, are given in complete detail—department by department, function by function—but taken all in all the Commission recommendatioins make a full tabulation of simple common sense.

The estimated savings are large—but the biggest savings are the ones we cannot estimate.

If we succeed in simply stopping the up-trend in the curve of Government costs—you as engineers know that a value cannot be placed on that savings—because we have no way of telling how much more might have been spent.

The Hoover Report contains some 318 major recommendations. To give you a few more of the highlights of the Commission's recommendations; they suggested that:

The President's Council of Economic Advisors should be replaced by a single advisor.

Government Agencies should conduct a nation-wide recruiting program to get more qualified employees.

There should be some intelligent and speedy procedure for discharging incompetent Government workers.

Supervisors should be rewarded for reducing the number of their employees, in lieu of the present method of pay for supervisors based on the number of employees handled.

An office of General Services could be set up to handle Federal supply, records, management and the operation and maintenance of public buildings. This office would make policies and coordinate procurement procedures for all Government departments.

Many of the existing statues relating to Federal Supply should be repealed.

There should be a nation-wide system of storehouses for items of common use in Government Agencies.

The Post Office Department should be taken out of politics and Postmasters selected by the Department after consultation with community leaders.

Air Mail and other subsidies should be paid by open appropriation—not hidden in postal deficits—so that Congress will know how the money is spent.

Veteran insurance operations should be handled independently from the Veterans' Administration by a separate Government Corporation with the Veterans' Administrator as Chairman.

The Secretary of Commerce should be given authority over all major government transportation activities except regulatory functions, and should have the duty of making over-all route programs for air, land and water transportation.

The Reconstruction Finance Corporation, The Federal Deposit Insurance Corporation and the Export-Import Bank should be transferred to the Treasury Department.

The Labor Department should be given charge of Selective Service and of various other employment services as well as unemployment compensation programs now being administered by the Federal Security Agency.

A United Medical Administration should take over Federal Medical Activities including those of the Veterans' Administration, the Public Health Service and most of those of the Armed Forces in this country.

The Government should get out of the business of direct lending to persons or enterprises. Government businesses should be stripped of all interest-bearing Federal securities and compelled to take non-interest-bearing credit. They should be forced to include interest charges on their money in determining costs of construction projects, and all government business operation reports should "show the amount of taxes" which would have been paid if the projects were private enterprises.

Senate Bill No. 1704 to strengthen and improve the organization of the State Department—passed without dissent in both Houses and was promptly signed by President Truman became **the first major measure** embodying Hoover Report recommendations to be enacted into law. (Public Law 73—81st Congress: 5/26).

Further progress and acceptance of the Hoover Report is evidenced in the enactment into Public Law 36—81st Congress; 6/2—the first step in Better Organization of Armed Services, in creating a much-needed Deputy for Secretary of Defense.

One fact is apparent to close observers—Hoover Report bills made more progress in the 81st session of Congress than any observer would have dared to predict.

As of July 1st four Hoover bills had been enacted into law, a fifth was nearing passage, three more were showing signs of life and 13 additional had been introduced. Remember February 7, 1949 marked the submission of the first section of the report to Congress.

In addition to the State Department measure, and the first step in Better Organization of Armed Services cited—in order of enactment we find (Public Law 109—81st Congress; 6/20). The Reorganization Act of 1949—empowering the President to submit plans for re-alignment of Agencies; enacted into law; along with (Public Law 152—81st Congress; 6/30). The General Services Bill Combining Purchasing Functions, Records, Building Management and War Assets; and the Tydings Bill—Unifying the Armed Services, Centralizing Purchasing, improving Budgeting and Accounting, and creating a Chairman of Joint Chiefs of Staff.

These represent the most important portions of the Hoover Report in terms of Dollar Savings, and again it is interesting to note the rapidity with which Congress accepted its responsibilities in these respects.

On August 24, 1949 Louis Johnson, Secretary of Defense, gave the first tangible evidence of the savings attainable from the recommendations of the Hoover Commission. He announced a personnel slash of 147,000. This will reduce the military budget by two hundred million dollars in 1950 (which was already approximately three months on the way) and by five hundred million dollars in each subsequent fiscal year.

This slash in the Defense Establishment is the most important reduction of Federal personnel in recent years. By this action alone the cost of the Hoover Report was returned to the taxpayers **well over one hundred fold.**

Probably most Americans will agree in principle with the ideas of the Hoover Report—so long as they apply to the other fellow.

We don't like lobbies, but we find good reason for lobbying for our pet ideas .

We are disgusted with subsidies and Federal grants for other people and other communities, but we welcome funds spent on our personal projects and in our own communities.

We want to see the payrolls of Federal, State and local Governments reduced, but we demand services—which someone must perform.

We don't want interference with our businesses—but we think Government should step in and regulate the other fellow.

We despair at the loss of personal liberty in Russia—and we shake our heads about social changes in England, but we don't realize that we are losing our personal own liberties—that social changes we deplore are taking place in our own country in a subtle and indirect manner.

The Hoover Commission reports will help to halt these changes only if millions of citizens change their fundamental attitude toward life.

There seems to be such a general desire for the Welfare State—depending so much on Government—that personal liberties are being curtailed and may be further curtailed unless somewhere deep in the hearts of the American people a responsive chord is struck. The possibilities are apparent. Public support of the Report is necessary—after all American voters do still tell Congress what they—the voters—want.

Obviously the rapid growth of Government expense was in large part due to war. Nobody can subsequently disprove that fact. We have all of the additional obligations that were created in the war itself—some we can never eliminate. Under the most drastic hope and expectation we can never see the budget again below twenty-five billion dollars. The executive agencies have grown up like a series of "lean-to's" all around the President's power. There is no specific constitutional authority for any department of the Government. The whole mechanism is a series of accretions from 160 years of Congressional and Administrative actions, with no effective plan.

A free people must have confidence in their Government—if they expect to stay free.

They have confidence in Government only if they understand and can afford to support it.

Mr. Hoover—when celebrating his 75th birthday—said: "If America is to be run by the people, it is the people who must think."

We as a people have been free because we have been willing to think.

Let us think now—and think well—how best to build for the future—how best to govern ourselves.

We are learning that taxes are not derived from static wealth. Taxes are taken from income—and income derives from production. All these things we want and need, come primarily from this source—not only Government services, military protection, but schools, hospitals, libraries, museums, all the things of permanent value in "Our American Way."

In asking your continuing support of the Hoover Report, I need not remind you that this task force report was signed by nearly all of the foremost figures of World War II—military, industrial and political.

It is in the light of these thoughts that I ask you to view the Hoover Report—to support the public educational program of the Citizens Committee.

Today—in contrast to our early history—we face the danger of a new tyranny—not the tyranny of a stupid monarch across the sea—a more dangerous tyranny—one of our own making and in our own back yard.

We face alternatives. One way lies orderly government, productivity, individual enterprise—free enterprise—and the discharge of huge new world obligations incurred on behalf of peace and freedom—The American Way of Life.

The other way leads to waste, inefficiency—and a fate similar to that which most of us have twice witnessed during our life's experience.

The choice is ours—we must make a decision—we cannot vacillate.

I hope we are not forced to wait for what is now becoming known in economic circles as "Belcher's Law."

Mr. Paul E. Belcher in a statement published by the 1st National Bank of Akron, Ohio, said, "The trend leading to a Welfare State will end whenever—and only when—more than 50% of the voters are required to pay for benefits they themselves do not get.

THE TECHNICAL MAN'S PLACE IN INDUSTRY*

By Cecil Morgan

Technical men are so fully and essentially a part of the industrial picture today that their contributions to industry and hence to the rising standards of living in this country really need no special emphasis. Throughout the industrial history of this country our increased standards of living have come primarily from the contributions made by science and engineering in the development of machines and machine technique which have greatly increased the producing capacity of the individual and hence the wealth of the average individual.

Although the industry that I represent has its full quota of tough, "practical" men who used to run the business without technical assistance, even the most stubborn of these will admit that the technical boys are welcome aids in an increasingly complex business.

In the oil industry we have seen engineering and research, within twenty-five years, change our processing from a crude physical separation of the components of crude oil, followed by rudimentary purification, to a maze of chemical operations and synthetic products, even if you consider only the major products and disregard those we label chemicals.

At the Baton Rouge Refinery approximately 640 products are manufactured, and when it is considered that these are made from a single raw material, the problem of manufacturing these materials to meet rigid specifications and at the same time in the most economical manner can be appreciated. It is the function of the Refinery's technical division to provide the technical assistance required to solve these problems and operate the Refinery efficiently. The Technical Division is organized to carry out operations analysis, economic studies, cost analysis, project coordination, equipment inspection, process engineering, yield and cost work, laboratory development and laboratory control and testing work. Inprovements in manufacturing methods through technological development is a problem to which the Technical Division attaches great importance. Toward this end technical services are extended to cover mechanical operations in the same manner as it has been applied to process operations.

Dr .Robert E. Wilson, Chairman of the Board of Standard Oil Company (Indiana) (and I should like to point out here that my Company, Esso Standard Oil Company and its parent, Standard

* By Cecil Morgan, Vice-President of Esso Standard Oil Co. Presented at the luncheon meeting of Louisiana Engineering Society in connection with the Annual Meeting, January 13, 1950.

Oil Company (N. J.) has no relation to this or any other Standard Oil Company operating in this country) has pointed out in a recent speech that life in America is what it is today largely as a result of engineering and research on a single chemical reaction; the cracking reaction that breaks large hydrocarbon molecules into smaller ones so that the useful supply of gasoline from petroleum reserves has more than doubled. He brought out vividly the tremendous significance of the cracking process by considering that automobiles, trucks, tractors, and airplanes have given the American public freedom of mobility such as mankind had never previously dreamed. The use of such vehicles could never have been expanded to anything like today's quantities and tempos without the doubling or trebling of the gasoline supply that cracking made possible.

It is, therefore, clear that those of us working in the petroleum industry are employed in a field that without research and engineering would bear no resemblance to its present-day self. Furthermore, America would be a vastly different place today without the reasarch and engineering techniques that have built this industry. What is true of petroleum is true of many other industries, your industries, through the breadth of our land and the fabric of our life.

We have only to look about us, read our newspapers and magazines and listen to our radio and view our television to appreciate what engineering has done and is doing in ever greater measure for our well being, comfort and convenience. In fact, and it is a sobering thought, scientific knowledge has carried us so far that the scientists and layman alike are faced with a challenge as to whether we have the moral and spiritual capabilities of using it as a springboard toward undreamed of human progress or destruction.

Probably none of us question how much better we live today than our great-grandfathers. But when we stop and look at some of the specific things that have happened to better our life, the changes seem almost miraculous. For example, this country has needed plenty of food. Well, since 1859 we've cut the labor to produce an acre of wheat from 60 manhours to 4—cutting the costs in half in spite of quadrupled wages. Where eight men once had to toil on the farm to feed two in the factory, now two men with petroleum-operated farm machinery can feed eight in industry.

We've wanted more and better goods for all of us—clothing, automobiles, radios and other things. In the 15 years between 1923-1937 alone, the output in our manufacturing industries per man-hour has increased 50 per cent. In the same period the transportation of goods to consumers was speeded up by increasing railroad efficiency 43 per cent.

No one can question the richness of our life in America today as compared with any other place in the world. The American workman can obtain all the necessities and many of the luxuries of life with a fraction of the effort that is needed in other countries just to exist. Here in America today, we have 7 per cent of the world's population, yet we produce about 45 per cent of the entire world's manufactured goods.

Our superiority, our engineering achievements, in material things has freed us from drudgery. It has given the people of this country the surplus time needed for cultural and spiritual life. Some idea of how well we are using this surplus time is seen when we consider that 13 out of every one thousand Americans are now enrolled in college as compared to 2 in every thousand people in England—a country usually considered as one of the world's most honored citadels of culture.

When we think of facts like these, we cannot help but be impressed by the two important factors in the industrial progress of this country—the technical man and the machine which has come from engineering ingenuity. Less than a hundred years ago only a little more than 6 per cent of all the energy used in our nation was provided by machines. Men and animals did the hard work in those days and got small return indeed for the amount of labor expended. Today, men and animals supply only a small part of our national energy requirements. Now machines supply more than 90 per cent of all the power we use. Machines, one of the great American symbols, helped make possible our miracle of plenty so that today we are able to provide food, clothing and manufactured goods not only for ourselves but for many other peoples in other countries less fortunate than ours.

Now all these facts and statistics would mean little unless they went hand in hand with another very important point. *Our mechanical advance has taken place under a system that equitably divided the benefits.* It is entirely possible of course to increase a nation's productivity without raising the living standards of the majority of its own people. That didn't happen in this country. Here everyone shared in a better living. The benefits have been passed out in many ways. Employees got higher wages; customers got lower prices; industries and business were expanded; owners and managers were given greater incentives to work harder; governmental revenues were increased. Everyone of these distributive methods helped people. Thus, industry in this country has certainly contributed to the progress of human happiness as well as to human production.

In our competitive system, advances, improvements and new demands are being made too rapidly for any manufacturer or industry to depend upon a practical horsesense viewpoint alone to main-

tain his competitive position. The need for and value of scientifically trained men to participate in the day to day functioning to today's industry is irrefutable. The American business system has never before needed intellectual honesty and analytical minds as it does today. Industry, I believe, has recognized that if it is to survive and prosper in a competitive system it must avail itself of those talents.

That this is true can be seen from the type of men that are more and more coming to the fore in American business—men who combine scientific backgrounds and operating experience in many fields of business—men who are neither, in the narrowest sense, solely technical men nor solely "practical" business men, but who are, rather, well rounded executives of the activities of which they are a part.

This does not imply that all technical men or engineering graduates are destined to become executives. Whether he is in engineering or some other field the successful executive is usually born with an aptitude for leadership. Engineering training alone, though it provides a valuable foundation, does not necessarily provide that peculiar quality of leadership which involves the ability to organize and direct others and to solve problems in human relationships. But there are many outstanding examples, many in my own company, of business executives starting in the technical or research field whose admixture of technology and operating experience not only contributes more to a company as a whole in executive ability but a better understanding between the technical and other phases of the business.

Next spring the number of engineering graduates in the nation is expected to be the greatest in the history of engineering education. One estimate indicates some 55,000 will receive B. S. degrees in engineering compared with 42,000 graduates with a B. S. degree in 1949. At Louisiana State University 460 students graduated last spring with B. S. degrees from the College of Engineering, 26 with Master's degrees and 2 with Ph. D. In 1950, 500 will graduate with Bachelor degrees, 40 will obtain master's degrees and 2 are expected to get Ph. D. degrees.

The U.S. Department of Labor has estimated that out of more than 45,000 graduates from the engineering schools of the country this year(presumably the 1950 graduating class) industry will absorb only 18,000 of them.

I do not vouch for the accuracy of these figures, but it is clear that industry cannot absorb all of these young men. Engineering education, however, is an excellent preparation for employment in non-engineering work; in fact, an engineering education has always been recognized as a good foundation for work in many pro-

fessions, and I am not apprehensive that we are educating in America too many engineers.

These young graduates should be encouraged by all of us in business and industry, by those already successfully engaged in the engineering profession, to find places for themselves, to help them realize that they can, under the American system, create their own jobs when no jobs are available. It seems to me that this would be an especially good opportunity to try to convince these young men that their aim should be to increase their individual capacities to serve themselves. In the United States the emphasis is on the individual. Every man has the hope of great rewards—and the freedom to try. The result is that great numbers do try, and inevitably many succeed.

Let's keep these young men headed in the right direction and away from the idea of the "soft security" that Dr. Vannevar Bush decried in a recent address to a M.I.T. convocation. After all, the advances in technology, the progress of men and machines that we have been talking about, have been really due to the freedom under which machines have operated and men have lived in this country. Let's try to give these young engineering graduates an understanding of that rugged pioneer spirit so typical of American industry, of that freedom which has been preserved for us by individuals furnishing proof of the importance of free opportunity. This system of free competitive enterprise—the system in which freedom of opportunity is of first importance—is the main reason why human and mechanical progress has been so outstanding in the United States.

Progress will continue in the field of machine and men. What the machine can do for us under the American system of individual opportunity in the years ahead has no practical limit. Harold Moulton, head of the Brookings Institute, recently estimated that in a hundred years twice the present number of people can be living in the United States on a prosperity scale eight times higher than today's. This unbelievable plenty would be brought about through the continual rise in man-hour output that the machine already has made possible in the past. It is not a pipe-dream, not a casually made prediction. It is a projection of fact—the same rate of progress that the machine has given us before.

What progress man will make in human relations is not so easily charted. The affairs of men always seem to be at a crisis. In review, it is clear that over the years they have become increasingly better. These evidences of better human relations confirm the fact that better machines alone do not make for better living. Better understanding is needed among the men who build, operate, manage, and consume the products of, machines. As that understanding improves, life for all of us grows better.

Compared with the techniques of improving the machine, the solutions of our social problems require more intensive efforts and much more imagination. We know that we know how to solve technical problems, but the particular human relations need that seems the most important at this particular time is advancing understanding. Because engineering is becoming more and more a part of the socio-economic and industrial scene, there is need for the technical men to combine their engineering skill with equal skill in the field of human sciences. In technology we have made great strides; in the human field apparently we are still moving at a snail's pace.

Technical men are said to be so absorbed in engineering problems as to neglect some of the public responsibilities facing business and industry today. I do not know whether the engineering fraternity is more derelict in this respect than any other business or professional group, but the fact is that one of the most serious problems facing business and industry today is to gain and maintain the confidence of the American people if they are to survive as free institutions. Industry has a responsibility to do an engineering job on social as well as industrial progress.

Our system, which has performed so well and which makes possible so much, has somehow neglected to make its own goals clear.

Should we not make every effort to show all men that freedom, competition, initiative and opportunity are priceless things? Is it not our job to make men see that our way means a happy mind as well as a well-fed body—that the American system produces better people as well as better machines?

ENGINEERING BRIEFS

Look, No Hands! Wartime experience with rockets and glide bombs, developments in radar, television, and jet propulsion, and continued large-scale research, all point toward bigger and "better" guided missiles. This enormously complex and expensive ($100 million yearly) activity has little immediate industrial applicability, but it is an important aspect of research today, and is directed toward such fantastic objectives that the scientific techniques turned up may eventually have important implications for peacetime industry.

The only guided missiles to reach large-scale wartime use, except for the primitive Japanese "suicide" planes, were the ingeniously contrived German V-2 supersonic guided rocket and its predecessor, the V-I pulse-jet "buzz bomb," which was controlled by an automatic pilot corrected by a compass and an altimeter. The German "Wasserfall" and "Rheintochter" radioguided anti-aircraft rockets might have become formidable obstacles to the heavy bombing of Germany if the manufacturers had had a few more months. The American winged glide bomb, "Bat," controlled by a built-in radar set keyed to the target by radar in a parent plane, had several naval successes in the Pacific near the end of the war. Also highly successful was the American "Azon," an adapted bomb whose fin surfaces were controlled by radio from a parent plane.

Present work in the United States stems from the German developments, and has three major objectives. One is a short-range missile to be launched from the ground, shipboard, or a moving plane at a moving target, such as an attacking bomber or another missile. An example is a ten-foot winged rocket-powered bomb, with a warhead designed to explode when it comes close enough to enemy aircraft. This "Firebird" is so small and fast that it cannot be followed by enemy radar. It is launched from a jet fighter or bomber. Another objective is a medium-range ground-to-ground type of missile, which might be launched from a ship or shore installation within a few hundred miles of its fixed target. The Navy has recently demonstrated two such missiles launched from submarines off Hawaii, to show that subs can deliver atom bombs. These 30-foot missiles, called "Loons," are pulse-jet powered, weigh seven tons, travel 460 miles an hour, and have a range of 100 to 200 miles. The third objective is the ground-to-ground rocket-powered missile which could fly several thousand miles by progressively dropping burnt-out portions of its body. The efficiency of such missiles versus conventional bombing is however questionable.

When a missle's target may be moving at supersonic speed or located thousands of miles from the launching site, the problem of guidance seems almost insurmountable, and little more than rudimentary control has yet been achieved. Short-range missiles can be oriented to follow radioed instructions of electronic computing devices, which observe both target and missile by radar. Radar observation, like television broadcasting, is limited by the horizon. The Loran navigation system, by which land-based radio stations now tell ships their locations, might guide a missile for some thousand miles, but is open to enemy jamming, as are other kinds of radio and radar control. Possible long-range guidance methods, not subject to jamming, include automatic celestial navigation and systems based on the earth's gravitational field using a new gyroscope as a standard. To bring the missle to the bull's-eye at the end of the run, a selfcontained television "eye" or radarscope could observe the target and adjust the course to follow a given plan.

The reaction chambers of guided missiles, whether driven by ram-jets, turbo-jets, pulse-jets, or rockets, become extremely hot, and must either be cooled or made of new alloys, containing such materials as niobium, chromium, wolfram, nickel, and cobalt, as well as ceramics combinations. This work is vitally interesting to modern aircraft designers, metallurgists, and heat-transfer specialists.

Fuel Handling

Fuels for missile motors, including alcohol-oxygen mixtures and more complex chemicals, do not seem to offer as many undeveloped opportunities as do other phases of the problem, although nuclear power plants are the subject of one large-scale, but currently unpromising, investigation. Much remains to be done, however, in handling fuels, One outstanding achievement was the use, in the German V-2, of small pumps which could spray within a minute ten tons of liquid oxygen and alcohol in the form of a fine mist into a combustion chamber, roughly spherical and about twice the size of a basketball. Designers of long-range, rocket-type missiles must also provide an instantaneous fuel cut-off to coast their 5000-mile-per-hour vehicle accurately to its target.—*Industrial Bulletin of Arthur L. Little, Inc.*

Rainbows At Work. Thirty years ago the chemical analyst relied mostly on his own dexterity and limited laboratory equipment; today he is offered a flood of new instruments embodying the latest techniques, usually developed in the course of fundamental research. Most of these instruments use one kind of spectroscopy or another and are usually designed to meet specific problems of industrial analysis quickly and simply. Their development has involved growth of an outstanding spectrographic instruments industry in the United States.

Spectroscopy involves determining the amount and kind of radiation given off or absorbed by the sample in question. The chemical constituents of the sample may radiate "light" of a characteristic "color" and intensity, or absorb specific wave lengths. The nature of the material determines whether the analysis is to be made with ultraviolet (short wave lengths), visible light (middle range)), or infrared (longer wave lengths) and whether by emission or absorption methods.

Analysis of samples containing metallic elements is achieved by emission spectroscopy with visible or ultraviolet light. The sample is placed in an electric arc, and the light given off by the excited metal is dispersed into a spectrum and identified. Because the intensity of radiation coming from a given element is quantitatively related to the number of atoms emitting it, the amount of the element present in the sample can be determined. The measurement is most commonly done photographically, but there are now direct-reading instruments in which the intensity of spectral lines is measured, often within a few seconds, by phototubes, with the presence and concentration of as many as twelve elements reported simultaneously.

Absorption spectroscopy is preferred when the molecules must not be destroyed. Here the light absorbed by the sample is measured; the nature of the absorption depends on the type of molecule present in the sample, and the amount on the number of molecules present. The region of the spectum used for absorption spectroscopy depends on the type of compounds being analyzed. The visible and ultraviolet regions give specific results of high accuracy for specialized classes of organic compounds, such as dyestuffs and benzene-like compounds. On the other hand, many substances show little or no absorption in these ranges, but absorb strongly the longer infrared waves. All carbon compounds, for example petroleum derivatives and plastics, can be investigated by this technique. The molecular structures of some materials, such as penicillin, have been revealed by infrared spectroscopy, supplemented by a variety of other techniques.

Still untried for general industrial applications are instruments for microwave spectroscopy, a by-product of wartime radar research. Some molecules absorb radar waves, which are longer than, but similar to, the other kinds of radiation, giving highly specific results because of the sharpness of the absorption and the high precision—one part per million—with which the absorbed wave lengths can be measured. The National Bureau of Standards has recently announced a new clock for setting the nation's time standards which utilizes the microwaves absorption of the ammonia molecule to control time measurements to a far greater precision than previously obtainable. A further advantage of the technique is the small quantity of material that can be detected

—less than a millionth of a gram under optimum circumstances. Although there as still many practical problems to be overcome, the equipment offers promise as another member of the spectroscopic team.

A second technique new to industry is Raman spectroscopy, which seems likely to play an important though rather restricted rôle. This effect, which involves the scattering of light, gives information similar to that obtainable with infrared absorption spectroscopy. In general, infrared absorption techniques are somewhat simpler and quicker, but the Raman effect may be more useful with water solutions, since water is opaque to infrared radiation. An outstanding advantage of Raman spectroscopy is that the effective spectral range is somewhat wider than that of present infrared spectrometers.

Mass Spectrometer

One of the newer instruments, the "mass spectrometer," is actually not an optical instrument, in contrast to the other types of spectrometers, but analyzes a sample according o the molecular weights of the substances composing it. A charged molecular particle from the sample is propelled by an oppositely charged plate in the instrument. This moving particle is deflected by an imposed magnetic field, with the amount of deflection dependent on the molecular weight, hence the identity, of the material. The instrument is called a spectrometer because the images of the attracted particles, when collected on a photographic plate, instead of on the charged plate of the instrument, gives the appearance of a line spectrum. Although the mass spectrometer is the most sensitive of all analytical instruments for many special applications, such as analysis of petroleum components, it is not always well suited for general qualitative analysis of a totally unknown sample. It is successfully used as a member of the instrumental team, to complement, the other instruments with respect to sensitivity and speed.—*Industrial Bulletin of Arthur D. Little, Inc.*

Steam Auto Revival . . . "Steam-driven cars are a practical proposition," according to the British Light Steam Power Society. Individual engineers of the society already have experimented with a steam automobile and one member has completed a unit and carried on road tests.

In the early days of the automobile the steam generator design competed with gasoline engines, but it was scrapped twenty-three years ago as inefficient. Current interest in the steam-driven car in England is aroused by the need to save dollars on imported gasoline. The society said progress in motor design may enable it to pioneer a successful rebirth of a steam car with a soundless engine and powerful acceleration.—*"The Lamp."*

1950

MEMBERSHIP LIST

C. M.: Charter Member
H. M.: Honorary Member
L. M.: Life Member
A.: Affiliate Member
J.: Junior Member

— A —

ALFRED E. ABAUNZA, (1938), *Civil Engineer*, Partner, Ajax Machine Works, 415 Eighth St. *Mail*: 7724 Burthe St., New Orleans, 18.

HARRY I. ABBOUD, (J), (1949), *Chemical Engineer*, Plant Engineer, Thermatomic Carbon Co., Sterlington. *Mail*: 520 DeSiard St., Monroe, La.

MACK ABRAHAM (J), (1948), *Mechanical Engineer*, Jr. General Engr., Cities Service Refining Corp. *Mail*: 402 Hodges St., Lake Charles, La.

CARL E. ABRAHAMSON, (1940), *Civil Engineer*, Bridge Detailer, La. Dept. of Highways. *Mail*: P. O. Box 1002, Baton Rouge 2.

NILS C. C. ABRAHAMSON, (1944), *Civil Engineer*, Sr. Project Engr., Department of Highways, Box 807, Bogalusa. *Mail*: P. O. Box 1002, Baton Rouge, La.

MICHAEL C. ABRAHM, (1936), *Mechanical Engineer*, Principal Mechanical Engineer, New Orleans Public Service. Home: 325 Fairway Drive. *Mail*: 317 Baronne St., New Orleans, 9.

AARON ABRAMSON, (1946), *Mechanical Engineer*, Vice-Pres., Petrolane Gas Co., Inc., Home: 1611 Audubon St. *Mail*: P. O. Box 4067, Sta. F, New Orleans.

FARRELL W. ADAMS (J), (1948), *Mechanical Engineer*, Air Conditioning Engr., United Gas Corp. Home: 421 Charles St. *Mail*: Box 435, New Iberia, La.

FRED R. ADAMS, (1940) *Electrical Engineer*, District Engineer, Southern Bell Tel. and Tel. Co. Home: 3258 Morning Glory Ave. *Mail*: 555 Florida St., Baton Rouge, La.

FELIX L. ALCUS, (1922), *Mechanical Engineer, Registered Miss.*, owner, Engineering Specialty & Mfg. Co., Home: 1621 Audubon St. *Mail*: 623 So. Peters St., New Orleans, 12.

LEWIS SCHERCK ALCUS, (1923), *Mechanical Engineer*, Chas. Dennery, Inc., 524 Magazine St. *Mail*: 474 Audubon St., New Orleans, 18.

ALBERT M. ALEXANDER, (1944), *Civil Engineer, Registered La. and Miss.*, Consulting Engineer. Home: 2210 Octavia St., *Mail*: 308 Balter Bldg., New Orleans 12.

LESTER F. ALEXANDER, (1915), (L. M.), *Civil Engineer*, Partner, Lester F. Alexander Co., Contractors. Home: 28 Audubon Place. *Mail*: 830 Audubon Bldg., New Orleans 16.

TOM E. ALEXANDER, (1946), *Mechanical and Electrical Engineer*, Sales and Service Engineer, Crane Packing Co., *Mail*: 7741 S. Claiborne Ave., New Orleans 18.

JOHN W. ALLEE, (J), (1948), *Civil Engineer, Registered La.*, Instructor, Tulane University, Home: 208 Stella St. *Mail*: Tulane University School of Civil Engineering, New Orleans 18.

HUNTER S. ALLEN (A), (1948), Highway Engr., Spec. Representative, Black Rogers & Co., 316 La. Nat. Bank Bldg. *Mail*: 7236 Goodwood Ave., Baton Rouge, La.

JACK W. ALLEN, (1949), *Mechanical Engineer*, Plant Engineer, The Celotex Corp., Marrero, La. *Mail*: 236 Ridgewood Drive., New Orleans 20.

JAMES E. ALLEN, (J), (1949), *Civil Engineer, Registered La.*, Engineer-Draftsman, E. M. Freeman & Associates, 416 Texas Eastern Bldg. *Mail*: Box 592, Rt. 4, S. Lakeshore Drive, Shreveport, La.

ROBERT D. ALLEN, (J), (1947), *Mechanical Engineer*, Service Engineer, Gulf Engineering Co., 1000 S. Peters St. *Mail*: 3300 Upperline St., New Orleans 15.

WINFIELD W. ALSUP, (1949), *Civil Engineer*, Chief Engineer, J. B. Beaird Co. *Mail*: 733 Stephenson St., Shreveport, La.

WALTER J. AMOSS, (1943), *Civil Engineer*, Vice-President, New Orleans Public Service Inc. Home: 1571 Henry Clay Ave. *Mail*: 317 Baronne St., New Orleans, La.

DOUGLAS S. ANDERSON, (H. M.) (L. M.), (Jan. 1, 1909), Dean Emeritus, College of Engineering, Tulane University. *Mail*: Ogunquit, Me.

ALVIN P. ANDREWS, (1947), *Surveyor, Registered La.*, La. Dept. of Public Works. Home: 203 Peach St., *Mail*: P. O. Box 1206, Monroe, La.

PHILIP P. ANGIER, (1942), *Highway Engineer*, District Construction Engineer La. Dept. of Highways. *Mail*: Box 1482, Lake Charles, La.

JULIUS B. ARBOUR, (J), (1947), *Mechanical Engineer*, Maint. Engr. Esso Standard Oil Co. of N. J., La. Div. *Mail*: 2952 Belmont Ave., Baton Rouge, La.

ROBERT L. ARGUS, (1938), *Civil Engineer, Registered La.*, Mechanical Engineer. Asst. Supt. Pan American Southern Corp., Destrehan, La.

WILBERT L. ARGUS, (1938), *Civil Engineer*, Sales Manager, Woodall Industries, Inc., Home: 706 21st St. *Mail*: Box 673, Laurel, Miss.

ALANSON J. ARNOLD (J), (1948), *Mechanical Engineer*, Project Engineer, The Flintkote Co. *Mail*: 4509 Toulouse St., New Orleans 19.

— B —

BENTON P. BABIN, (1945), *Electrical Engineer*, Sales Engineer, Westinghouse Electric Corp., 238 S. Saratoga St. *Mail*: 1241 N. Rampart St., New Orleans 16.

LIONEL J. BABIN, JR. (J), (1948), *Mechanical Engineer*, Vice-President, B & M Corp. P. O. Box 6, Houma, La.

JEROME C. BAEHR, (1931), *Civil Engineer, Registered La.*, Flood Control Branch, Eng. Div., U. S. Engineers, New Orleans District, Foot of Prytania St. Home: 3502 Octavia St. *Mail*: Foot of Prytania St., New Orleans.

GEORGE J. BAILEY (1948), *Mechanical Engineer*, Asst. State Mtce. Engr., La. Dept. of Highways. 1109 May St., Baton Rouge.

HARRY T. BAILEY, JR. (1948), *Mechanical and Electrical Engineer*, Ind. Sales Engr..La. Power & Light Co. *Mail*: 210 Norland Ave., New Orleans 14.

JOE M. BAKER (1948), Production Supt., Union Sulphur Co. *Mail*: 22 Keever St., Sulphur, La.

O. J. BAKER, (1947), *Architect*, Director Low Cost Housing Research Project, Louisiana State University. *Mail*: College of Engineering, L. S. U., Baton Rouge, La.

ALONZO A. BALCOM, JR. (1940), *Civil Engineer, Registered La.*, President, Balcom Supply Co., Inc., 2950 North St. *Mail*: 4608 Capitol Hts. Ave., Baton Rouge.

AL BALTAZAR, (J), (1947), *Mechanical Engineer*, 2701 Gladiolus St., New Orleans 17.

WARREN K. BANKSTON (1948), *Mechanical Engineer*, N. O. Public Service Inc. *Mail*: 5958 Argonne St., New Orleans 19.

E. H. BARENTINE (1948), *Surveyor*, Crosby Chemical Co. *Mail*: P. O. Box 51, De Ridder, La.

CHARLES C. BARNARD (1937, *Civil Engineer, Registered La.* Partner, Barnard & Burk, Consulting Engineers. Home: 2247 Oleander St. *Mail*: 314 Triad Bldg., Baton Rouge.

ROBERT LELAND BARNES (1942), *Civil Engineer, Registered La.* Senior Project Engr., La. Dept. of Highways. *Mail*: Fordoche, La.

WILLIAM WALTON BARNES, JR. (1948), *Electrical Engineer*, 818 Sixth St., Lake Charles, La.

VAN A. BARNETT, (1949), *Civil Engineer, Registered La.* Consulting Engineer. Private Practice. Home: P. O. Box 158, Mooringsport. *Mail*: 214 Simon Bldg., Shreveport.

WILLIAM C. BARNWELL (1948), *Mechanical Engineer*, Asst. Power Plant Engr., Gaylord Container Corp. *Mail*: 883 N. Border Drive, Bogalusa.

HAROLD T. BARR (1947), *Agricultural Engineer*, Head Agri. Eng. Research, La. State University. Home: 409 Cornell Ave. *Mail*: Agri. Eng. Bldg., L. S. U., Baton Rouge.

ROBERT H. BARTHOLOMEW (1948), *Chemical Engineer*, Jr. Technologist, Shell Oil Co., Inc., Norco, La.

Z. W. BARTLETT, (1949), *Mining Engineer, Registered Texas*. Asst. General Superintendent, Freeport Sulphur Co., Port Sulphur, La.

JOHN C. BARTLEY, (1940), *Civil Engineer*, Partner, Bartley & Binnings. Home: 1711 Milan St., Apt. D. *Mail*: 708 Interstate Bldg., New Orleans 12.

JOHN W. BARTON, (1949), *Chemical Engineer*, Vice-Pres. & General Manager Anderson-Dunham Co., Inc., Box 1028. *Mail*: Route 2, Baton Rouge, La.

RAYMOND P. BASSICH, (A), (1929), Manager, N. O. Blue Print & Supply Co., Inc. 2929 Octavia St. *Mail*: 824 Union St., New Orleans 12.

JOHN HENRY BATEMAN, (1947), *Civil Engineer, Registered La. and Mich.*, Professor of Civil Engineering, Louisiana Sttae University. 418 E. State St. *Mail*: Box 8699, L.S.U., Baton Rouge, 3, La.

J. O. BAUMAN (A), (1947) *Station Electrician*, Gulf States Utilities Co. *Mail*: 2542 Jackson Ave., Baton Rouge 7.

JOHN W. BAXTER (J), (1948). Junior Membership Award Winner, Louisiana State University: *Mail*: 1048 W. State St., Baton Rouge, La.

CLAYTON M. BEAMER (1945), *Chemical Engineer*, Sales Mgr., Enjay Co., Inc. *Mail*: 45 Jefferson Ave., Maplewood, N. J.

THOMAS H. BEAN, JR., (1946), *Electrical Engineer*, Consulting Engineer, 813 Hildago St., New Orleans 19.

WILLIAM K. BECNEL (1941), *Civil Engineer, Registered La.* R. E. McKee Contractor. *Mail*: 1218 Pine St., New Orleans 18.

JOHN G. BEDELL, (1946), *Civil Engineer*, Partner, V. J. Bedell Co. 18 Hydrangea Lane, N. O. 17. *Mail*: 840 Union St., N. O. 12.

VICTOR J. BEDELL, (1936), *Civil Engineer*, Partner, V. J. Bedell Co., Consulting Engineers, 840 Union St. *Mail*: 63 Egret St., New Orleans 19.

HARVEY M. BEGUE (A), (1944), *Design Draftsman*, Esso Standard Oil Co. *Mail*: 7003 Goodwood Ave., Baton Rouge, La.

BEN H. BELL, (L.M.), (1920), *Operating and Electrical Engineer*, New Orleans Public Service Inc., 317 Baronne St. *Mail*: 4604 S. Derbigny St., New Orleans 15.

R. F. A. BENSON, (1938), *Mechanical Engineer*, Mgr. Employee Relations, Gulf Refining Co., Maison Blanche Bldg. *Mail*: 4465 Music St., New Orleans 17.

LOUIS A. BERGERON (J), (1949), *Civil Engineer*, Head Right-of-Way Draftsman, La. Dept. of Highways. Mail: 3507 Seneca St., Baton Rouge, La.

CHAILLE CLAUDE BERNARD, (1943), *Civil Engineer Registered Miss.*, Acct. Project Control Engineer, La. Dept. of Highways. *Mail*: 2040 Oleaner St., St., Baton Rouge.

JOHN H. BERNHARD, (L. M.), (1912), *Civil Engineer*, Consultant on Harbors and Waterways. *Mail*: 26 Orient Ave., Newton Center, Mass.

GEORGE BERTRAM, (1945), *Mechanical & Electrical Engineer*, Asst. Dept. Head, Cracking Dept., Shell Oil Co. Inc. *Mail:* Norco, La.

ROY W. BEST (1947), *Mechanical Engineer*, Mech. Supt., Cities Service Refining Corp. *Mail*: 1920 Seventh St., Lake Charles, La.

ALLEN W. BETZ, (1945), *Chemical Engineer*, Industrial Sales Mgr., Gulf Engineering Co., Inc., 916-30 S. Peters St. *Mail*: 215 Rose Ave., New Orleans 20.

MALCOLM BIENVENU (J), (1949), *Electrical Engineer*, 514 Voorhies St., Lafayette, La.

CECIL W. BIGGS, (1949), *Civil Engineer*, Route 4, Winnsboro, La.

ARTHUR E. BIGLER (1948), *Electrical Engineer*, Office Engr., La. Power & Light Co. *Mail*: 9530 Stroelitz St., New Orleans 18.

F. N. BILLINGSLEY, (L. M.), (1915), *Consulting Civil Engineer, Registered La. and Ala.*, Billingsley Engineering Corp. Home: 2122 Jefferson Ave. *Mail*: 409 Cigali Bldg., New Orleans 12.

CHARLES BITTENBRING III, (J), (1940), *Civil Engineer*, Vice-President. Smith-Bittenbring, Inc., P. O. Box 731, Cedartown, Ga.

F. B. BLACKSTONE, (1944), *Mechanical Engineer*, Power Plant Supt. Freeport Sulphur Co. *Mail*: c/o Freeport Sulphur Co., Port Sulphur, La.

HUGH M. BLAIN, JR., (1941), *Gas Engineer*, Supt., Gas Distribution Division, New Orleans Public Service Inc., 2324 Octavia St. *Mail:* 527 Magnolia St., New Orleans 13.

SYLVESTER CLARENCE BLAIZE, (1945), *Civil Engineer*, Head, Levee Mtce. & Flood-Fight Planning Section, U. S. Engineer Dept., Foot of Prytania St. *Mail*: 305 Lowerline St., New Orleans 18.

FELIX J. BLANCHARD (J), (1949), *Mechanical Engineer*, Box 64, Labadieville, La.

GLEN P. BLANCHARD (J), (1949), *Mechanical Engineer*, Estimator, C. B. Construction Co., 1085 Choctaw Road. *Mail*: 4633 Underwood Ave., Baton Rouge, La.

JOHN G. BLANCHE, (1949), *Mechanical Engineer*, Assistant Professor of Mech. Eng., Louisiana State University. *Mail*: 3239 Morning Glory Ave., Baton Rouge, La.

ROBERT F. BLAND (J), (1948), *Civil Engineer, Registered La.* R. P. Farnsworth Co., Inc. *Mail*: 1626 Napoleon Ave., New Orleans 15.

WALTER E. BLESSEY, (1943), *Civil Engineer*, Associate Prof. of Civil Engineering, Tulane University. Home: 11 Forrest Ave. *Mail*: College of Engineering, Tulane University, New Orleans 18.

ALBERT R. BOELTE, (1937), *Civil Engineer*, Chief Structural Designer, Board of Commissioners, Port of New Orleans. *Mail*: 6032 Patton St., New Orleans 15.

J. EDWIN BOELTE, (A), (1945), *Electrical Engineer*, District Manager, Sperry Gyroscope Co., Inc., 549 Baronne St., New Orleans. *Mail*: 19 Maryland Drive, New Orleans 18.

BEN T. BOGARD, (1949), *Mechanical Engineer*, Professor of Mechanical Engineering, Louisiana Polytechnic Institute. Home: 507 S. Trenton St. *Mail*: L.P.I., Ruston, La.

HENRY BOH, (1949), *Civil Engineer*, Owner, Boh Brothers Contsruction Co., 2400 Cypress St. *Mail*: 5430 Canal Blvd., New Orleans.

WILLIAM H. BOHNE, (1940), *Civil Engineer, Registered La.* Building Estimator, R. P. Farnsworth, P. O. Box 2029. *Mail*: 769 Mouton St., Baton Rouge, La.

CLYDE E. BOLTON (1947), *Architectural Engnieer*, Partner, R. S. McCook, Lake Charles. *Mail*: 80 Beech Road, Maplewood, La.

NED J. BOND, JR., (J), (1948), *Agricultural Engineer*, Hawthorne, Inc., Welch, La.

W. RAY BOOTH (J), (1949), *Chemical Engineer*, Engineer, Interstate Natural Gas Co., Inc., Box 1482, Monroe, La. *Mail*: Box 531, Opelousas, La.

CONRAD O. BOSTROM (J), (1947), *Civil Engineer, Registered La.*, Engineer, Bartley & Binnings, General Contractors, 433 Gravier St. *Mail*: 765 Hickory Ave., Harahan, La.

CLARENCE N. BOTT, (1927), General Contractor, 2551 Metairie Road, New Orleans.

HAMILTON J. BOUDREAUX, JR., (1944), *Mechanical Engineer*, Assistant Chief Engineer, Godchaux Sugars Inc. *Mail*: Box 386, Reserve, La.

ROSCOE H. BOWERS, 1946), *Electrical Engineer*, Asst. Chief Engineer, Kieckhefer Container Co.. Delair, N. J. *Mail*: 708 Filbert St., Palmyra, N. J.

JAMES A. BOX, JR., (1949), *Chemical Engineer*, Gaylord Container Corp. *Mail*: Box 647, Bogalusa, La.

CHARLES R. BRACKIN (J), (1949), *Mechanical Engineer*, Student Engineer, La. Power & Light Co., 142 Delaronde, New Orleans 14. *Mail*: 309 Verdun St., Lafayette, La.

WILLIAM G. BRANCH, (1949), *Civil Engineer*. District Maintenance Engineer, La. Dept. of Highways, Hammond, La. Home: 959 Rittiner Drive, Baton Rouge, La.

SHIRLEY C. BRASELMAN (L.M.), (1919), Vice-President, American Creosote Works, 1725 Palmer Ave. *Mail*: 1305 Dublin St., New Orleans 18.

VAL D. BREAUX, JR. (J), (1949), *Civil Engineer*, Chief of Party, La. Dept. of Highways. *Mail*: 1010 Lafayette St., Lafayette, La.

GRADY L. BREECE, (1945), *Structural Engineer*, Chief Engineer, McWilliams Dredging Co., 860 St. Charles Ave. *Mail*: 3105 Metairie Road, New Orleans 20.

JOHN O'R. BREEDEN (J), (1949), *Mechanical Engineer*, 3716 La. Avenue Parkway, New Orleans, La.

EDWARD S. BRES, Major Gen. USA, (1925), *Civil Engineer*, Secretary of Army Personnel Board. Home: Wardman Park Hotel, Washington, D. C. *Mail*: 5C-522, Pentagon Bldg., Washington, D. C.

RICHARD H. BRETZ, (1949), *Chemical Engineer*, Esso Standard Oil Co., La. Div. Home: 3415 Adams Ave., Baton Rouge, La.

BARNET BREZNER, (1944), *Civil Engineer, Registered, La. and Mich.*, Private practice. *Mail*: P. O. Box 654, Alexandria, La.

WARREN J. BRIGNAC (J), (1949), *Mechanical Engineer*, Instructor in Engineering Mechanics, La. State University. *Mail*: College of Engineering, L. S. U., Baton Rouge.

LEO E. BRODERS, (1946), *Chemical Engineer*, Partner and Sales Mgr., Davis Mfg. Co., 1075 S. Clark St. *Mail*: 1834 S. Jeff. Davis Parkway, New Orleans 15.

ERNEST N. BRODNAX, (A), (1944), *Highway Engineer*, Party Chief, La. Dept. of Highways, Baton Rouge, La. *Mail*: 500 McCreight St., Bastrop, La.

AUGUST J. BRODTMANN, (1936), *Chemical Engineer*, Property Accountant Engineer, N. O. Public Service Inc. Home: 14 Egret St. *Mail*: 317 Baronne St., New Orleans 9.

JAMES P. BRODTMANN (A), (1932), Sales Representative, Gulf States Creosoting Co. Home: 417 Eliza St., Algiers 14. *Mail*: 901 United Fruit Bldg., New Orleans 12, La.

V. HUBERT BROGDON, (1947), *Mechanical Engineer*, Technical Assistant to General Supt., Freeport Sulphur Co., Port Sulphur, La.

ROBERT TERYL BROOKS, (1942), *Civil Engineer*, Assistant District Engineer, Dept. of Highways. *Mail:* Box 595, Lafayette, La.

JAMES K. BROTHERS, JR. (J), (1949), *Mechanical Engineer*, Columbian Gasoline Corp. *Mail*: 708 Glenmar St., Monroe, La.

ANDRE R. BROUSSEAU, (1935), *Engineer of Mines,* District Representative, J. A. Zurn Mfg. Co. Home: Camilia St., New Iberia. *Mail:* 822 Perdido St., New Orleans 12, La.

DAVID H. BROWN, (1947), *Mechanical Engineer,* Standard Oil Co. of N. J., La. Div. *Mail:* 2780 Reymond Ave., Baton Rouge 15.

HARWOOD I. BROWN, (1948), *Mechanical and Electrical Engineer,* Mech. Engineer, Celotex Corp. *Mail:* 622 Seguin St., New Orleans 14.

HENRY NEWTON BROWN, (1948), Highway Engineer, Senior Project Engr., La. Dept. of Highways. Home: 1235 Traffic St., Bossier City. *Mail:* P. O. Box 260, Shreveport, La.

JOHN A. BROWN, (1949), *Project Engineer,* La. Dept. of Highways. *Mail:* 2169 Aline St., Baton Rouge, La.

VERNON M. BROWN, (J), (1948), *Mechanical Engineer,* Southern Alkali Corp. *Mail:* 627½ Cleveland, Lake Charles, La.

JOHN S. BROYLES, (1949), *Civil Engineer, Registered, Texas.* Engineer, United Gas Pipe Line Co., Box 1407. *Mail:* 156 Fremont St., Shreveport 67, La.

LAWRENCE C. BRUNE, (1933), *Mechanical and Electrical Engineer,* Assistant Engineer, U. S. Engineers, 2nd New Orleans District, Ft. of Prytania St. *Mail:* 4625 Spain St., New Orleans 17.

RAY E. BURGESS, (1945), *Civil Engineer, Registered, La. and Tex.* Technical Asst. to Chief Engineer, Cities Service Refining Corp. *Mail:* 3643 South St., Lake Charles, La.

RAY WESLEY BURGESS, (1948), *Mechanical Engineer,* Resident Engineer. Stone and Webster Engineering Corp. *Mail:* 3258 Riley St., Baton Rouge, La.

JACK S. BURK, (1944), *Civil Engineer,* Partner, Barnard and Burk, Consulting Engineers, 314 Triad Bldg., Baton Rouge.

JOHN S. BURKE (1946), *Heating and Ventilating Engineer,* Dealer Coordinator, N. O. Public Service Inc. *Home:* 3817 Gen. Taylor St. *Mail:* 317 Baronne St., New Orleans 9, La.

JOHN O. BURNETT, (1944), *Civil Engineer,* Construction Engineer, Private Practice, 510 Lafayette St., Baton Rouge. *Mail:* Denham Springs, La.

RICHMOND S. BURNSIDE, JR. (J), (1949), *Civil Engineer, Registered La.* Chief of Party, La. Dept. of Highways, 302-B N. Cedar St. Tallulah, La.

CHARLES A. BURTON, (1945), *Mechanical Engineer,* Asst. Plant Engineer, The Flintkote Co., 4500 N. Galvez St. *Mail:* 238 E. Livingston Place, New Orleans 20.

SOULE BUTLER, (1945), *Civil Engineer, Registered, La.* City Engineer, Alexandria, La. *Mail:* City Hall, Alexandria, La. Home: 521 Park Place.

WALTER C. BYRNE, JR. (J), (1947), *Electrical and Mechanical Engineer,* Research Engineer, Tulane University. *Mail:* 82-G Stadium Place, New Orleans 18.

— C —

D. RALPH CAFFERY (J), (1949), *Civil Engineer.* Cost Accountant, Farnsworth & Chambers Const. Co. *Mail:* 7930 Valerye St., Houston 12, Texas.

SAM CALHOUN, JR., (J), (1949), *Electrical Engineer,* Commercial Service Rep., La. Power & Light Co. *Mail:* 219 Broadway, New Orleans 18.

SEYMOUR CAMBIAS, JR., (J), (1947), *Electrical Engineer,* Asst. Elect. Engr., N. O. Public Service Inc. *Mail:* 1822 Gentilly Blvd., New Orleans 17.

ANDREW L. CAMERON (1948), *Electrical Engineer,* Shell Oil Company, Norco, La.

CHARLES ROLLIN CAMP, JR. (J), (1948), *Civil Engineer, Registered La.* Engineer, Keller Construction Corp., 7900 Palm St. *Mail:* 2024 Milan St., New Orleans, 15.

SALVADOR J. CAMPAGNA (J), (1949), *Mechanical Engineer,* Corps. of Engineers, New Orleans, La. *Mail:* Route 1, Box 158, Chalmette, La.

PHILIP H. CAMPBELL, (1926), *Civil Engineer,* Chief Engineer, Union Industrial & Astilleros Barranquilla. *Mail:* Apartado Aereo No. 319, Barranquilla, Colombia.

KOHLMAN CAMPELL, (1949), *Chemical Engineer,* Export Mgr., International Lubricant Corp., Southport, La. *Mail:* 5537 Willow St., New Orleans 15, La.

GEORGE S. CANNON, (J), (1949), *Electrical Engineer,* Junior Electrical Engineer, Gulf States Utilities Co. *Mail:* 304 Brosig St., Navasota, Texas.

C. GLENN CAPPEL (L. M.), (1915), *Civil Engineer, Registered La. and Tex.* Vice-President, W. Horace Williams Co. Home: 2531 Milan St. *Mail:* 833 Howard Avenue, New Orleans 13.

ROY GLENN CAPPEL (J), (1948), *Civil Engineer, Registered La.* Engineer, W. Horace Williams Co. Home: 114 Mulberry Drive. *Mail*: 833 Howard Ave., New Orleans 13.

M. H. CARAWAY, (A), (1947), *Quantity Surveyor.* Owner, M. H. Caraway Co. Home: 2903 Bore St. *Mail*: 409 Carondelet Bldg., New Orleans 12.

MARTIN CARBONELL, (1939), *Civil Engineer, Registered La.* Head, Revetment Section, U.S. Engineer Dept., Foot of Prytania St. *Mail*: 464 Glendale Blvd., New Orleans 20.

FRANKLIN D. CARDWELL, (1945), *Mechanical Engineer,* Chief of Specification Dept., Chemical Construction Corp. Home: 104-28 128th St., Richmond Hill, N. Y. *Mail*: 350 Fifth Avenue, New York 1.

FRANK C. CARY, (1943), *Civil Engineer.* Consulting Engineer, Republic of Mexico. Home: Sierra Torrecillas 125. *Mail*: Humboldt 30, Mexico D.F.

S. STEVE CARNEGIE, (1940), *Civil Engineer, Registered La.* Partner, Carnegie & Smith, Consulting Engineers, 3000-A Dalrymple Drive, Baton Rouge 13, La.

HARRISON F. CARR, (1944), *Civil Engineer,* District Manager United Gas Pipe Line Co. P. O. Box 1628, New Orleans 11. *Mail*: 19 Neron Place, New Orleans 18.

J. B. CARTER, (1939), *Civil Engineer, Registered La.* Design Engineer, Louisiana Dept. of Highways. Home: 362 Amherst Ave., Baton Rouge, La. *Mail*: Dept. of Hwys., Baton Rouge, La.

JAMES LEWIS CARTER, (1949), *Civil Engineer,* Licensed La. Engineer, Southwest Gas Production Co., Inc. *Mail*: 607 Seventh St., West Monroe, La.

WILLIAM H. CARTER, (1939), *Agricultural Engineer,* Professor, La. State University. Home: 1721 Hood Ave. *Mail*: 113 Atkinson Hall, University Station, Baton Rouge, La.

GERARD P. CARUSO, (1948), *Chemical Engineer,* Research Engineer, International Lubricant Corp. *Mail*: 6901 Catina St., New Orleans 19.

JULES A. CARVILLE, JR., (1948), *Electrical Engineer,* Office Engineer, Shell Oil Co., Norco, La.

T. F. CASH, (1949), *Civil Engineer, Registered Texas.* Engineer, United Gas Pipe Line Co., P. O. Box 1407. *Mail*: 1341 Jennings St., Shreveport 49, La.

CHARLES E. CASSAGNE, JR., (1937), *Civil Engineer,* Licensed La. Administrative Engineer, N. O. Railroad Terminal Board, City Hall Annex. *Mail*: 326 Pelican Ave., Algiers 14, La.

N. S. CATCHINGS, (1939), *Civil Engineer,* Sales Engr., La. Metal Culvert Co., 1744 N. 21st St. Home: 928 West Moreland St. *Mail*: Box 2427, Baton Rouge, La.

WILLIAM B. CATCHINGS, (1948), *Civil Engineer.* Address unknown.

JOHN W. CAVANAUGH, (J), (1946), *Electrical Engineer,* Senior Electrical Instructor and Asst. Director, Delta Electrical Trade School, 239 Canal St. *Mail*: 621 S. Scott St., New Orleans 19.

D. B. H. CHAFFE, JR., (1920), *Mechanical & Electrical Engineer,* Secretary-Treasurer, Southern States Equipment Co. 425 Celeste St., New Orleans 11. Home: 1136 Second St. *Mail*: Box 1584, New Orleans 11.

HENRY G. CHALKLEY, (1948), *Mechanical Engineer,* Captain, U.S.N.R. *Mail*: Box 558, Lake Charles.

ARTHUR E. CHAMPEAU, (1943), *Marine Engineer, Registered U.S.C.G. Chief Engr.* Asst. Dist. Supervisor, U.S. Maritime Commission, Federal Bldg. *Mail*: 3644 Fairmont Drive, New Orleans 22.

A. WATSON CHAPMAN, (1945), *Chemical Engineer,* Asst. Research Director, Celotex Corp., Chicago 6. *Mail*: 2329 Gen. Pershing St., New Orleans 15.

ROBERT CHAPMAN (J), (1949), *Mechanical Engineer,* Lake Arthur, La.

FREDERICK E. CHARLES, (1950), *Chemical Engineer.* Field Engineer, Cities Service Refining Corp. *Mail*: 26 Poinsettia Road, Maplewood, La.

FREDERIC M. CHATRY, (J), (1949), *Electrical Engineer,* Hydraulic Engineer, U. S. Army Corps of Engineers. *Mail*: 5929 Coliseum St., New Orleans 15

THEO. T. CHENET, (1923), *Civil Engineer, District Maintenance Engineer,* Dept. of Highways, 707 Eleventh St., Lake Charles, La.

ROGER E. CHESNUT, (1941), *Marine & Mechanical Engineer,* Higgins Industries, Inc. 713 Joseph Ave., Gulfport, Miss.

A. R. CHOPPIN, (1948), *Dean,* College of Chemistry & Physics and Head of Dept. of Chemistry, La. State University. *Mail*: L.S.U., Baton Rouge.

JOSEPH G. CHUMLEY, (1949), *Mechanical Engineer,* Instructor in Mechanical Engineering, Louisiana Polytechnic Institute. *Mail*: Box 354, Tech Station, Ruston, La.

FRANK H. CLARK, (1948), *Mechanical Engineer,* Retired. *Mail:* P. O. Box 485, Chalmette, La.

RUSSELL S. CLARK, (1948), *Mechanical Engineer, Registered, Ohio.* Div. Power Engineer, Southern Alkali Corp., P. O. Box 900, Lake Charles. *Mail:* 209 Wilson Ave., Lake Charles, La.

F. T. CLARKE, (1942), *Civil Engineer,* Chief Civil *Engineer.,* Union Sulphur Co., Inc., Sulphur, La.

C. M. COCKRELL, (1945), *Mechanical Engineer,* Supervisor of Engineering, Freeport Sulphur Co., Port Sulphur, La.

AUBREY G. CODE, (1933), *Civil Engineer, Registered, La. and Texas.* Associate David W. Godat & Associates, Terminal Station Bldg. *Mail:* 4936 Mandeville St., New Orleans 17.

GERARD O. COIGNET, (1947), *Electrical Engineer,* Geological Engineer, La. Geological Survey, L.S.U. *Mail:* 610 University Walk, Baton Rouge.

TOM F. COLBERT, (1942), *Highway Engineer,* Asst. District Maintenance Engineer, La. Dept. of Highways, Baton Rouge, La.

JAMES HOWARD COLLINS, (1929), *Mechanical and Electrical Engineer,* Ebasco Services Inc., New York *Mail:* 1310 Short St., New Orleans 18.

JEFFREY H. COLLINS, SR., (1943), *Chemical Engineer,* General Supt. Gas Dept. New Orleans Public Service Inc., 5830 Memphis St. *Mail:* 317 Baronne St., New Orleans 9.

JAMES B. COLTHARP, (1942), *Electrical Engineer,* Supt. Transmission & Distribution Dept., Gulf States Utilities Co., Baton Rouge. *Mail:* 6628 Goodwood Ave., Baton Rouge, La.

RALPH E. COMPAGNO (J), (1947), *Civil Engineer,* Freeport Sulphur Co., Port Sulphur, La. *Mail:* 932 Nashville Ave., New Orleans, La.

RUSSELL G. CONE, (1949), *Civil Engineer, Registered, Calif. and New Jersey.* General Manager, Silas Mason Co., Box 1162, Shreveport, La.

ALVIN J. CONNER, (1949), *Chemical-Mechanical Engineer.* Sales Engineer, Process Equipment Co., P. O. Box 855. Home: 2229 Desire St., New Orleans, La.

JOSEPH B. CONVERSE, (1921), *Civil Engineer, Registered, Ala., Fla., Ga., Miss., La. and Texas.* President, J. B. Converse & Co., 106 Joseph St., Mobile. *Mail:* P. O. Box 1084, Mobile 6, Ala.

ALVA LEE COOPER (J), (1949), Junior Award Winner, Southwestern Louisiana Institute. *Mail:* 812 Johnston St., Lafayette, La.

ROBERT S. COOPER, (1940), *Civil Engineer, Registered La.* Division Engineer, Texas Eastern Transmission Corp. Home: 105 Ridgeway, Little Rock. *Mail:* Box 352, North Little Rock, Ark.

STEPHEN H. CORDILL, (1949), *Petroleum Engineer.* Gas Transmission Engineer, Union Sulphur Co. *Mail:* Route 2, Box 108, Sulphur, La.

GEORGE E. CORE, (1946), *Mechanical Engineer,* Maint. Engr. Standard Oil Co. of N. J., La. Div. *Mail:* 2646 Pimpernal Ave., Baton Rouge, La.

GLEN LEE CORRIGAN, (1949), *Petroleum Engineer, Registered Texas and Okla.* Professor and Head, Dept. of Petroleum Engineering, Louisiana Polytechnic Institute. Home: Monroe Highway, Ruston. *Mail:* Tech Station, Ruston, La.

ROBERT D. COSGROVE, (J), (1946), *Mechanical Engineer,* McWilliams Dredging Co., 860 St. Charles St., New Orleans 13. *Mail:* Box 584, N. O. 7.

HUGH COUGHLIN, (1945), *Civil Engineer,* Vice-Pres. & Gen. Mgr. La. Ice & Electric Co. *Home:* 2133 Marye St. *Mail:* Box 111, Alexandria, La.

ERNEST COULOHERAS, (1930), *Civil Engineer,* Assistant Chief Engineer, Orleans Levee Board, Civil Courts Bldg. *Mail:* 5416 Fontainbleau Drive, New Orleans.

EDWIN R. COUSINS, (J), (1944), *Chemical Engineer.,* Dept. of Agriculture, Southern Regional Research Laboratory, 2100 Robert E. Lee Blvd. *Mail:* 3627 Cambronne St., New Orleans 18.

GEORGE S. COVERT, (1947), *Civil Engineer,* Mgr. Asphalt Div., Anderson Dunhan Concrete Co. *Home:* 5946 George St. *Mail:* P. O. Box 1028, Baton Rouge, La.

GAYLORD H. COX, (1949), *Mechanical Engineer.* Design and Estimating Engineer, Cit-Con Oil Corp., Lake Charles. *Mail:* 518 N. Pine St. DeRidder, La.

JOHN E. COYNE, *Civil Engineer,* Owner, Coyne Construction & Engineering Co., No. 1 Fried St., *Mail:* 735 Rupp St., Gretna, La.

EMMETT T. CRAIG, (J), (1943), *Chemical Engineer,* Process Design Engr., Standard Oil Co. of N. J., La. Div., Box 513, Baton Rouge 1, La.

CHARLES C. CRAWFORD, (1921), *Mechanical Engineer,* President, A. M. Lockett & Co., Ltd. Home: 1315 First St. *Mail:* 308 Whitney Bldg., New Orleans, 12.

LAWRENCE E. CREASY, (1948), *Agricultural Engineer,* Associate in Agri. Eng. Research, La. State University. Home: 2063 Tulip St. *Mail:* Agri. Eng. Dept., L.S.U., Baton Rouge 3.

L. VILLERE CRESSY (A), (1930), *Mechanical Engineer*, Associate, James M. Todd & Associates. Home: 3217 DeSoto St. *Mail*: 217 N. Peters St., New Orleans 16.

MARCEL E. CRETTET, JR., (1940), *Mechanical and Electrical Engineer*. Address unknown.

ROBERT N. CREWS, (J), (1948), *Civil Engineer, Registered, La.* Engineer, J. Ray McDermott Co., Inc., Harvey. *Mail*: 2032 Peniston St., New Orleans 15.

GEORGE A. CROWDER, (1947), *Civil Engineer*, P. O. Box 297, Seymour, Md.

HORACE E. CRUMP, (L.M.), (June 8, 1906), *Mechanical and Civil Engineer*, Assistant Engineer in Charge of Plans and Specifications, Board of Commissioners, Port of New Orleans, 2 Canal St. *Mail*: 1422 Peniston St., New Orleans, 15.

CORNELIUS C. CRUSEL, (1944), *Civil and Mechanical Engineer*, Application Engineer, A. M. Lockett & Co. *Mail*: 308 Whitney Bldg. Home: 1418 Seventh St., New Orleans 15.

CLYDE CUCULLU (J), (1948), *Electrical Engineer*, Cost Analysis Engineer, N. O. Public Service Inc. *Mail*: 4638 Arts St., New Orleans 17.

LIONEL J. CUCULLU, (1928), *Mechanical Engineer*, Assistant to Chief Engineer, New Orleans Public Service Inc. 4630 Arts St. *Mail*: 317 Baronne St., New Orleans 9.

DAVID L. CULLOM, (L.M.), (1916), *Civil Engineer*, Retired. *Mail*: Box 5272, Station B, New Orleans 15.

WILLIAM F. CUMMER, (1949), *Chemical Engineer*. Research Engineer, United Gas Pipe Line Co., P. O. Box 1407. *Mail*: 552 Wilkinson St., Shreveport 14, La.

SIDNEY A. CURLEY (J), (1949), *Mechanical Engineer*. Route 2, Box 232, Lake Charles, La.

— D —

JOSEPH V. D'AMICO, JR., (A), (1949), *Mechanical Engineer*. Owner, Louisiana Steam Equipment Co., 305 N. Peters St. Home: 1913 Valence St., New Orleans 15.

LAWRENCE R. DANIEL, JR. (1949), *Mechanical Engineer*, Assistant Professor of M. E., Louisiana Polytechnic Institute. *Mail*: L.P.I., Ruston, La.

WATSON S. DAUBERT, (1949), *Chemical Engineer*. Office Engineer, The Celotex Corp., Marrero, La. *Mail*: 4317 Elba St., New Orleans 15.

TOM C. DAVID, (1940), *Civil Engineer, Registered La.* Partner, Pan American Engineers, 1418 Third St. *Mail*: 126 Hudson St., Pineville, La.

HENRY RICHARD DAVIES, JR. (J), (1947), *Mechanical Engineer*, Sales Engineer, Davies Sales & Eng. Co., 612 Maritime Bldg. *Home*: 535 Toulouse St., *Mail*: P. O. Box 1566, New Orleans, La.

ALBERT E. DAVIS, JR., (1938), *Civil Engineer*, Engineer, U. S. Engineer Office, Santa Fe Bldg. *Mail*: 5028 Avenue S, Galveston, Tex.

DAVID D. DAVIS, (J), (1944), *Chemical Engineer*, R. P. Farnsworth Co. *Mail*: 3016 Tulane Ave., New Orleans.

EDWIN A. DAVIS, (1943), *Civil Engineer, Registered La.* Works Program Engineer, La. Dept. of Highways. *Mail*: 604 Laurel St., Baton Rouge 8.

GEORGE B. DAVIS (J), (1948), *Civil Engineer, Registered La.* Asst. Plan Examiner, City of N. O., City Hall. *Mail*: 4600 S. Claiborne Ave., New Orleans 15.

GEORGE H. DAVIS (L. M.), (1909), *Mechanical Engineer, Registered N. Y., Penn., La.* Retired member of Ford, Bacon & Davis, Inc., 39 Broadway, N. Y. *Mail*: 20 Exchange Place, New York 11, N. Y.

HUGH DAVIS, (1946), *Mechanical Engineer*, Dist. Mtce. Engineer, La. Dept. of Highways. Box 1852, Monroe, La.

S. G. DAVIS, (1949), *Mechanical Engineer*, Sales Engineer, Allan J. Harris Co., 400 Balter Bldg. *Mail*: 4 Virginia Court, New Orleans 19.

WILLIAM M. DAVIS, (1947), *Civil Engineer*, Gen. Supervising Engr., Butadiene Plant, Cities Service Refining Corp., Lake Charles. *Mail*: Box 2583, Maplewood, La.

RAY L. DAY (J), (1949), *Civil, Mechanical Engineer*. Assistant Engineer, A. C. Volk, 109 W. Jefferson St., Bastrop, La.

HAROLD J. DEBRAY (J), (1949), *Civil Engineer, Registered La.* Engineer, Interstate Natural Gas Co., Inc. Home' Fairbanks, La. *Mail*: Box 1482, Monroe, La.

RATHBONE DEBUYS, (C. M.), (Jan. 1, 1898), Architect-Engineer, Private Practice, 1514 Calhoun St., New Orleans, La.

KENNETH M. DECOSSAS, (J) (1945), *Chemical Engineer,* U. S. Dept. of Agriculture So. Reg. Research Lab., 2100 R. E. Lee Blvd. *Mail:* 5028 Burgundy St., New Orleans 17.

WALLACE V. deGRUY, (1939), *Electrical Engineer,* Asst. Electrical Engr., N. O. Public Service, 317 Baronne St. *Mail:* 2539 Jonquil St., New Orleans 17.

RENE F. DELAHOUSSAYE (J), (1949), *Mechanical Engineer.* 806 E. Main St., New Iberia, La.

GEORGE T. DE LA MATYR, (1946). *Electrical Engineer,* Gulf States Utilities Co. *Mail:* 1018 Camelia Ave., Baton Rouge 11, La.

W. DAVID DE LAUREAL, (1946), *Mechanical and Electrical Engineer, Registered Miss., Ala.,* partner, De Laureal and Moses. Home: 2036 Broadway. *Mail:* 302 Nola Bldg., New Orleans 12.

A. H. DEMERS, (1943), *Electrical Engineer,* Station Engr., Gulf States Utilities Co. *Mail:* 1915 Walnut St., Baton Rouge 7.

CHRIS DEMOPULOS (J), (1949), *Structural Engineer and Draftsman,* E. M. Freeman & Associates. Home: 1095 Louisiana Ave. *Mail:* 416 Texas Eastern Bldg., Shreveport, La.

EDWIN L. DENNIS, (1941), *Mechanical Engineer,* President, E. L. Dennis Engineering Co. Home: 1549 Owens Blvd. *Mail:* 715 Camp, New Orleans 12.

OTWAY B. DENNY, (1949), *Petroleum Engineer.* Engineer, Interstate Oil Pipe Line Co., Box 1107, Shreveport 83. Home: 624 Egan St., Shreveport, La.

DONALD DERICKSON (H. M.), (L. M.), (1912), *Civil Engineer.* Licensed La. Emeritus Professor and Head, School of Civil Engineering, Tulane University. *Mail:* 1311 Henry Clay Ave., New Orleans 18.

JAMES H. DERR, JR., (1944), *Mechanical Engineer,* Asst. Test Engineer, Gulf States Utilities Co. *Mail:* 2733 Jackson Ave., Baton Rouge 7.

LEON deSALIGNAC, (1936), *Civil Engineer,* Chief Engineer Pan American Petroleum Corp., 944 St. Charles Ave. *Mail:* 5122 Baronne St., New Orleans 15.

CLARENCE E. DICKEY, (1949), *Mechanical* Engineer. Engineer, La. Power & Light Company. *Mail:* Box 81, Sterlington, La.

JERRY L. DICKSON, (1947), *Chemical Engineer,* Plant Supt., The Flintkote Co., 4500 N. Galvez St. *Mail:* 2523 S. Carrollton Ave., New Orleans 18.

THEODORE W. DIETZE, (1942), *Electrical Engineer,* Test Engineer, General Electrical Co., 1 River Road, Schenectady, N. Y. *Mail:* 407 Engleman Ave., Scotia, N. Y.

TOM O. DILLON, (1949), *Civil Engineer, Registered La.* Union Sulphur Co. *Mail:* 109 Union St., Rt. 2, Sulphur, La.

FARRAR R. DODGE, (1949), *Civil Engineer.* City and County of San Francisco, Dept. of Public Works, City Hall. *Mail:* 650A 45th Avenue, San Francisco 21, Calif.

CHARLES EDWARD DOERLER (A), (1949), *Safety Engineer.* Managing Director Caddo Bossier Safety Council, Inc. Home: 274 Penna Ave. *Mail:* P. O. Box 806, Shreveport, La.

EMERY DOMINGUE (J), (1949), *Civil Engineer.* Head Right-of-Way Draftsman, La. Dept. of Highways. Home: Box 10-E, Buson, La. *Mail:* Apt. C-9, 850 N. 5th St., Baton Rouge, La.

JULES C. DOMINGUE (J), (1949), *Electrical Engineer,* Box 107, Scott, La.

THOMAS F. DONLON, (1947), *Civil Engineer,* Partner, La. Metal Culvert Co. *Mail:* 906 North Sixth St., Baton Rouge, La.

BERNHARD M. DORNBLATT, (1937), *Civil Engineer, Registered Ala., Ga., La.,* B. M. Dornblatt & Associates, 818 Carondelet Bldg. *Mail:* Box 254, New Orleans 9.

AUGUST HOFFMAN DOUGLAS, (A), (1942), *Industrial Sales Engineer,* Representative Dixie Mill Supply Co., Inc., 901 Tchoupitoulas St. *Mail:* 4711 Baronne St., New Orleans 15.

WALTER E. DOUGLAS, JR., (1942), *Civil Engineer, Registered La.,* Construction Examiner, Federal Housing Admin., 860 St. Charles St. *Mail:* 6807 Vicksburg, New Orleans 19.

FLETCHER G. DOWNS, (1940), *Mining Engineer,* State of La. Highway Dept., Baton Rouge. Mail 2068 Myrtledale Ave., Baton Rouge 15.

JAMES M. DOYLE, JR., (1943), *Civil Engineer,* Resident Engr., La. Dept. of Hwys. P. O. Box 687, Ferriday, La.

JAMES HARRISON DRAKE, (1948), *Highway Engineer,* Asst. to District Engr., La. Dept. of Hwys. *Mail:* 809 K. Street, Monroe, La.

JESSE D. DRAKE, (1945), *Electrical Engineer, Registered La. and Miss.,* Owner, Drake Electric Company, Route 10, Box 59, Jackson, Miss.

CHARLES R. DRAUGHON, JR., (1948), *Mechanical Engineer,* Head of Equipment Inspection Dept., Esso Standard Oil Co., Box 551. *Mail:* Zachary, La.

WILLIAM J. DRAWE, JR., (1933), *Mechanical and Electrical Engineer*, Rate Analyst, New Orleans Public Service, Inc., 317 Baronne St. *Mail*: 2611 Burdette St., New Orleans, 18.

ROBERT J. DREUDING, (1926), *Civil Engineer, Registered, La.*, Construction Engr., Boh Bros. Const. Co., 2400 Cyprus St. *Mail*: 4455 Lafaye St., New Orleans.

RODERICK C. DUCHESNE, (1949), *Civil Engineer*, Asst. Professor of Agri. Eng., La. Polytechnic Institute. *Mail*: Box 507, Tech Station, Ruston, La.

LOUIS DUCLOS, (1947), *Civil Engineer, Registered La.*, Head Brdige Designer, La. Dept. of Highways. *Mail*: 4328 Hyacinth Ave., Baton Rouge 15, La.

GEORGE H. DUDLEY, (1947), *Civil Engineer*, Chief River Stabilization Branch, Eng. Div., Corps of Engineers, New Orleans District. *Mail*: 1622 King Drive, New Orleans 19.

JOHN V. DUGAN, JR., (1941), *Mechanical Engineer*, Sales Engineer, *Murray*-Baker-Frederic, Inc. *Home*: 84 Dream Court. *Mail*: 628 S. Peter St., New Orleans 6.

KENNEDY J. DUGAS, (J), (1949), *Mechanical Engineer*, 516 Lewis St., New Iberia, La.

JOHN S. DUHE, (1943), *Mechanical Engineer*, Mathieson Chemical Corp., Lake Charles, La. *Mail*: 114 Beauregard St., Maplewood, La.

CRAWFORD K. DUNBAR, (1949), *Civil Engineer, Registered Ala.* Drainage Engineer, City-Parish D.P.W., Baton Rouge. Home: 2405 Terrace Ave. *Mail*: P. O. Box 155, Baton Rouge, La.

A. LEE DUNLAP, (1925), *Mechanical Engineer*, Professor of Mechanical Engineering, Tulane University, *Mail*: 935 Pine St., New Orleans 18.

C. MONROE DUNLAP, (J), (1949), *Civil Engineer, Registered La.* Engineer, S. E. Huey & Co., Ouachita National Bank Bldg. *Mail*: 410 Moore Ave., Monroe, La.

EDGAR M. DUNN, (1942), *Electrical Engineer*, Board of Port Commissioners. *Mail*: 934 Howard Ave., New Orleans.

CLARENCE DURHAM, (1949), *Mechanical Engineer*. District Engineer, United Gas Pipe Line Co. *Mail*: 1819 Fourth St., Lake Charles.

AUGUSTUS W. DURNING, (1943), *Chemical Engineer*, Gas Supt., La. Power & Light Co., 142 Delaronde St. *Mail*: 12 Forrest Ave., New Orleans, 20.

ALLAN T. DUSENBURY, (L.M.), (May 25, 1909), *Consulting Engineer*, 1637 Octavia St. *Mail*: 2207 American Bank Bldg., New Orleans, 12.

JAMES T. DWYER, JR., (1941), *Chemical Engineer*, Inspection Engineer, Gulf Oil Corp., Port Arthur, Texas.

JAMES O. DYAL, (1937), *Civil Engineer*, Joint Manager, Acevedo-Dyal & Cia. Ltda. Puerto Cabezas, Nicaragua.

OSBORN J. DYKES, SR., (1949), *Mechanical Engineer*. General Manager, Air Conditioning Contracting Co. *Mail*: 4735 Thornhill Ave., Shreveport, La.

LESLIE M. DYSON (J), (1949), *Electrical Engineer*. Instructor, Department of E.E., Louisiana Polytechnic Institute. *Mail*: Box 462, Tech Station, Ruston, La.

— E —

HOLMES EARL (J), (1942), *Civil Engineer, Registered La.* Engineer, M. H. Caraway Co., 409 Carondelet Bldg. *Mail*: 636 Nashville Ave., New Orleans 15.

RALPH EARL, (L.M.), (1913), *Civil Engineer*. 2125 Leonidas St., New Orleans 18.

RICHARD H. EARL, (1945), *Civil and Mining Engineer, Registered Texas*. Supt. Engineering and Maintenance Dept., Freeport Sulphur Co., Port Sulphur, La.

GARLAND O. EDELEN, (J), (1948), *Agricultural Engineer*, Rural Service Representative, La. Power & Light Co., West Monroe, La.

CHARLES W. EDWARDS, (1947), *Civil Engineer, Registered N. Y.* President, Chas. W. Edwards Co., Inc. Home: 255 Brockenbraugh Court. *Mail*: 232 Balter Bldg., New Orleans 12.

CLARENCE C. EDWARDS, JR., (1942), *Civil Engineer*, Dist. Construction Engineer, La. Dept. of Highways. *Mail:* Box 872, Alexandria, La.

JOHN P. EAGAN (A), (1931), Assistant Engineer in Charge of Maintenance & Operation, Market Street Steam Electric Station, New Orleans Public Service Inc. *Mail:* 5436 S. Claiborne Ave., New Orleans 15.

S. W. ELBERSON, (L.M.), (1911), *Mechanical Engineer*, Vice-President & Gen. Manager Gulf Public Service Co. Inc. *Mail*: P. O. Box 165, Lafayette, La.

L. C. ELDRIDGE, (1948), Engineer and Superintendent, Baton Rouge Water Works Co., 131 Lafayette St. *Mail:* P. O. Box 2391, Baton Rouge.

M. H. ELISSALDE, (1942), *Electrical Engineer*, Drafting & Design, Gulf States Utilities Company. *Mail*:1647 Washington Blvd., Beaumont, Texas.

D. X. ELLETT, (1950), *Architectural Engineer, Registered La., Miss., Ala., Okla., Mich.* Chief Engineer Monroe Office, Ford, Bacon & Davis, N. Y. *Mail*: Box 1762, Monroe, La.

JOHN A. ELLIS, (1949), *Electrical Engineer*, Distribution Engineer, Gulf States Utilities Co. *Mail*: 323 Knox St., Baton Rouge.

J. HAMILTON ELLIS, (1949), *Civil Engineer, Registered La.* Supt. of Mtce. & Construction, Highway Dept. Caddoo Parish Police Jury, P. O. Box 772. *Mail*: 1141 Janther Place, Shreveport 49, La.

SYDNEY ELLIS, JR., (1940), *Chemical Engineer. Mech. Engr.*, N. O. Public Service, Inc. *Mail*: 5633 Ada Place, New Orleans 19.

WILLIAM C. ELLIS, (1947), *Electrical Engineer*, General Mgr., Walter J. Barnes Electric Co., 1001 Magazine St. *Mail*: 7814 Burthe St., New Orleans 18.

O. H. ELVERUM, (1936), *Civil Engineer*, Sr. Project Engineer, La. Dept. of Highways. *Mail*: 802 First St., Morgan City, La.

WALDO A. ERICKSON, (1945), *Mechanical and Electrical Engineer*, Senior Engineer, Shell Oil Co., Inc., Norco, La.

T. EDWARD ERNST, (1934), *Civil Engineer, Registered La.* Consulting Engineer, Private Practice. Home: 5526 S. Johnson St. *Mail*: 822 Perdido St., New Orleans 12.

ERNEST L. EUSTIS, JR., (1946), *Civil Engineer, Registered La.* Engineer and Estimator, Perrilliat-Rickey Constructor Co., Inc., 1530 S. Rendon St. *Mail*: 213 Norland Ave., Aurora Gardens, New Orleans 14.

EDWARD E. EVANS, (1947), *Civil Engineer, Registered La. and Tex.*, Instructor in Civil Engineering, Louisiana State University. *Mail*: College of Engineering, L. S. U., Baton Rouge 3. Home: 4773 Highland Road.

JAMES A. EVANS, (J), (1947), *Mechanical Engineer*, Sales Engr., Taylor-Seidenbach Co., Inc., Home: 4316 Baronne St. *Mail*: 1401 Tchoupitoulas St., New Orleans 13.

J. OWEN EVANS, (1946), *Consulting Engineer*, Private Practice. *Home*: 4432 Queen St., New Orleans 10. *Mail*: Box 153, New Orleans 3.

WILLIAM S. EVANS, (1949), *Architect-Engineer, Licensed Architect, Conn., Okla., La., Miss., Texas*. Licensed Engr., La. Private Practice of architecture. *Mail*: 426 Ratcliff St., Shreveport, La.

WILLIFORD J. EVANS (J), (1947), *Civil Engineer and Architect, both registered La.* Asst. to the Dean, College of Eng, Louisiana State University. *Mail*: Box 5618, L.S.U., Baton Rouge 3, La.

— F —

ARNOLD LESLIE FARMER (J), (1948), *Electrical Engineer*, Property Accounting Engineer, N. O. Public Service Inc. *Mail*: 6002 Spain St., New Orleans 17.

NORMAN P. FAUCHEUX (J), (1949, *Electrical Engineer*. Asst. Elec. Mtcs. Engr., Louisiana Power & Light Co., Sterlington, La. *Mail*: 121 Jackson St., W. Monroe, La.

ARTHUR E. FAULK, JR. (J), (1948), *Electrical Engineer*. Partner, Marine Electric Company, 119 E. Congress St. *Mail*: Box 137, S.L.I., Lafayette, La.

JAMES C. FAULKNER, (1949), *Chief Draftsman*, Texas Eastern Transmission Corp., 508 Texas Eastern Bldg., Shreveport, La.

HAROLD FRANCIS FAVRET, (1937), *Civil Engineer, Registered La.* Estimator, Lionel F. Favret, General Contractor. Home: 144 W. Livingston Place. *Mail*: 937 Gravier St., New Orleans 12.

JAMES E. FAVRET, (1942), *Civil Engineer*, Lionel F. Favret. *Home*: 226 Brockenbraugh Court. *Mail*: 937 Gravier St., N. O. 12.

GEORGE CALVERT FELTON, (J), (1946), *Metallurgical Engineer*, Refinery Metallurgist, Standard Oil Co. of N. J., La. Div., Baton Rouge. *Mail*: 1805 Perkins Road, Baton Rouge.

FRED H. FENN, (1933), *Civil and Electrical Engineer*, Professor of Engineering Mechanics, L. S. U. Home: Starring Lane. *Mail*: College of Engineering, Louisiana State University.

CHARLES H. FENSTERMAKER, (L. M.), (1914), *Civil Engineer*, Consulting and General Engineer, Hillyer, Deutsch, Edwards, Inc., P. O. Box 293, Oakdale, La.

ARTHUR J. FERGUSON, (1938), *Mechanical Engineer*, Asst. Head of Mtce. and Const. Dept., Esso Standard Oil Co. *Mail*: 1866 Blouin Ave., Baton Rouge.

BILLY M. FERGUSON, (1949), *Civil Engineer, Registered La.* Engineer, E. M. Freeman & Associates. Home: 3509 Curtis Lane. *Mail*: 416 Texas Eastern Bldg., Shreveport, La.

JOHN P. FERNANDEZ, (1943), *Mechanical and Electrical Engineer*, U. S. Engineer District, Foot of Prytania St. *Mail*: 9011 Apple St., New Orleans 18.

JOHN J. FINEGAN, JR., (J), (1948), *Electrical Engineer*, 8410 Panola St., New Orleans 18.

FRANK P. FISCHER, (1940), *Electrical Engineer*, Owner, Frank P. Fischer Engineering Co., 7924 Maple St., New Orleans 18.

CHARLES LEAHY FISCHER, (1940), *Civil Engineer*, Asst. Planning Engr., City Planning and Zoning Comm. *Mail*: 1014 Aline St., New Orleans 15.

EUGENE L. FITHIAN, (A), (1940), Division Manager, Eugene Dietzgen Co. Home: 58 Flamingo St. *Mail*: 318 Camp Street, New Orleans 12.

R. F. FITZGERALD (A), (1949), *Mechanical Engineer*, Secretary-Treasurer, Fitzgerald Plumbing & Heating Co., Inc. Home: 113 Penn St. *Mail*: 939 Louisiana Ave., Shreveport, La.

WILLIAM E. FITZGERALD, 1949), *Mechanical Engineer*, President, Fitzgerald Plumbing & Heating Co., P. O. Box 886. *Mail*: 1905 Gilbert St., Shreveport, La.

H. A. MIKE FLANAGAN, (1940), *Civil Engineer, Registered La.* Associate Professor, Civil Eng. Dept., Louisiana State University. *Mail*: 755 Lafayette St., Baton Rouge, La.

J. D. FLEMING, JR., (1927), *Electrical Engineer*, Operating Engineer, Gulf States Utilities Co. *Mail*: 2652 Adams Ave., Baton Rouge, La.

HARRY W. FLETCHER, (A), (1937), Proprietor, Fletcher Equipment & Supplies. Home: 33 Farnham Place, Metairie. *Mail*: 743 Camp St., P. O. Box 539, New Orleans 1.

LIONEL E. FLOTTE, (1939), *Civil Engineer, Registered La., Miss., Ala., Tex. Mail*: 205 Rosewood Drive, New Orleans 20.

J. THAD FLOYD, JR., (1939), *Civil Engineer*, Partner, Metal Building Products Co. Home: 1731 Audubon Street. *Mail*s 720 S. Claiborne Ave., New Orleans 13.

JOHN T. FOLK, (1948), *Civil Engineer*, Professor of Civil Engineering, La. Polytechnic Institute. Home: 108 Bonner St. *Mail*: Box 315, Tech Station, Ruston, La.

ELBERT E. FORD, (1950), *Petroleum Engineer*, Resident Engineer, Barnard & Burk. Home: 3105 Washington Ave., Baton Rouge. *Mail*: 2415 S. Grand, Monroe, La.

HAROLD N. FORD (J), (1949), *Electrical Engineer*. Student Engineer, New Orleans Public Service Inc., 317 Baronne St. *Mail*: 3912 La. Ave. Parkway, New Orleans 15.

GEORGE P. FORMAN, (1949), *Civil Engineer*. Senior Project Engineer, La. Dept. of Highways, 109½ N. Grand. Home: 2203 S. Grand St., Monroe, La.

CHARLES B. FOSTER, JR., (1949), *Civil Engineer, Registered La.* Asst. Supt. Engineer, City of Shreveport, Dept. of Water & Sewerage, City Hall. *Mail*: 247 Preston Ave., Shreveport, La.

JAMES M. FOURMY, (1940), *Civil Engineer*. Consulting Engineer, Fourmy Bldg.. *Mail*: 308 N. Pine St., Hammond, La.

MAURICE B. FOURNET, JR. (J), (1949), *Mechanical Engineer*, St. Martinsville, La.

FREDERICK H. FOX, (1922), *Civil Engineer, Registered La.* Professor and Head, School of Civil Engineering, Tulane University. Home: 1437 Calhoun St. *Mail*: Tulane University, New Orleans 15.

LUIGI FRANCILLO, (1948), *Mechanical Engineer*, Marine Estimator and Engineer, Boland Machine & Mfg. Co., Inc., 1000 Tchoupitoulas St. *Mail*: 2100 Lowerline St., New Orleans 18.

ALBERT J. FRANSEN, (1934), *Mechanical & Electrical Engineer*, General Manager, Industrial Steel Co., Inc., 831 S. Cortez St. *Home*: 201 Ringgold St., *Mail*: P. O. Box 7128, New Orleans 19.

LOUIS T. FRANTZ, (1936), *Electrical Engineer*, Retired. *Mail*: 8735 Apricot St., New Orleans 18.

HAROLD M. FRASER, (1943), Vice-President, International Lubricant Corp. *Mail*: 1604 Audubon St., New Orleans 18. *Mail*: P. O. Box 390, New Orleans, La.

MARION ELLIS FRATER, (1943), *Architect, Registered Arch., La.* Architectural Engineer. W. Horace Williams Co., 833 Howard Ave. *Mail*: 2504 Audubon St., New Orleans 18.

JOHN H. FREDERICKSON, JR., (1940), *Civil Engineer*, Address unknown.

ERNEST M. FREEMAN, (1939), *Civil Engineer, Registered La., Tex., Okla., Miss., Ark.* Owner, E. M. Freeman & Associates. Home: 3427 Youree Drive. *Mail*: Texas Eastern Bldg., Shreveport 23, La.

WILLIAM H. FRENCH, (1947), *Civil Engineer*, Freeport Sulphur Co. *Mail*: Box 30, Port Sulphur, La.

CLIFTON A. FREY, (1949), *Civil Engineer, Registered La.* Associate, E. M. Freeman & Associates, 416 Texas Eastern Bldg., Shreveport, La.

DAVID B. FRIED, JR., (J), (1949), *Electrical Engineer,* Sales Engineer, Engineering Specialty & Mfg. Co., 632 S. Peters. *Mail:* 7736 Nelson St., New Orleans 18.

JOSEPH J. FRIEDLIER, JR., (1947), *Ventilating Engineer,* Southern Dist. Mgr., Ilg. Electric Ventilating Co. Home: 500 Audubon Blvd. *Mail:* 201 Pan American Bldg., N. O. 12.

JAMES L. FRIER, JR., (J), (1947), *Mechanical Engineer,* Instructor, Mechanical Engineering Dept., Louisiana State University. *Mail:* 827 Waverly Drive, Baton Rouge, La.

EUGENE A. FRISCH, JR. (J), (1949), *Mechanical Engineer.* Assistant Engineer, La. Power & Light Co., 433 Metairie Road. *Mail:* 631 Louisa St., New Orleans 17.

A. F. FRITCHIE, (1945), *Mechanical Engineer,* Supt. Mechanical Division, Standard Oil Co. of N. J., *Mail:* 2331 Kleinert Ave., Baton Rouge 11, La.

ALVIN M .FROMHERZ, (L.M.), (1915), *Civil Engineer, Registered La., Miss., Ala.* Consulting Engineer, Fromherz Engineers. Home: 1430 Henry Clay Ave. *Mail:* 823½ Poydras St., New Orleans 13.

FRANK C. FROMHERZ, (1943), *Civil and Sanitary Engineer, Registered La.* Civil and Sanitary Engineer, Fromherz Engineers, 823½ Poydras St. *Mail:* 1225 Nashville Ave., New Orleans, La.

THOMAS A. FROMHERZ (J), (1945), *Civil Engineer, Registered La.* Civil and Structural Engineer, Fromherz Engineers, 823½ Poydras St. *Mail:* 1430 Henry Clay Ave., New Orleans 18.

DONALD D. FULLMER, (J), (1947), *Mechanical Engineer,* Civil Engr., Construction Div., Corps of Engineers, New Orleans Dist. *Mail:* 131 Fillmore Ave., New Orleans 19.

MINOR M. FUNDERBURK, (1949), *Electrical Engineer,* Louisiana Power & Light Co., Box 304, Sterlington, La.

— G —

GAUDENZ GADMER (J), (1948), *Chemical Engineer,* Asst. Plant Engineer, Pan-Am Southern Corp. *Mail:* 2836 Palmer Ave., New Orleans 15.

NICHOLAS J. GAGLIANO, (J), (1949), *Electrical Engineer,* Estimator, Cabirac Plumbing & Heating Contractors, 4717 Baronne St. *Mail:* 6115 Canal Blvd., New Orleans 19.

EARL B. GAINES, (1947), *Mechanical Engineer,* General Electric Co. *Mail:* 3117 Yupon St., New Orleans 19.

BENJAMIN E. GALLOWAY, JR., (1941), *Civil Engineer,* 807 Broadway, N. O. 18.

WILLIAM S. GALLOWAY, (1949), *Mechanical Engineer,* Marketer, Transportation and Contractor, Gulf Refining Co. *Mail:* 130 Harrison Ave., New Orleans 19.

CARY B. GAMBLE, (1941), *Electrical Engineer,* Partner, Cary B. Gamble & Associates, 314 St. Charles St., New Orleans 12.

GLENN D. GARBER, (J), (1948), *Mechanical Engineer,* Engineering Inspector, Cities Service Refining Corp. *Mail:* 198 Watkins St., Lake Charles.

VERGIL S. GARNETT, (1949), *Civil Engineer, Registered La.* Chief Engineer, Interstate Natural Gas Co., Inc. Home: 1606 N. 2nd St. *Mail:* P. O. Box 1482, Monroe, La.

JOSEPH D'L. GARON (J), (1949), *Mechanical Engineer,* Box 56, Lafayette, La.

FRANK G. GAULT, (1939), *Sales Engineer,* A. M. Lockett & Co., Ltd., P. O. Box 553, Lake Charles, La.

LEWIS B. GAY, (1948), *Electrical Engineer,* Sales Engineer, Allis-Chalmers Mfg. Co. *Home:* 2225 Abundance St. *Mail:* 724 Canal Bldg., New Orleans 12.

JOHN STONE GENTILICH, (1933), *Civil Engineer,* Hydraulic Engineer, U. S. Engineers, N. O. District. *Mail:* 4675 Venus St., New Orleans 17.

ROY GEOGHEGAN, (1949), *Civil Engineer,* Manager, Plibrico Sales & Service Co. *Mail:* 3817 Octavia St., New Orleans 15.

F. J. GERMANO, (1938), *Civil Engineer,* Professor and Acting Head of Engineering Mechanics, Louisiana State University. Home: 2153 Wisteria St. *Mail:* Atkinson Hall, L.S.U., Baton Rouge, La.

EDWARD H. GESSNER (1933), *Civil Engineer, Registered La., N. Y.* Executive Vice-President, J. P. Ewin, Inc. Home: 2058-B Bragg Ave. *Mail:* P. O. Box 361, Mobile 3, Ala.

RILEY L. GILBERT, (1943), *Mechanical Engineer,* Chief Engineer, Gulf Engineering Co., 916 S. Peters St., New Orleans 12. *Mail:* 134 Rose Ave., N. O. 20.

SIDNEY S. GILL, (1949), *Mechanical Engineer.* Plant Engineer, Thermatomic Carbon Co., Sterlington, La. *Mail*: 701 K Street, Monroe, La.

ERNEST McKAY GILLEN, (1944), *Highway Engineer,* Asst. Mtce. Engineer, La. Dept. of Highways. Box 38, Shreveport. *Mail*: 101 Egan St., Shreveport, La.

J. HARRY GILLUM, (1934), *Electrical Engineer,* Assistant to Process Supt., Standard Oil Co. *Mail*: 1332 Leo Drive, Baton Rouge.

ALLEN T. GIVENS, (1948), *Mechanical Engineer,* Superintendent, Southern Carbon Co. Home: 603 Auburn St. *Mail*: P. O. Drawer 1562, Monroe, La.

HOWARD W. GLEASON, (1938), *Civil Engineer,* Glover Construction Co., 1430 Whitney Bldg. *Mail*: 320 Brockenbraugh Court, New Orleans 20.

ALBERT A. GLODT, (1949), *Civil Engineer,* Resident C. E., Gulf Production Div., Gulf Refining Co. *Mail*: 208 Athania Parkway, New Orleans 20.

JOHN A. GLOVER, (1938), *Civil Engineer,* Vice-President., George J. Glover Co., Inc., 1430 Whitney Bldg. *Mail*: 1305 Soniat St., New Orleans 15.

DAVID W. GODAT, (1924), *Civil Engineer, Registered La. and Miss.,* David W. Godat & Associates, Consulting Engineers, 314 Terminal Station Bldg. *Mail*: 540 St. Peter St., New Orleans 12.

JULES GODCHAUX, (L. M.), (Jan. 1, 1899), Vice-President and Engineer of Operation, Godchaux Sugars, Inc., P. O. Box 583, New Orleans 7.

LEON GODCHAUX II, (1941), *Chemical Engineer,* Asst. Director, Research, Godchaux Sugars, Inc., Home: 85 Audubon Blvd. *Mail*: Carondelet Bldg., New Orleans 12.

MAYER GODCHAUX, (1920), *Mechanical Engineer,* Private Practice, Home: 1916 Jefferson Ave. *Mail*: 825 Ninth St., New Orleans.

WALTER GODCHAUX, JR., (1938), *Chemical Engineer,* Asst. Vice-Pres., Operations, Godchaux Sugars, Inc., Carondelet Bldg., New Orleans: *Mail*: 1835 Octavia St., New Orleans 15.

H. DICK GOLDING, (1947), *Mechanical Engineer,* Box 6939, Louisiana State University, Baton Rouge 3, La.

JOSEPH McCORMACK GONDRAN, (1923), *Civil Engineer,* Construction Engineer American Sugar Refining Co. *Mail*: 8228 Panola St., New Orleans 18.

LOUIS K. GOOD, (1944), *Civil Engineer,* Vice-Pres., R. P. Farnsworth & Co., Inc., 1515 S. Salcedo Street. *Home*: 2817 Jefferson Ave. *Mail*: P. O. Box 850, New Orleans.

EDWIN HENRY GOODLOE, (1942), *Civil Engineer,* District Engineer, La. Dept. of Highways, Lake Charles. *Mail*: 1011 South Division St., Lake Charles, La.

ROBERT E. GOSA, (1929), *Civil Engineer and Contractor,* Vice-Pres., W. Horace Williams Co. 6020 Prytania St. *Mail*: 833 Howard Ave., New Orleans 13.

ALVIN G. GOTTSCHALL (J), (1943), *Mechanical Engineer,* Lubrication Engr., Gulf Refining Co., Box 1470, Hattiesburg, Miss.

J. MALLORY GRACE, (J), (1947), *Mechanical Engineer,* 208 St. Louis St. Home: 970 Ingleside Drive. *Mail*: P. O. Box 1703, Baton Rouge, La.

BERNARD GRAFF, SR., (1939), *Mechanical & Electrical Engineer,* Private practice, 1321 Dante St., New Orleans 18.

RICHARD N. GRAHAM, (1944), *Civil Engineer,* U. S. Corps of Engrs., N. O. Dist. *Mail*: 233 Walnut St., New Orleans 18.

ARTHUR A. GRANT, (1937), *Mechanical Engineer,* Marine Surveyor and Consulting Engineer, Private Practice, 1215 Exposition Blvd. *Mail*: 1745 Canal Bldg., New Orleans 12.

FRANCIS W. GRANT, (1949), *Civil Engineer, Registered La.* Associate E. M. Freeman & Associates, Texas Eastern Bldg. *Mail*: 525 Rutherford St., Shreveport, La.

CHARLES L. GRAVES, (1948), *Civil Engineer,* Manager Offshore Construction J. Ray McDermott & Co., Harvey, La. *Mail*: 136 Glenwood Drive, N. O. 20.

EDWARD C. GRECO, (1949), *Senior Research Chemist,* United Gas Pipe Line Co. Home: 1410 East Kings Highway. *Mail*: P. O. Box 1407, Shreveport, La.

CHARLES H. GREEN, (1937), *Civil Engineer,* Partner Wm. F. Surgi Equipment Co. *Home*: 4601 Lafaye St. *Mail*: P. O. Box 1309, New Orleans 10.

ROBERT LAMAR GREEN, (1948), *Agricultural Engineer,* Assistant Professor of Agricultural Engineering, La. State University. *Mail*: Dept. of Agri. Eng., L. S. U., Baton Rouge 3.

BERNARD A. GREHAN, (1942), *Civil Engineer, Registered La.* Partner, B. M. Dornblatt & Associates, Inc., 818 Carondelet Bldg. *Mail*: 1670 Soniat St. New Orleans 15.

BERNARD H. GREHAN, (L. M.), (1915), *Civil Engineer, Registered, La.* Boh Bros. Const. Co., 2400 Cypress St. *Mail*: 1670 Soniat St., New Orleans 15.

F. B. GREVEMBERG, (1935), *Civil Engineer, Registered La.* Private Practice, 829 Union St. *Mail*: 530 St. Peter St., New Orleans 16.

GEORGE JOHN GROH (J), (1949), *Mechanical Engineer.* Sales Engineer, R. J. Tricon Co. Home: 6616 Canal Blvd. *Mail*: 751 Tchoupitoulas St., New Orleans, La.

ROBERT J. GRUSH (J), (1949), *Mechanical Engineer.* Sales Engineer, F. N. Johnson Co., American Bank Bldg. *Mail*: 534 Carol Drive, New Orleans 21.

WILL S. GUEDRY, (1940), *Civil Engineer, Registered La.* Consulting Engineer, A. M. Mutersbaugh, Box 1540, Lake Charles. *Mail*: 1105 Reid St., Lake Charles, La.

MARIO R. GUELL, (1938), *Electrical Engineer, Chief Draftsman and Desiging Engineer,* Gaylord Container Co. *Mail*: 601 West 3rd St., Bogalusa, La.

WALDECK F. GUILBEAU, (1943), *Chemical Engineer,* Southern Regional Research Laboratory, 2100 Robert E. Lee Blvd. *Mail*: 6667 Memphis St., New Orleans 19.

J. MASON GUILLORY, (1933), *Mechanical and Electrical Engineer,* Manager, Industrial and Commercial Engineering Division, New Orleans Public Service, Inc., Home: 4128 Monroe St. *Mail*: 317 Baronne St., New Orleans, 9.

EDGAR E. GUILLOT, JR., (1947), *Highway Engineer.* Sr. Project Engineer, La. Dept. of Highways. *Mail*: P. O. Box 455, Thibodaux, La.

MALCOLM A. GUILLOT, (1950), *Mechanical Engineer.* Design Engineer, E. L. Dennis Engineering Co., 715 Camp St. *Mail*: 1221 Behrman Ave., New Orleans 14.

DONATO ENRIQUE GUIZA, (1939), *Civil Engineer, Registered La.* Engineer Supt., Boh Bros. Construction Co., 2400 Cypress St. *Mail*: 351 W. Livingston Pl., New Orleans 20.

JOSEPH W. GUNN, (1949), *Chemical Engineer.* Division Chief Chemist, Lone Star Cement Corp. Home: 164 E. Oakridge Park. *Mail*: 1120 Hibernia Bldg., New Orleans 12.

WILLIAM BREWSTER GURNEY, (1943), *Mechanical Engineer,* Gulf States Utilities Co. *Mail*: 2631 Hundred Oaks Ave., Baton Rouge.

MARTIN M. GURTLER II, (1938), *Civil Engineer, Licensed La., Ala.* Vice-President, Bernard & Byrd, Inc. Home: 6538 Catina. *Mail*: 1539 Pleasure St., New Orleans.

ARNOLD A. GUSTAFSON, (1944), *Mining Engineer,* Operations Assistant, Freeport Exploration Co. *Mail*: P. O. Box 24, Port Sulphur, La.

JOHN JOSEPH GUTWEILER, (1945), *Civil Engineer, Registered La.* Engineer, R. Swart, Engr. and Surveyor, Baton Rouge. *Mail*: 5472 Jackson, Baton Rouge, La.

—H —

JOHN A. HAASE III, (1939), *Civil Engineer, Registered* La. Vice-Pres., Haase Construction Co., Inc., *Mail*: 5901 Vicksburg St., New Orleans 19.

ROBERT N. HABANS, (1939), *Civil Engineer,* Chief Engineer, Orleans Materials & Equipment Co., Inc., 1556 Tchoupitoulas St. *Mail*: 5228 Pitt St., New Orleans 15.

JOSEPH O. HACHET, JR., (J), (1948), *Electrical Engineer.* Junior Engineer, Shell Oil Co. Home: Box 153, LaPlace, La. *Mail*: c/o Shell Oil Co., Norco, La.

ALLEN S. HACKETT, (1921), *Civil Engineer,* 1580 Jefferson Ave., New Orleans 15.

CALLENDER FAYSSOUX HADDEN, (1928), *Mechanical & Electrical Engineer,* Executive-Vice-President and Treasurer, Standard Supply & Hardware Co., P. O. Drawer 620, New Orleans 7.

EDGAR J. HAGSTETTE, JR., (1935), *Chemical Engineer,* Mgr. Product Procurement Dept., Baroid Sales Div., National Lead Co. *Mail*: 830 Ducommun St., Los Angeles, Calif.

FRANK E. HAIGHT, (1946), *Engineer,* Creole Petroleum Corp., Caripito, Venezuela.

HARVEY A. HALL, (1945), *Civil Engineer, Registered La.* Engineer, Dept. of Public Works, Capitol Bldg. *Mail*: 675 Canal St., Baton Rouge, La.

IRA E. HALL, (A), (1946), Superintendent, Flynn Mfg. Co., 1009 Guaranty Bank Bldg., Alexandria, La.

WILLIAM HANSEN HALL, (1941), *Electrical Engineer, Registered Texas.* Asst. Professor, Elec. Eng. Dept., Texas A. & M., College Station, Texas.

DANIEL HALLARON, JR., (1939), *Mech. & Electrical Engineer,* Electrical Distribution Engr., New Orleans Public Service Inc. *Home*: 4491 Franklin Ave. *Mail*: 317 Baronne St., New Orleans 9.

GEORGE R. HAMMETT, (1920), *Mechanical Engineer,* Manager, A. M. Lockett & Co., Ltd. Home: 340 Vincent Ave., Metairie. *Mail*: P. O. Box 561, New Orleans 7.

DALE L. HANNAFORD (J), (1949), *Assistant Engineer*, La. Power & Light Co., *Mail*: 1306 N. Third St., West Monroe, La.

FRED A. HANNAMAN, JR., (1944), *Mechanical Engineer*, Group Head., Mech. Engr. Dept., Esso Standard Oil Co., Louisiana Division. Home: 1671 Cedardale Ave., Baton Rouge, 15. *Mail*: Box: 551, Baton Rouge, La.

IRVE E. HANSON, *Chief Engineer*, Supt. Engineering and Maintenance, Freeport Sulphur Co., Box 25, Port Sulphur, La.

WILLIAM HARDY, (1937), *Construction Engineer*, General Contractor, Hardy-Stevens Co. *Mail*: 917 Carondelet Bldg. Home: 2404 Pine St., New Orleans.

LOUIS W. HARRELL, (1942), *Mechanical Engineer*, Field Testing Engineer, La. Dept. of Highways. *Mail*: 1939 University Ave., Baton Rouge, La.

ALLAN J. HARRIS, (1924), *Sales and Application Engineer*, Owner Allan J. Harris Company, 400 Balter Bldg. *Mail;* 7615 Jeannette St., New Orleans 18.

BENJAMIN D. HARRISON, (1949), Manager, Industrial Eng. Section, Ethyl Corp. *Mail*: 1877 Blouin Ave., Baton Rouge, La.

JAMES E. HASSINGER, JR., (J), (1945), *Civil Engineer, Registered La.* 2021 S. Carrollton Ave., New Orleans 18.

JOHN D. HAVERKAMP, (1946), *Electrical Engineer*, Commercial Supervisor, New Orleans Public Service, Inc. Home: 3910 La. Ave. Pkwy. *Mail*: 317 Baronne St., New Orleans 9.

EUGENE C. HAWKINS, (1948), *Mechanical & Electrical Engineer*, Chief Engineer, Celotex Corp., Marrero. *Mail*: 1510 S. Carrollton Ave., New Orleans 18.

N. L. HAWKINS, (1943), *Civil Engineer*, President, Orleans Materials & Equipment Co., 1556 Tchoupitoulas St. *Mail*: P. O. Box 87, New Orleans 6.

W. WALLACE HAY, (1927), *Civil Engineer, Registered La.* Head Terminals & Floating Plant Section, Tennessee Valley Authority Home: 5507 Radio Road, Fountain City, Tenn. *Mail*: c/o T.V.A., Arnstein Bldg., Knoxville, Tenn.

HONORE M. HAYNE, (1948), *Civil Engineer*, Chief of State Lands Section, Dept. of Public Works. *Mail*: 2106 Stanford Ave., Baton Rouge, La.

ARTHUR C. HAYS, (1940), *Sales Engineer*, Manufacturer's Representative. Home: 1114 Burgundy St. *Mail*: 1221 Caronelet Bldg., New Orleans 12.

LINDA REX HAYS, (J), (1948), *Mechanical Engineer*, Junior Inspector, Cities Service Refining Corp. *Mail*: 515 Churchill Ave., Lake Charles, La.

MARION D. HEATH, (1948), *Civil Engineer, Registered La.* Assistant to Chief Engineer, La. Dept. of Public Works. *Mail*: 2059 Cloverdale Ave., Baton Rouge, La.

J. I. HEBERT, JR., (1941), *Civil Engineer, Registered La.* Civil & Consulting Engineer. Balfour & Hebert, Rayville, La.

OMER J. HEBERT, (1947), *Civil Engineer, Registered La.* Consulting Engineer, Hebert Bros., Engineers, Plaquemine, La. *Mail*: 711 Railroad Ave., Plaquemine, La.

GEORGE A. HEFT, (1939), *Civil Engineer, Registered La.* Consulting Engineer, G. A. Heft & Co., 820 Union St. *Mail*: 2420 Audubon St., New Orleans 18.

ELBERT S. HEIM, (1949), *Civil Engineer*, La. Dept. of Highways. *Mail*: 1017 New Benton Road, Bossier City, La.

CARL J. HELBAK, (1949), *Civil Engineer* District Construction Engineer, La. Dept. of Highways, P. O. Box 610, Hammond, La.

MALCOLM B. HELM, (1941), *Civil Engineer, Licensed Texas*, Petroleum Engineer, The Texas Company, Producing Dept. P. O. Box 252. *Mail*: 1812 Marengo St., New Orleans 15.

NUMA J. HELWICK, (1936), *Mechanical Engineer*, Partner, American Heating & Plumbing Co., 829 Baronne St. *Mail*: 809 Greenwood St., N. O. 19.

HARRY B. HENDERLITE, (1929), *Civil Engineer*, Partner, Masters & Henderlite, Consulting Engineers, 2500 Calliope St., New Orleans. *Mail*: 622 Westmoreland Dr., Baton Rouge.

JAMES P. HENDERSON, (1938), *Mechanical Engineer*, 1627 S. Carrollton Ave., New Orleans 18.

ALTON M. HENRICKSON, JR. (J), (1949), *Civil Engineer, Registered La.* Contracting & Sales Engineer, Gulf Buildings, Inc., 409 Vincent Bldg. *Mail*: 2247 Baronne St., New Orleans 13.

H. L. HENRY, JR., (1948), *Mechanical Engineer*, Associate Professor of M. E., La. Polytechnic Institute. Home: R.F.D. 1. *Mail*: Box 323,, Tech Station, Ruston, La.

THOMAS R. HENRY, JR. (J), (1949), *Civil Engineer, Registered La.* Civil Engineer, Columbian Gasoline Corp. Home: 1412 Riverside. *Mail*: Box 1562, Monroe, La.

FRANK M. HEROY, JR. (J), (1948), *Civil Engineer, Registered La.* Civil Engineer, Board of Commissioners, Port of N. O., 2 Canal St. *Mail*: 103 Elvis Court, New Orleans 20, La.

RUDOLPH HERTZBERG, (1943), *Civil Engineer,* Head, Levee Section, U. S. Engineer Office, Foot of Prytania St. *Mail:* 8019 Hickory St., New Orleans 18.

JAMES K. HESS, (1946), *Civil Engineer, Registered La.* Sales Engineer, Jones & Laughlin Steel Corp. Home: 65 Jackson Barracks. *Mail:* P. O. Box 66, New Orleans 6.

WILLIAM T. HESS, (1933), *Mechanical & Electrical Engineer,* Vice-Pres. and Chief Engr., La. Power & Light Co., 142 Delarondo St., New Orleans 14.

L. H. HIERS, (1946), *Mechanical Engineer,* Gas Engineer, N. O. Public Service Inc. Home: 5218 Chestnut St. *Mail:* 317 Baronne St., New Orleans 9.

LLOYD D. HIGGINBOTHAM, (J), (1949), *Electrical Engineer,* 22 Bowen Ave., Ocean Springs, Miss.

OSCAR HIGGINBOTHAM, (1934), *Chemical Engineer,* Compania Ingenios Azucareros Matanzas, S. A., Central Espana, Perica, Cuba.

ARTHUR M. HILL, (1934), *Mechanical Engineer,* Professor and Head, School of Mechanical Engineering, Tulane University. *Mail:* 823 Pine St., New Orleans 18.

G. H. HILL, (1947), *Electrical Engineer,* Technical Assistant, Cities Service Refining Corp., Tutweiler Refinery. *Mail:* P. O. Box 5625, Drew Station, Lake Charles, La.

G. WILLIAM HILL, (1936), *Mechanical and Electrical Engineer,* Sales Engineering, Westinghouse Electric & Mfg. Co., Masonic Temple Bldg. *Mail:* 2800 Audubon St., New Orleans 18.

J. CLIFTON HILL, (1942), *Chemical Engineer.* Esso Standard Oil Co. *Mail:* 2154 Broussard St., Baton Rouge.

H. JACK HINRICHS, (J), (1946), *Mechanical Engineer,* 7617 Sycamore St., New Orleans 18.

CAMIEL HOCTEL, JR. (A), (1948), *Chief Safety Engineer,* Hardware Mutuals, 4137 Washington Ave. *Mail:* 3807 Morris Place, New Orleans 21.

EDWARD A. HODGE, (1948), *Agricultural Engineer.* Rural Service Consultant, La. Power & Light Co. *Mail:* 319 Alix St., New Orleans 14, La.

THOMAS L. HODGES, (1949), *Civil Engineer, Registered N. C.* District Manager, American Bitumuls Co., P. O. Box 1108, Baton Rouge, La.

F. E. HOGAN, (1948), *Civil Engineer, Registered La.* Asst. Professor of Civil Engineering, La. Polytechnic Institute. *Mail:* Box 255, Tech Station, Ruston, La.

EDWARD D. HOGG, (1940), *Civil Engineer, Registered La.* Engineer and Assistant, Supt. California Bldg., Keller Construction Co., 7900 Palm St. *Mail:* 1723 Pratt Drive, New Orleans 22, La.

W. T. HOGG, (L. M.), (1913), *Civil Engineer,* Designing Engineer, J. P. Ewin, Inc. Home: 8000 Nelson St., New Orleans 18. *Mail:* P. O. Box 361, Mobile, 3, Ala.

ERWIN HOGGE, (1945), *Mechanical and Electrical Engineer,* Supt. of Production, La Central Electric Co., Inc. Home: Box 283, Pineville, La. *Mail:* Box 111, Alexandria, La.

CARL R. HOGLE, (1948), *Electrical Engineer,* Associate, David W. Godat & Associates. Home: 1224 St. Charles Ave. *Mail:* 314 Terminal Station Bldg., New Orleans 16.

TRUDEAU J. HOGUE, JR. (1949), *Communications Engineer,* Southern Bell Tel. & Tel. Co., 555 Florida St. *Mail:* 3359 Morning Glory Ave., Baton Rouge, La.

JOSEPH A. HOLLAND, (1940), *Civil Engineer,* Field Engineer, Billingsley Engineering Co., 409 Interstate Bank Bldg. *Mail:* 1817 Valence St., N. O. 15.

C. W. HOLLENSHEAD, (1949), *Civil Engineer,* United Gas Pipe Line Co. Home: Route 5, Lincoln Drive. *Mail:* Box 1407, Shreveport, La.

WARREN R. HOLLIER, (J), (1949), *Mechanical Engineer,* Box 173, Washington, La.

BOBBY J. HOLLINGSWORTH (J), (1949), *Civil Engineer,* Junior Membership Award Winner, La. Polytechnic Institute. *Mail:* 3024 Exposition Blvd., Shreveport, La.

WALTER HOLLOWAY, (1923), *Mechanical & Electrical Engineer,* Air Installation Officer, Major U. S. Army, Tuskegee Field. *Mail:* 34 Washington Ave., Ocean Springs, Miss.

WILLIAM D. HOLLOWAY, (1945), *Lubrication Engineer,* Supt. Industrial & Technical Oil Sales, Gulf Refining Co., P. O. Box 400, New Orleans. *Mail:* 4762 Music St., New Orleans 17.

RALPH S. HOLT, (1938), *Testing Engineer and Chemist,* Co-owner, R. S. Holt Testing Laboratory, 637 Tchoupitoulas St., New Orleans 12.

LEO LEONARD HOLZENTHAL, (1946), *Chemical Engineer,* Southern Regional Research Laboratory, 2100 Robert E. Lee Blvd. *Mail:* 303 Audubon Blvd., New Orleans 15.

ROBIN M. HOOD, (1949), *Heating and Ventilating Engineer.* Managing Partner, Frigidaire Dealership. *Mail*: 633 McCormick St. Shreveport, La.

PAUL F. HOOTS, (1927), Assistant to President, New Orleans Public Service Inc. Home: 139 Fairway Drive. *Mail*: 317 Baronne St., New Orleans 9.

FRANKLYN G. HORNSBY, (1945), *Electrical Engineer,* Supt. Meters & Service, Gulf States Utilities Co., 840 Florida St., Baton Rouge. *Mail*: 2010 Walnut St., Baton Rouge 7.

WALTER G. HORSTMAN, (1947), *Chemical Engineer,* General Supt. Plantation Pipe Line Co., Box 1743, Atlanta 1, Ga. Home: 1696 N. Emory Rd., N. E. Atlanta 6, Ga.

JOHN R. HORTON, (1949), *Station Chief,* La. Power & Light Co., Box 463, Sterlington, La.

S. E. HOTTINGER, JR., (1932), *Electrical Engineer,* Municipal Engineer, La. Rating and Fire Prevention Bureau, 609 Canal Bldg. *Mail*: 38 Allard Blvd., New Orleans 19.

LEO W. HOUGH, (1942), *Civil Engineer and Geologist,* State Geologist, La. Dept. of Conservation. Home: 2-C-3 Pentagon Courts. *Mail*: Box 8847, L.S.U., Baton Rouge, La.

FRANK S. HOUGHTON, (1946), *Mechanical Engineer,* Standard Oil Co. of La. *Mail*: 430 Westmoreland Drive, Baton Rouge, La.

CHARLES P. HOYT, (1945), *Mechanical Engineer,* Asst. Superintendent Mechanical Division, Esso Standard Oil Co., Box 551, Baton Rouge. *Mail*: P. O. Box 864, Baton Rouge, La.

WAYNE H. HUCKABY, (1949), *Engineer,* La. Dept. of Highways. *Mail*: 3811 Vernon St., Monroe, La.

MORLEY A. HUDSON, (1949), *Mechanical Engineer, Registered Texas.* Sales Engineer, Egglehof Engineers. Home: 4609 Gilbert Drive. *Mail*: P. O. Box 1055 Shreveport, La.

GEORGE O. HUET, (1949), *Naval Architect and Martine Engineer,* 5635 Milne St., New Orleans 19.

JAMES T. HUEY, (1939), *Civil Engineer, Registered La.* Senior Bridge Designer. La. Dept. of Highways, Home: 946 Convention St. *Mail*: P. O. Box 1446. Baton Rouge 3, La.

STANTON ENNES HUEY, (1937), *Civil Engineer,* Consulting Engineer, S. E. Huey & Co., Ouachita National Bank Bldg. Home: 1910 Island Drive. *Mail*: P. O. Box 183, Monroe, La.

JOHN G. HUFFMAN, (1949), *Registered Surveyor,* La. Private practice, 217 Ricou-Brewster Bldg. *Mail*: 240 Lister St., Shreveport, La.

JAMES A. HUFFORD, (1948), *Civil Engineer,* Project Engineer, La. Dept. of Highways. *Mail*: 115 Dixie St., Oakdale, La.

EDWARD F. HUGHES, (1933), *Civil Engineer, Registered La.* Asst. to Gen. Supt., Sewerage and Water Board, 526 Carondelet St. Home: 4500 S. Miro St., New Orleans 15. *Mail*: 526 Carondelet St., New Orleans 12.

GEORGE GRIFFIN HUGHES, (1948), *Mechanical Engineer,* Dean, College of Engineering, Southwestern La. Institute. *Mail*: Box 51, S.L.I., Lafayette, La.

WILLIAM J. HUGHES, (1943), *Civil Engineer,* Construction Engineer, Louisiana Department of Highways. *Mail*: 2265 Ferndale Ave., Baton Rouge 15.

CHARLES H. HUNDEMER, (1947), *Mechanical Engineer,* Gaylord Container Corp., *Mail*: 335 Richmond St., Bogalusa, La.

A. E. HUTCHINSON (J), (1947), *Civil Engineer, Registered La.* Bridge Designer, La. Dept. of Highways. *Mail*: 1202 Florida St., Baton Rouge, La.

MILES B. HUTSON, (1949), *Electrical Engineer,* Shop Supt., Industrial Electric, Inc., 3227 Magazine St. *Mail*: 321 Hillary St., New Orleans 18.

LLOYD A. HYMEL (J), *Mechanical Engineer,* Route 1, Port Allen, La.

—I—

CLARENCE A. IBACH, (1944), *Power Plant Engineer.* Assistant Test Engineer, Gulf States Utilities. Home: 408 North Blvd. *Mail*: P. O. Box 111, Baton Rouge, La.

ORVILLE T. ICE, JR., (1949), *Mechanical and Electrical Engineer.* Chief Engineer, Rosett Engineering Service, 234 Patton St. *Mail*: 522 Egan St., Shreveport, La.

JAMES F. ILGENFRITZ (J), (1949), *Mechanical Engineer,* Interstate Oil Pipe Line Co. *Mail*: 606 Topeka St., Shreveport, La.

THEODORE J. INNES, JR., (1949), *Mechanical Engineer,* Esso Standard Oil Co., La. Div., P. O. Box 551. *Mail*: 5608 Castile Ave., Baton Rouge, La.

LYALL GIBSON IRELAND, (1929), *Mechanical and Electrical Engineer*, Vice-President & Chief Engineer, New Orleans Public Service Inc. Home: 1460 Henry Clay Ave. *Mail*: 317 Baronne St., New Orleans 9.

IRWIN ISAACSON, JR. (J), (1947), *Mechanical Engineer*, Leo S. Weil & Walter B. Moses, 801 Audubon Bldg. *Mail*: 2413 Pine St., New Orleans.

C. A. IVES, JR. (1922), *Civil Engineer*, Zone Engineer, Standard Oil Co. of N. J., Baton Rouge. *Mail*: 940 Park Blvd., Baton Rouge.

—J—

ALLEN S. JACKSON (J), (1949), *Electrical Engineer*, La. Dept. of Highways. *Mail*: 238 E. State Street, Baton Rouge, La.

CLARENCE A. JACKSON, (1949), *Mechanical Engineer*, Construction Superintendent, Graven Tank & Mfg. Co. *Mail*: Box 564, Lake Charles, La.

COMMODORE ERNEST LEE JAHNCKE, (L. M.), (Jan. 1, 1900), Special Representative, Bureau of Ships, U. S. Navy, 731 Iberville. *Mail*: 726 West Beach, Pass Christian, Miss.

PAUL E. JAHNCKE, (L.M.), (Jan. 1, 1908), *Civil Engineer, Registered La.* President, Jahncke Service, Inc. Home: 7 Audubon Place. *Mail*: 814 Howard Ave., New Orleans 4.

JAMES S. JANSSEN, (1933), *Civil Engineer, Registered La.* Gas Engineer, New Orleans Public Service Inc. Home: 225 Bellaire Drive. *Mail*: 317 Baronne St., New Orleans 9.

JOSEPH EDMUND JARMAN, (1942), *Civil Engineer*, District Engineer La. Department of Highways, Box 595. *Mail*: 134 Memory Lane, Lafayette, La.

NEILL P. JEFFREY, JR., (J), (1943), *Civil Engineer, Registered La.* Structural Engineer, A. W. Thompson, 217 N. Peters St. *Mail*: 515 Short St., New Orleans.

RAYMOND E. JENKINS, (1948), *Electrical Engineer*, Assistant Professor of M. E., Southwestern La. Institute. *Mail*: P. O. Box 64, S.L.I. Lafayette, La.

ALLEN H. JENSEN, (1947), *Mechanical Engineer, Registered Ill.* New Orleans Public Service Inc. *Mail*: 4145 Vendome Place, New Orleans La.

FRANK E. JOHNSON, (1937), *Electrical Engineer*, Assistant Superintendent of Electrical Distribution, New Orleans Public Service Inc. Home: 4450 Baccich St. *Mail*: 317 Baronne St., New Orleans 9.

MILTON R. JOHNSON, JR., (1948), *Electrical Engineer*, Assistant Professor of Electrical Engineering, La. Polytechnic Institute. *Mail*: Box 255, Tech Station, Ruston, La.

ROY E. JOHNSON, (J), (1943), *Civil Engineer, Registered La.* Sales Engineer, H. H. Robertson Co., 2737 Onzaga St., New Orleans 19.

WARREN JOHNSON, (L.M.), (1906?), *Mechanical Engineer*, Retired, President and General Manager, Todd-Johnson Dry Docks, Inc. *Mail*: 6226 Marquette Place, New Orleans 15.

WILLIAM J. JOHNSON, JR., (1947), *Civil Engineer*, Superintendent, U. S. Corps of Engineers, New Orleans District. *Mail*: 536 North Market St., Opelousas, La.

WILLIAM H. JOHNSTON, (J), (1945), *Mechanical Engineer*, Partner, F. N. Johnston, Inc. Home: 1637 S. Jeff. Davis Pkwy. *Mail*: 2207 American Bank Bldg., New Orleans 12.

ALPHONSE R. JOLLISAINT, JR., (J), (1948), *Civil and Architectural Engineer*, F. C. Gandolfo, Jr. *Mail*: 3001 Elysian Fields Ave., New Orleans 19.

C. LEONARD JONES, (1923), *Civil Engineer, Registered La.* Assistant Engineer, Board of Commissioners Port of N. O., 2 Canal St. *Mail*: 2747 Audubon St., New Orleans 18.

E. LEE JONES, (1949), *Civil Engineer, Registered Ark., La., Tex.* Chief Civil Engineer, Arkansas Natural Gas Co. *Mail*: 1324 Camille St., Shreveport, La.

JACK H. JONES, (1950), *Soils Engineer*, La. Dept. of Highways. *Mail*: 2005 N. 34th St., Baton Rouge, La.

ROBERT R. JONES, (1948), *Agricultural Engineer*, Rural Service Representative, La. Power & Light Co. Home: 211 Neil Ave., New Orleans. *Mail*: 711 Second St., Gretna, La.

SARGENT F. JONES, (1940), *Civil Engineer, Registered La.* 5422 Prytania St., New Orleans 15.

WILLIAM B. JORDAN, (1949), *Mechanical Engineer*, Mech. Maintenance Engineer, La. Power & Light Co., Sterlington, La.

CHARLES E. JOUBERT, (L.M.), (Jan. 1, 1909), *Civil Engineer*, 306 W. Congress St., Lafayette, La.

JOHN A. JUDICE, (J), (1948), *Chemical Engineer*, Technician, Cit-Con Oil Corp. *Mail*: 716 Common St., Lake Charles, La.

—K—

CHARLES N. KAHN, JR., (J), (1948), *Mechanical Engineer*, Plant & Field Engineer, Petrolane Gas Co., Inc., 1352 Jefferson Highway, *Mail*: 4020 S. Derbigny St., New Orleans 15.

KARL P. KAMMER, (1931), *Mechanical Engineer*, General Superintendent of Elec. Production, New Orleans Public Service Inc. Home: 1201 Jefferson Ave. *Mail*: 317 Baronne St., New Orleans 9.

NOEL P. KAMMER, (1936), *Architectural Engineer*. Contractor, General Earthwork Service. 3527 Carondelet St., New Orleans 15.

W. J. KEATING, (A), (1946), *Electrical Engineer*, Superintendent, E. Levy & Co., 530 Murray St., Home: 335 Sixteenth St. *Mail*: P. O. Box 1845, Alexandria, La.

THOMAS S. KEATY, (1946), *Chemical Engineer*, Training Director, Standard Oil Co. of N. J. Route 2, Druscilla Lane, Baton Rouge, La.

ARTHUR R. KEILER, (1940), Chief Inspector, Hartford Steam Boiler Inspection and Insurance Co. Home: 841 2nd Orleans Parkway. *Mail*: 519 Hibernia Bank Bldg. New Orleans 12.

HARRY E. KELLAR (J), (1949), *Industrial Engineer*. Standards Engineer, J. B. Beaird Co., Inc. *Mail*: 8103 E. Linwood Ave., Shreveport, La.

CHARLES KELLER, JR., (1946), *Mechanical Engineer*, President, Keller Construction Corp. Home: 497 Audubon St. *Mail*: P. O. Box 439, New Orleans 1, La.

CLAUDE J. KELLY, (1936), *Civil Engineer*, Vice-President, N. O. Cement Products Co., Inc. 3301 Julia St. *Mail*: 4139 General Taylor St., N. O. 15.

CHARLES MACDONALD KERR, (L. M.), (1913), *Civil Engineer, Registered La.* 5831 S. Robertson St., New Orleans 15.

GERALD C. KERR, (1937), Acoustical Engineer in charge Construction Dept. Johns-Manville Co. P. O. Box 1050, New Orleans, La. *Mail*: 625 Pine St. New Orleans 18.

JAMES M. KIDD, JR., (J), (1948), *Electrical Engineer*, Instructor, Eng. Mechanics, La. State University. *Mail*: 320 St. Phillip St., Baton Rouge.

BERNARD L. KIERNAN, JR., (J), (1944), *Mechanical Engineer*, Production Supt., Asbestone Corp., 5372 Tchoupitoulas St. *Mail*: 5315 St. Anthony St., New Orleans 22.

BERNARD L. KIERNAN, SR., (1944), *Mechanical Engineer*, Chief Engineer, Jackson Brewing Co., 620 Decatur St. *Mail*: 1622 Mirabeau Ave., N. O. 19.

CLIFFORD A. KING (A), (1948), *Contractor*. Home: 389 Broadway. *Mail*: 219 Dryades St., New Orleans 12.

KENNETH M. KING, (1949), *Traffic Engineer*, City of New Orleans. *Mail*: 1232 Lowerline St., New Orleans 18.

O. G. KIRBY, (1940), *Civil Engineer*, Engineer & Construction Supt., W. R. Aldrich & Co., P. O. Box 2027. *Mail*: 1959 Myrtledale Ave., Baton Rouge, La.

THOMAS W. KIRBY, (1947), *Chemist*, Chief Chemist, Cities Service Refining Corp. *Mail*: 1704 Bryant Court Drive, Lake Charles, La.

MILTON E. KIRKPATRICK, JR., (1948), *Mechanical Engineer*, Fischer Engineering Co. 7924 Maple St., New Orleans. *Mail*: 2217 Treasure St.

LEONARD R. KIRST, (1929), *Civil Engineer, Registered La.* La. State Dept. of Public Works, Capitol Building. *Mail*: 317 East Drive, Baton Rouge 12.

JOHN T. KNIGHT, JR., (1940), *Air Conditioning Engineer*. Manager, Air Conditioning and Refrigeration Division, Equitable Equipment Company, 410 Camp Street, New Orleans. Home: 117 Chalfant Place.

NATHANIEL B. KNIGHT, JR., (J), (1944), *Electrical Engineer*. 11 Newton St., Gretna, La.

CHARLES P. KNOST, (1944), *Electrical Engineer*, District Representative, Moloney Electric Company. Home: 7903 Belfast. *Mail*: 4018 Thalia St., New Orleans, La.

MARION F. KNOST, (1946), *Mechanical and Electrical Engineer*, Chief Staff Engineer, Gulf Refining Co. Home: 1810 S. Dupre St. *Mail*: P. O. Box 400, New Orleans, La.

WILHELM E. KOCH, (1916), (L. M.), *Construction Engineer*, Shutzr & Armistead, Architects & Engineers, Atlanta, Ga. *Mail*: 2627 Coliseum St., New Orleans 13.

RICHARD B. KOHNKE, (L. M.), (1911), *Civil Engineer, Registered La.* Engineering Administrative Asst., City of New Orleans, City Hall. *Mail*: 932 Picheloup Place, New Orleans 19.

BOLESLAUS M. KOPACZ, (1949), *Chemical Engineer*. Sales Engineer, Process Equipment Co. *Mail*: 5341 St. Charles Ave., New Orleans 15.

JOSEPH S. KOPFLER, JR., (1949), *Highway Engineer.* Member Board of Highways, State of La. *Mail*: 330 Clay St., Kenner, La.

LOUIS I. KORN, (1933), *Mechanical and Electrical Engineer,* Corps of Engineers, Ft. of Prytania St. *Mail*: 2201 Octavia St., New Orleans 15.

GUS C. KRAUS, (A), (1929), *Mechanical Engineer,* Assistant Superintendent, Rolling Stock & Shops, New Orleans Public Service Inc., 317 Baronne St. *Mail*: 2838 Iberville St., New Orleans 19.

HAROLD F. KRAUS (J), (1950), *Electrical Engineer,* Corps of Engineers, Foot of Prytania St. *Mail*: 4956 Venus St., New Orleans 22, La.

FREDERICK KRING, JR., (1948), *Mechanical Engineer,* Asst. Process Supt., Baton Rouge Refinery, Standard Oil Co. of N. J. *Mail*: 6129 Esplanade Ave., Baton Rouge, La.

S. HENRY KRONTHAL, (1950), *Architectural Engineer.* Construction Engineer, Research Corp. and Research Const. Co., Bound Brook, N. J. Home: P. O. Box 106, Bogalusa, La.

ROBERT J. KUHN, (1925), *Electrical Engineer,* Consulting Engineer, Electrolysis and Corrosion. Home: 2724 Octavia St., New Orleans 15.

—L—

EDWIN A. LAFAYE, (J), *Mechanical Engineer,* Sales Engineer, Murray-Baker-Frederic, Inc. *Mail*: 620 S. Peters. Home: 911 Lowerline St., New Orleans 18.

PAUL M. LAGARDE, (1947), *Civil Engineer,* Asst. Chief Engr., New Orleans Public Belt Railroad. *Mail*: 38 Davis Blvd., New Orleans, La.

EDWARD O. LAKIN, (J), (1947), *Mechanical Engineer,* Sales Engineer, Westinghouse Electric Supply Co., 420 S. Peters St., New Orleans. *Mail*: 1748 Cloverdale Ave., Baton Rouge.

GEORGE B. LAMBERT, JR., (1939), *Engineer,* M. T. Reed Construction Co., Operation Div., U. S. Navy ABD., Gulfport, Miss. *Mail*: Mississippi City, Miss.

EARL A. LANDRY, (1942), *Civil Engineer,* Asst. Maint. Engineer, La. Dept. of Highways. *Mail*: Port Allen, La.

HENRY LOUIS LANDRY, (1942), *Electrical Engineer,* Industrial Sales Engineer, Gulf States Utilities Co. *Mail*: 2222 Cedardale Ave., Baton Rouge, La.

HERRICK J. LANE, (1929), *Civil Engineer,* Member of firm, W. Horace Williams Co. 1465 State St. *Mail*: 833 Howard Ave., New Orleans 13.

HERRICK J. LANE, JR., (1946), *Civil Engineer,* W. Horace Williams Co., *Mail*: 833 Howard Ave. *Mail*: 1465 State St., New Orleans 15.

WILLIAM J. LANK, (1949), *Civil Engineer, Registered La., Tex., Ark.* Division Engineer, Kansas City Southern Ry. Co. *Mail*: 171 Albert St., Shreveport, La.

N. E. LANT, (1937), *Chief Engineer.* La. Dept. of Highways. Home: 4780 Newcomb Drive. *Mail*: La. Dept. of Highways, Baton Rouge, La.

FERNAND S. LAPEYRE, (1948), *Mechanical & Electrical Engineer,* Sales Engineer, Murray-Baker-Frederic, Inc. *Mail*: 1224 Octavia St., New Orleans 15.

WILLIAM M. LARKIN, (1944), *Electrical Engineer,* Supt., Ind. and Comm. Sales L. C. Div. Gulf States Utilities. Home: 315 Kirkman St. *Mail*: Gulf States Utilities, Lake Charles, La.

LEO JOS. LASSALLE, (1936), *Civil and Mechanical Engineer,* Dean, College of Engineering and Professor of Eng. Mechanics, La. State University and A & M College. Home: 1160 Stanford Ave. *Mail*: University Station, Baton Rouge 3.

DOUGLAS F. LATIMER, (1946), *Mechanical and Civil Engineer,* Industrial Sales Engineer, Gulf States Utilities Co. Home: 1974 Ramsey Drive. *Mail*: P. O. Box 2431, Baton Rouge, La.

JOHN A. LAURENT, (J), (1946), *Electrical Engineer,* General Electric Co., *Mail*: 2014 E. Genesee St., Syracuse, N. Y.

MAXWELL A. LEA, (1948), *Mechanical Engineer,* Power Supervisor, Ethyl Corp., Box 341. *Mail*: 528 Kenmore Ave., Baton Rouge 11.

W. STONE LEAKE, (1934), *Electrical Engineer,* Sales Engineer, General Electric Co. Home: 303 Betz Place. *Mail*: 1004 Richards Bldg., New Orleans 12.

H. A. LEBLANC, JR., (1947), *Chemical Engineer,* Head Inspection Dept., Shell Oil Co., Inc., Norco, La.

JOSEPH H. LEBLANC, JR., (J), (1945), *Mechanical Engineer,* Shop Engineer, Welding and Mfg. Co., 1040 S. Peters St. *Mail*: 3529 Clermont Drive, New Orleans 17.

OWEN V. LEBLANC, (J), (1944), *Civil Engineer, Registered La.* Civil Engr., W. Horrace Williams Co. *Mail*: 5643 West End Blvd., New Orleans La.

WHARTON A. LEBLANC, (1948), *Agricultural Engineer,* Chief Engineer, General Gas Corp. Home: 2226 Pickett Ave. *Mail*: Box 2271, Baton Rouge, La.

WENDEL J. LECHTENBERG, (J), (1944), *Electrical Engineer*, Mathieson Chemical Corp., Lake Charles, La. *Mail*: 820½ Clement St., Lake Charles, La.

STANLEY M. LECOURT, (1933), *Civil Engineer*, Naval Architect and Research Engineer, Mississippi Shipping Co., Inc., 1300 Hibernia Bldg. *Mail*: 3033 Robert St., New Orleans 15.

J. McLEAN LeDOUX, (1945), *Electrical and Civil Engineer*, District Manager, National Electric Products Corp., 629½ Baronne St. *Mail*: 5700 Garfield St., New Orleans 15.

CLARENCE O. LEE, (1944), *Mining Engineer*, Technical Assistant to Gen'l. Mgr., Freeport Sulphur Co. Home: 3520 Vincennes Place. *Mail*: 1804 American Bank Bldg., New Orleans 5.

RANDALL F. LEGEAI, (1923), *Mechanical & Electrical Engineer*, Sales Engineer, New Orleans Public Service Inc., 317 Baronne St., New Orleans 9. *Mail*: 3824 Nashville Ave., New Orleans 15.

A. J. LEHMAN, (1948), *Electrical Engineer, Registered Texas*, Asst. Supt. of Eng. and Mtce., Freeport Sulphur Co., Box 187. Port Sulpbur, La.

BRYAN J. LEHMANN, (1935), *Mechanical Engineer*, Dept. Manager, Shell Oil Co., Inc. *Mail*: c/o Shell Oil Co., Inc., Norco, La.

H. L. LEHMANN, (1937). *Highway Engr., Testing and Research Engineer*, La. Dept. of Highways. Home: 2152 Myrtledale Ave. *Mail*: Louisiana Department of Highways, Baton Rouge, La.

WENDEL G. LEIBE, (J), (1946), *Mechanical Engineer*, Junior Engineer, Celotex Corp., Marrero. *Mail*: 426 S. Jefferson Davis Parkway, New Orleans 19.

HARSHALL B. LEICHT (J), (1949), *Electrical Engineer*. Jr. Field Engineer, Stone and Webster Engineering Corp., Box 151. *Mail*: 4292 Detroit St., Beaumont, Texas.

JACK E. LeMAY, (1947), *Mechanical Engineer*. Industrial Sales Engr., National Carbon Co., Inc. *Mail*: 340 W. Roosevelt St., Baton Rouge, La.

HOUSTON LESTER, (1947), *Civil Engineer*, Res. Construction Engr., Stone & Webster Engr. Corp., Box 1109, Baton Rouge. *Mail*: 1476 S. 24th St., Baton Rouge, La.

HAROLD A. LEVEY, (1936), *Chemical Engineer, Consultant, Registered Texas*, President American Products Mfg. Co. 8131 Oleander St. *Mail*: 311 Audubon Blvd., New Orleans 15.

ALLISON M. LEVY (J), (1944), *Mechanical Engineer*. Structural and Mechanical Engineer, A. Hays Town. *Mail*: 2543 Rittiner Drive, Baton Rouge, La.

EUGENE LEVY, (A), (1946), *Electrical Contractor*, Owner, E. Levy & Co., Electrical Contractors. Home: 2108 Jackson St. *Mail*: 530 Murray St., Alexandria, La.

MILTON L. LEVY, (1946), *Electrical Engineer*, Electrical Engineer, Higgins Inc., Gentilly Hwy. & Ind. Canal. *Mail*: 5673 West End Blvd., N. O. 19.

NEVILLE LEVY, (1929), *Mechanical and Electrical Engineer*, President, Equitable Equipment Co., Inc. Home: 6306 Prytania St. *Mail*: 410 Camp St., New Orleans.

RALPH E. LIND, (1930), *Civil Engineer, Registered La.* 6624 Louis XIV St., New Orleans 19.

RALPH E. LIND, JR., (1947), *Civil Engineer*, Asst. Engr., Bechtel Corp., Box 371, Louisiana, Mo. *Mail*: 2202 W. 20th St., Los Angeles, Cal.

ROBERT P. LINFIELD, (1930), *Civil Engineer*, Favrot & Reed, Architects. *Mail*: 7715 Burthe St., New Orleans 18.

ROBERT P. LOCKETT, (A), (1931), *Mechanical Engineer*, Vice-President, A. M. Lockett & Co. Home: 2130 Palmer Ave. *Mail*: 308 Whitney Bldg., New Orleans 7.

ROBERT P. LOCKETT, JR., (1947), *Mechanical Engineer*, Sales Engineer, A. M. Lockett & Co., *Mail*: 308 Whitney Bldg. Home: 2130 Palmer Ave., New Orleans.

T. BENBURY LOCKETT, (1949), *Mechanical Engineer*. Sales Engineer, Standard Supply and Hardware Co., 832 Tchoupitoulas St. Home: 2130 Palmer Ave., New Orleans, La.

WILLIAM A. LOCHTE, (1945), *Mechanical Engineer*, Marine Engineer, American-South African Steamship Co., 26 Beaver St., N. Y. *Mail*: 7021 Hickory St., New Orleans 18.

GEORGE L. LOGAN, (1948), *Petroleum Engineer*, Lyons and Prentiss. Home: 3731 Richmond. *Mail*: 806 Giddens-Lane Bldg., Shreveport, La.

JOHN S. LOGAN, (1949), *Highway Engineer*. District Engineer, U.S. Bureau of Public Roads, 323 Post Office Bldg. *Mail*: 416 East Drive, Baton Rouge, 12, La.

JULES A. LORIO, (1921), *Mechanical Engineer,* Mgr. Sugar Mill Div., Dibert, Bancroft & Russ Co., Ltd., 3400 Tulane Ave. *Mail:* 7420 Benjamin St., New Orleans 18.

ALFRED J. LOUP, JR., (J), (1949), *Civil Engineer, Registered La.* Senior Detailer, La. Dept. of Highways. *Mail:* 2349 Edgewood Drive, Baton Rouge, La.

L. A. Loustalot, (L.M.), (1913), *Civil Engineer,* Hammond, La.

BERNARD LOUVIERE, (J), (1948), *Mechanical Engineer,* Sales Engineer, Gulf Engineering Co., Inc. Home: 818 Greenwood Drive. *Mail:* 1000 S. Peters St., New Orleans 13.

A. A. LYONS, (1949), *Civil Engineer, Registered.* Private practice. *Mail:* 659 Rutherford St., Shreveport, La.

BYRON PHELPS LYONS, (1944), *Civil Engineer, Registered La.* Chief Engr., La. Dept. Public Works. *Mail:* 614 Drehr Ave., Baton Rouge.

VAL A. LYONS, (1949), *Civil Engineer.* Draftsman, E. M. Freeman & Associates-416 Texas Eastern Bldg. *Mail:* 228 E. Wilkinson St., Shreveport, La.

— M —

DANIEL P. MABEL, (1945), *Electrical Engineer,* District Manager, Anaconda Wire & Cable Co. Home: 305 W. Maple St., Zone 20. *Mail:* 601 Hibernia Bldg., New Orleans 12.

AUBON L. MABRY (J), (1947), *Civil Engineer, Registered La.* Engineer, Stevens Bro. and The Miller-Hutchinson Co., Inc. 730 Gravier St. *Mail:* 101 Larchmont Place, New Orleans 14, La.

FRANK W. MACDONALD, (1933), *Civil Engineer,* Associate Professor of Civil Engineering, Tulane University. Home: 2412 Calhoun St. *Mail:* c/o Tulane University, New Orleans 18.

WALLACE RAY MACK, (1942), *Civil Engineer,* Senior Project Engr., Louisiana Department of Highways. *Mail:* Box 555, Oakdale, La.

KENNETH W. MACKENZIE, (1939), *Testing Engineer,* Owner, Construction Materials Laboratory, 624 Atchley St., Knoxville, Tenn.

WILLIAM D. MAITLAND, (1947), *Safety Engineer,* Resident Engineer, Travelers Ins. Companies, 417 Richards Bldg., New Orleans 12.

JOHN F. MALLETTE, (1943), *Junior Project Engineer,* La. Dept. of Highways, Monroe, La. *Mail:* Harrisonburg, La.

HENRY J. MALOCHEE, (L. M.), (March 5, 1898), *Mechanical Engineer,* Retired, 4420 Danneel St., New Orleans 15.

JOHN D. MALONE, JR., (1937), *Electrical Engineer,* Operating Engineer, New Orleans Public Service Inc. Home: 234 Glendale Blvd., Metairie. *Mail:* 317 Baronne St., New Orleans 9.

H. H. MANNER, JR., (1947), *Architectural Engineer,* Partner and Manager, La. Metal Culvert Co. Home: 6277 Jefferson Highway. *Mail:* Box 2427, Baton Rouge, La.

SPALDING KENAN MANSON, JR., (J), (1942), *Civil Engineer, Registered La.* Building Specialties Sales, Clifford A. King, 219 Dryades St. *Mail:* 7819 S. Claiborne Ave., New Orleans 18.

MICHAEL J. MARCHESE, (1948), *Electrical Engineer,* U. S. Engineer Corps, N. O. Dist. *Mail:* 1716 St. Roch Ave., New Orleans 17.

ALBERT E. MARKS, (1925), *Civil Engineer,* 5633 Rosemary Place, N. O. 19.

HAROLD O. MARQUART, (1943), *Civil Engineer,* Resident Engineer, Carnegie & Smith, Bogalusa, La. *Mail:* P. O. Box 314, Franklinton, La.

EDMUND B. MARTIN, (1937), *Electrical Engineer,* Federal Land Bank, 4118 Saratoga St., New Orleans 15.

JAMES H. MARTIN, JR., (1941), *Electrical Engineer,* Transmission Engineer, Woodward Wight & Co., *Mail:* 2714 Palmer Avenue, New Orleans.

JOHN L. MARTINEZ, (J), (1947), *Mechanical Engineer,* Instructor in Experimental Eng., Tulane University. *Mail:* 12 Fontainebleau Drive, New Orleans 18.

AUSTIN J. MARY, (1946), *Electrical Engineer,* Supervisor Electric Distribution Engineering, Gulf States Utilities Co. *Mail:* 1767 Cedardale Ave., Baton Rouge, La.

HIRAM RUSSELL MASON, (1945), *Electrical Engineer,* Professor and Head of Department of Electrical Engineering, Southwestern Louisiana Institute, Lafayette, La.

SEBASTIAN V. MASSIMINI, (1931), *Mechanical Engineer,* President Gulf Engineering Co. Inc. Home: 1430 Broadway. *Mail:* 1000 S. Peters St., New Orleans 13.

ALLEN J. MATHERNE, JR., (1943). *Electrical Engineer*, Maintenance Engineer, Gulf States Utilities Co., Lake Charles, La. *Mail*: 41 Eucalyptus Road, Maplewood, La.

C. A. MATHERNE, JR., (J), (1948), *Mechanical Engineer*, 425 S. 21st St., Baton Rouge, La.

RUSSEL A. MATHERNE, (J), (1945), *Mechanical Engineer*, Design Engineer, Barnard & Burk, *Mail*: 314 Triad Bldg., Baton Rouge, La. Home: 325 Evergreen Dr.

EMMETT LEE MATHEWS, JR. (J), (1949), *Electrical Engineer*, Junior Engr. City of Alexandria. *Mail*: Route 2, Box 21, Alexandria, La.

ARNOLD CARL MATTHIES, (1945), *Chemical Engineer*, Petroleum Technical Service Dept., Esso Standard Oil Co., North Baton Rouge, La. *Mail*: 2285 Cederdale Ave., Baton Rouge 15.

E. D. MATTIX, (1947), *Chemical Engineer*, Technical Asst., Cities Service Ref. Corp. *Mail*: 1616 Seventh St., Lake Charles, La.

W. J. MATTOX, (1947), *Research Chemist*, Esso Standard Oil Co. *Mail*: 612 S Lakeshore Drive, Baton Rouge 15.

GEORGE ELMER MAY, (1940), *Mechanical and Electrical Engineer*, Principal Utilization, N. O. Public Service Inc., 317 Baronne St. *Mail*: 2031 Short St., New Orleans 18.

JOHN K. MAYER, (1933), *Mechanical and Electrical Engineer*, Professor of Mechanical Engineering, Tulane University, 2419 Audubon St. *Mail*: College of Engineering, Tulane University, New Orleans 18.

WILLIAM G. MAYER (J), (1950), *Civil Engineer, Registered La.* Senior Instrumentman, La. Dept. of Highways, P. O. Box 268, Plain Dealing, La.

CHARLES J. MAYEUX, JR., (1947), *Civil Engineer, Registered La.*, Gaylord Container Corp. *Mail*: 906 North Border Drive, Bogalusa, La.

JOHN F. MAYS, (1937), *Civil Engineer*, U. S. Corps of Engrs., N. O. Dist. *Mail*: 1407 First St., New Orleans 13.

JOHN E. McADAM, (1949), *Electrical Engineer*, Manager, Dixie Electric Membership Corp., Box 2230. *Mail*: 736 North Blvd., Baton Rouge, La.

SAMUEL H. McAFEE, JR., (1950), *Mechanical Engineer*, Assistant Engineer, Eqpt. Dept., New Orleans Public Service Inc., 2838 Iberville St. *Mail*: 4520 S. Johnson St., New Orleans, La.

JOHN I. McCAIN, *Civil Engineer, Registered La.*, Engr., Mason-McCain, Inc., 8200 Florida St. *Mail*: 195 E. Airport Ave., Baton Rouge, La.

A. HEWS McCANN, JR., (1946), *Civil Engineer*, 410 Howes Building, Clinton, Iowa.

R. A. McCLENAGHAN, (1949), *Civil Engineer, Registered La., Tex.* Partner, McClenaghan & Barr, Engineers and Architects. Home: 741 Linden St., *Mail*: P. O. Box 4117, Shreveport, La.

S. LOGAN McCONNELL, (1947), *Mechanical and Electrical Engineer, Surveyor, Registered L., Miss.*, Director, Division of Regulatory Inspections, City of New Orleans. *Mail*: 1327 Webster St., New Orleans 18.

LUTHER D. McCORQUODALE, (J), (1942), *Civil Engineer, Asst.* Dist. Maint. Engr. La. Dept. of Highways, Box 1482. *Mail*: 1007 S. Division St., Lake Charles, La.

JAMES P. McCULLOUGH, (1938), *Chemical Engineer*, Contracts Supervisor, United Gas Pipe Co. Home: 724 McCormick St. *Mail*: P. O. Box 1407, Shreveport, La.

A. H. McDONALD, (1949), *Civil Engineer*, Registered La. Gas Engineer, United Gas Pipe Line Co. *Mail*: 136 East Rutherford St., Shreveport 56, La.

J. L. McGEGEE (J), (1949), *Naval Engineer*, Mente & Company, 1401 Montegut St. *Mail*: 1415 Exposition Blvd., New Orleans, La.

GEORGE B. McGUIRE, (1947), *Civil Engineer*, Resident Engineer, Standard Oil Development Co. *Mail*: 295 Forest Drive, Union, N. J.

KENNETH N. McINTOSH, (1949), *Electrical Engineer*, Head, Rate Dept., New Orleans Public Service Inc. *Mail*: 317 Baronne St. Home: 5418 S. Miro St., New Orleans, La.

PAUL A. McKIM (J), (1944), *Chemical Engineer*, Process Design Engineer, Ethyl Corp., Box 341. *Mail*: 5637 Lemonwood Drive, Baton Rouge, La.

MARC McKINLEY, (A), (1947), *Electrical Engineer*, 407 Burnett St., Lake Charles, La.

GORDON J. McLEAN, (1923), *Mechanical and Electrical Engineer*, Registered Del. Hammond Highway, Covington, La.

LEAL C. H. McLEAN, (1933)),*Mechanical and Electrical Engineer*, Chief Engineer, Jones & Laughlin Steel Corp. Home: 1325 Cadiz St. *Mail*: P. O. Box 66, New Orleans 6.

EDWARD A. McLELLAN, (1938), *Mechanical Engineer,* Partner, McLellan A-C Supply Co. Home: 1453 Arabella St. *Mail:* 2375 Tchoupitoulas St., New Orleans 13.

JESSIE C. McLEMORE, (1949), *Surveyor,* Registered La. Private practice. Home: 736 Thora Blvd. *Mail:* 305 First National Bank Bldg., Shreveport, La.

EDWARD J. McNAMARA, (1937), *Civil Engineer,* Registered La. Engineer, Lionel F. Favret, General Contractor, 937 Gravier St., New Orleans 12, La.

FRANK P. McNAMARA (J), (1949), *Civil Engineer,* Registered La. Survey Party Chief, Cities Service Refining Corp., Tutweiler Refinery, Lake Charles, La. *Mail:* 425 Phillips St., Sulphur, La.

ERNEST W. McNEIL, JR., (1948), *Electrical Engineer,* Head, Training Dept., Esso Standard Oil Co., La. Div., Box 551. *Mail:* 1830 Walnut St., Baton Rouge, La.

NEIL McNELIS, (1949), *Civil Engineer,* Registered La. Civil Engineer, The Carter Oil Co., P. O. Box 1739. *Mail:* 212 East Elmwood St., Shreveport, La.

J. A. McNIVEN, (1922), *Civil Engineer, Chief Engineer,* Board of Commissioners, Port of New Orleans. Home: 224 E. Livinsgton Place, Metairie. *Mail:* No. 2, Canal St., New Orleans 6, La.

E. S. McROBERTS, (1949), *Mechanical Engineer.* Assistant Chief Engineer, The J. B. Beaird Company, Inc., P. O. Box 1115. *Mail:* 6114 Henderson St., Shreveport 41, La.

GEORGE P. MEADE, (1936), *Chemical Engineer,* Manager Gramercy Refinery, Colonial Sugars Co., Gramercy, La.

ALFRED MARION MELANCON, (1942), *Engineering Draftsman,* Gulf States Utilities Co. *Mail:* 762 North 27th St., Baton Rouge, La.

C. GLENNON MELVILLE, (1943), *Civil Engineer.* W. Horace Williams Co. 833 Howard Ave., New Orleans 13. *Mail:* 6026 Memphis St.

OSKAR R. MENTON, (1948), *Electrical Engineer,* Asst. Head Mech. Eng. Dept. Esso Standard Oil Co. *Mail:* 350 State Street, Baton Rouge.

WALTER H. MERCIER, (1947), *Mechanical Engineer,* Maintenance Engr., Esso Standard Oil Co., P. O. Box 551. *Mail:* 2220 Terrace Ave., Baton Rouge, La.

RICHARD F. MESSINA, (1945), *Civil Engineer,* Sales Engineer, Messina Eng. Sales Co., 4438 Calliope St. *Mail:* 10 Brockenbaugh Court, New Orleans 20, La.

HENRY M. MESSINGER, (1950), *Surveyor,* Registered La. Private Practice. *Mail:* 401 Jackson St., Bastrop, La.

RAYMOND J. MEYER, (J), (1947), *Mechanical Engineer,* Associate Engineer, Louisiana Power & Light Co., 711 2nd St. *Mail:* 816 Seventh St., Gretna, La.

ALBERT J. MEYERS, (1933), *Civil Engineer,* Utilities Engineer, Shell Oil Co., Norco, La.

FRANK J. MIANO, (J), (1949), *Mechanical Engineer,* Box 293, Garyville, La.

JOHN M. MIAZZA, (J), (1942), *Mechanical Engineer,* Research Associate, Biophysics Laboratory, Tulane University. *Mail:* 7120 Willow St., Apt. J, New Orleans 18, La.

GEORGE E. MILLARD, (1945), *Mech. Engineer,* Manager, Diesel Engine Dept., Fairbanks Morse Co. *Mail:* 5528 Pitt St., New Orleans 15.

ERNEST G. MILLER, (1949), *Mechanical Engineer,* Asst. Head Maintenance & Construction, Esso Standard Oil Co. Home: 5125 Greenside Lane. *Mail:* Box 551 Baton Rouge, La.

VERMON E. MILLS, (1948), *Mechanical Engineer,* Design and Estimating Engineer, Cit-Con Oil Corp., Box 1578, Lake Charles. *Mail:* 101 Center Circle, Maplewood, La.

ERNEST L. MIRE, (1938), *Civil Engineer,* Registered La. Chief Engineer, New Orleans Public Belt Railroad. Home: 5420 Fontainebleau Drive. *Mail:* P. O. Box 1240, New Orleans 10, La.

EDWARD C. MISHOU, (1949), *Petroleum Engineer,* Division Engineer, Interstate Oil Pipe Line Co., Southern Div., Box 1107. *Mail:* 4408 Youree Drive, Shreveport 86, La.

CHARLES A. MITCHELL, (1949), *Mechanical-Chemical Engineer,* Registered Ohio. District Representative, Joseph W. Eshleman & Co., 745 Laurel St. *Mail:* P. O. Box 2406, Baton Rouge, La.

H. LANE MITCHELL, (1944), *Civil Engineer,* Commissioner of Public Works, City of Shreveport. Home: 350 Albany Ave. *Mail:* City Hall, Shreveport, La.

HOMER E. MOBLEY, JR., (A), (1949), *Civil Engineer,* Asst. Chief Hired Labor Inspection, U. S. Engineer Corps, N. O. District. *Mail:* 409 Gordon Ave., Harahan, La.

H. C. MOFFITT, JR., (1948), *Civil Engineer,* Registered La. U. S. Engineer Corps, N. O. District. *Mail:* 510½ Henry Clay Ave., New Orleans, La.

HENRI J. MOLAISON, (1934), *Chemical Engineer*, Registered Texas. Head, Design Section, Engineering and Development Division, U. S. Southern Regional Laboratory, U. S. Dept. of Agriculture, 2100 Robert E. Lee Blvd. *Mail*: 1003 Hidalgo St., New Orleans 19, La.

JOHN EDWARD MONROE, JR., (1944),*Chemical Engineer*, Asst. Superintendent of Production, Freeport Sulphur Co. *Mail*: P. O. Box 657, Port Sulphur, La.

JOHN W. MONTGOMERY, (1923), *Structural Engineer*, Retired, 4109 Tchoupitoulas Street, New Orleans 15.

JOSEPH T. MONTGOMERY III (J), (1946), *Civil Engineer*, V. J. Bedell Co., 840 Union St. *Mail*: 2828 Audubon St., New Orleans 18.

DAVID MOODIE, (1933), *Mechanical Engineer*. Engineer. N. O. Public Service Inc., Market Street S. E. Generating Station. Home: 2839 Audubon St. *Mail*: 1600 So. Peters St., New Orleans 13.

JOHN E. MOREHISER, JR., (1936), *Mechanical Engineer*, Engineer Industrial Steel Co., Inc., P. O. Box 7128. *Mail*: Route 2, Box 714, New Orleans 21, La.

LELAND E. MORGAN, (J), (1948). *Agricultural Engineer*. Design & Development Engineer, Gatcher Eng. & Mfg. Co. Home: 413 LeFlore St. *Mail*: 128 Sunflower St., Clarksdale, Miss.

R. DOUGLAS MORGAN, (1949), *Civil Engineer*, Registered La. Resident Engineer, La. Dept. of Public Works, 218 Ricou-Brewster Bldg. *Mail*: 3611 Lillian St., Shreveport 65, La.

THURMAN C. MORGAN, (1949), *Civil Engineer*, Registered La. Asst. to District Engineer, Dept. of Public Works, State of La., Snyder Bldg. *Mail*: 601 N. Mulberry St., Tallulah, La.

RICHARD A. MORNHINVEG, (1937), *Mechanical Engineer*. *Mail*: 998 Ingleside Drive, Baton Rouge, La.

CARL T. MORRIS, (1949), *Civil Engineer*, Licensed Surveyor, La. Chief Civil Engineer, Gulf Refining Co., Box 1731 Shreveport, La.

DEWITT L. MORRIS, (1947), *Mechanical Engineer*, Supervisor of Cost Control, Freeport Sulphur Co., Port Sulphur, La.

ROBERT L. MORRIS, III, (1948), *Chemical Engineer*, Production Engr., Reilly-Benton Co. *Mail*: 1430 Philip Street, New Orleans, La.

WILLIS DEDRIC MORRIS, (1945), *Electrical Engineer*, Associate Professor of Electrical Engineering, Louisiana State University. *Mail*: 555 Stanford Ave., Baton Rouge 14.

MILTON K. MORRISON (J), (1949), *Mechanical Engineer*, Rotating Engineer, General Electric Co. *Mail*: 1007 Maryland Ave., Schenectady 8, N. Y.

WALTER B. MOSES, (L. M.), (1913), *Mechanical and Electrical Engineer*, Consulting Engineer, Partner Leo S. Weil & Walter B. Moses. 3504 Napoleon Ave. *Mail*: 801 Audubon Bldg., New Orleans 16.

F. PRESTON MOTTRAM, (J), (1948), *Mechanical Engineer*. Maintenance Engineer, Swift & Co., Plant Food Division, Harvey. *Mail*: 2403 Carondelet St., New Orleans 13, La.

JACOB F. MULLER, JR., (1932), *Mechanical Engineer*, Partner, Muller Furniture Mfg., Co., 200 N. Derbigny St. *Mail*: 3 Fairview Court, New Orleans 20, La.

KARL C. P. MULLER, (1949), *Mechanical Engineer*, Associate Engineer, Louisiana Power & Light Co., Sterlington. *Mail*: 2516 N. 10th St., West Monroe, La.

RICHARD F. MULLER, (1939), *Mechanical and Electrical Engineer*. District Mgr., Allis Chalmers Manufacturing Co. Home: 2905 Palmer Ave. *Mail*: 724 Canal Bldg., New Orleans 12.

ADAM G. MUNDINGER, (1943), *Civil Engineer*, Registered La. Owner, A. G. Mundinger Co., 410 Louisiana Ave. *Mail*: 4559 Highland Road, Baton Rouge, La.

JOHN J. MUNDINGER, (1947), *Civil Engineer*, Boundary Survey Engr., La. Dept. Highways.*Mail*: 901 Boyd Avenue, Baton Rouge, La.

ROBERT S. MUNSELL, (1944), *Mining Engineer*, Job Engineer, Bechtel Corp., 250 Sansome St., San Francisco, Calif. *Mail*: 6267 California Ave., Long Beach, Calif.

JOSEPH R. MURPHY, (1943), Power Plant Engineer, Assistant to Supt., Gulf States Utilities Co. *Mail*: 345 Kenwood Ave., Baton Rouge, La.

STENNING C. MURPHY, (J), (1944), *Chemical Engineer*. Chief Chemist, Blue Plate Foods, Inc., 1315 S. Jeff. Davis Parkway. *Mail*: 459 Audubon Blvd., New Orleans 18.

JOHN D. MURRY, (J), (1950), *Civil Engineer*, Registered La. Engineer-Estimator, Southern Builders, Inc. *Mail*: 212, Ruston, La.

WESTON W. MUSE, JR., (1945), *Civil Engineer*, Resident Engineer, Department of Highways. *Mail*: 528 Lakeland Drive, Baton Rouge 8.

CHARLES A. MYERS, (1937), *Civil Engineer*, Registered La. Partner, Pan American Engineers, 1418 Third St. Home: 2419 Midway St., Alexandria, La.

LARUE D. MYERS, (1949), *Civil Engineer, Registered Texas and Mississippi*, Engineer, United Gas Pipe Line Co., P. O. Box 1407. *Mail*: 522 Southfield Road, Shreveport, La.

— N —

EDWARD M. NABERSCHNIG, JR., (1923), *Chemical Engineer*, Assistant to Works Supt., Southern Cotton Oil Co., Star Route, Box 1630, Westwego, La.

PATRICK J. NAIN (J), (1949) *Civil Engineer*, 7721½ Green St., New Orleans 18.

CLAYTON L. NAIRNE, (1929), *Mechanical and Electrical Engineer*, Assistant to Executive Vice-President, New Orleans Public Service Inc. Home. 6031 Pitt St. *Mail*: 317 Baronne St., New Orleans 9.

ROBERT L. NALL, (1936), *Mechanical Engineer*, Plant Engineer, Flintkote Co., 4500 N. Galvez St. *Mail*: 1139 State St., New Orleans 18.

ARTHUR J. NAQUIN, (1928), *Mechanical and Electrical Engineer*, Safety Counselor New Orleans Public Service Inc. 2515 Pine St. *Mail*: 317 Baronne St., New Orleans 9.

STEVE A. NASCA, (1947), *Civil Engineer, Registered La*, Senior Bridge Designer, La. Dept. of Highways. Home: 531 E. Polk St. *Mail*: La. Dept. of Hwys., Bridge Design Section, Baton Rouge, La.

ALLEN J. NEGROTTO, (L.M.), (1929), *Civil Engineer*, Acting Division Engineer, R.F.C. O.D.P., 501 Board of Trade Bldg *Mail*: 129 Beverly Drive, New Orleans 20.

BERNARD STANLEY NELSON, (L.M.), (1911), *Mechanical Engineer, Registered Tex.*, Chief Engineer A. M. Lockett & Co., Ltd., 308 Whitney Bldg., *Mail*: 7319 Panola St., New Orleans 18.

LAWRENCE K. NELSON, (1940), *Mechanical and Electrical Engineer*, 2502 Palmer Ave., New Orleans 15.

WALDEMAR S. NELSON, *Mechanical-Electrical Engineer, Registered Tex., Ark., Miss.*, Partner, Bedell & Nelson, 840 Union St. *Mail*: 322 Hillary St., New Orleans 18.

WYLY D. NELSON, (1947), *Chemical Engineer*, Senior General Engineer, Cities Service Rfg. Corp. *Mail*: 934 N. Division St., Lake Charles, La.

RICHARD B. NERF (J), (1949), Junior Membership Award Winner for 1949, Louisiana State University. *Mail*: c/o Standard Oil Company, Baton Rouge, La.

CLIFTON R. NEWLIN, (1946), *Mechanical and Electrical Engineer*, Operating Engineer, Gas Dist. Dept., N. O. Public Service Inc., 527 Magnolia St. *Mail*: 2216 Octavia St., New Orleans 15.

LEROY L. NEWMAN, (1923), *Electrical Engineer*, General Superintendent, New Orleans Public Service Inc. *Mail*: 317 Baronne St., Home: 1227 Exposition Blvd., New Orleans.

HARRY P. NEWTON, (1939), *Chemical Engineer*, Asst. Director, Southern Regional Research Laboratory, 2100 Robert E. Lee Blvd. *Mail*: 35 Hibiscus Lane, New Orleans 19.

JAMES H. NICKELSON, (1944), *Highway Engineer*, Asst. Dist. Maint. Engineer, La. Dept. of Highways, Box 1106, Houma, La.

LEO A. NIXON, (1942), *Civil Engineer*, Asst. Engr., The Texas & Pacific Ry., Co. Home: Masonic Drive. *Mail*: Box 1526, Alexandria, La.

SIDNEY D. NOLAN, *Civil Engineeer*, Chief Draftsman, Cities Service Refining Corp., Lake Charles. *Mail*: 23 Center Ave., Maplewood, La.

JOHN STANLEY NORTON, (J), (1948), *Agricultural Engineer*, Research Associate in Agri. Engineering, La. State University. *Mail*: Agri. Eng. Dept., L.S.U., Baton Rouge 3.

CECIL P. NORWOOD (J), (1949), *Electrical Engineer*, 1819 Stanford Avenue, Alexandria, La.

— O —

CECIL K. OAKES, (1947), *Civil Engineer, Registered La.*, Chief, Hydraulic Section, La. Dept. of Public Works, Capitol Bldg. *Mail*: 1347 North St., Baton Rouge, La.

WILLIAM F. OAKES, (L.M.) (1918), *General Contractor*, O'Connor-Oakes Co., 344 Camp St., New Orleans, La.

EDWARD F. OAKLEY, (1947), Highway Engineer, La. Dept. of Highways. Box 446, DeRidder, La.

JOSEPH T. O'BRIEN, (1940), *Electrical Engineer*, Head of Light Ends. Div. Esso Standard Oil Co. *Mail*: 1557 Ingleside Drive, Baton Rouge 12.

PAUL S. O'BRIEN, (1943), *Metallurgical Engineer*, Sales and Technical Representative, Socony Paint Products Co. *Mail*: 726 Westmoreland Drive, Baton Rouge 2.

LEO M. ODOM, (1942), *Civil Engineer*, 2219 Myrtledale Ave., Baton Rouge, La.

SEWALL J. OERTLING, (1948), *Chemical Engineer*, Senior Technologist, Shell Oil Co. Inc., Norco, La.

HORATIO NASH OGDEN, (1950), *Civil Engineer*. Partner, Ogden & Woodruff, Consulting Engineers, 3170 Florida St., Baton Rouge, La.

CHARLES W. OKEY, (L.M.), (1911), *Civil Engineer*, Chief Flood Control and Drainage Div. Tennessee Valley Authority. Home: Crestwood Drive, Route 6. *Mail*: T. V. A. 616 Union Bldg., Knoxville, Tenn.

ROBBIE C. OLIVER, (1949), *Surveyor, Registered La.* Asst. Supt. Caddo Parish Highway Dept., P. O. Box 772. *Mail*: 2031 Mable Ave., Shreveport, La.

OLE K. OLSEN, (L.M.), (1907), *Civil Engineer, Registered La.* Senior Partner Ole K. Olsen Company. Home: 508 Millaudon St. *Mail*: 823 Perdido St., New Orleans 12.

HARDY L. O'NEAL (J), (1949), *Mechanical Engineer*, Route 3, Pitkin, La.

JOHN H. O'NEILL, (L.M.), (1916), *Public Health Engineer, Registered La.* Director, Division of Public Health Engineering, La. State Board of Health. Civil Courts Bldg. *Mail*: 637 Lowerline St., New Orleans 18.

ADLOE ORR, JR., (1938), *Civil Engineer*, 316 Baronne Street. *Mail*: 6506 Milne St. New Orleans 19.

FRANCIS J. ORY, (1941), *Civil Engineer, Registered La.* Civil Engineer, Keller Const. Co., 7900 Palm St. *Mail*: 312 Millaudon St., New Orleans 18.

WILLIAM P. OSTER, (1928), *Mechanical and Electrical Engineer*, Vice-President Equitable Equipment Co., Inc. Home: 4651 Baccich St., *Mail*: 410 Camp St., New Orleans 12.

PAUL F. OSWALD, (1945), *Mechanical Engineer*, Owner, Oswald Engineering Co. 3031 Coliseum St., New Orleans 15.

RALPH OWEN (J), (1949), *Structural Draftsman*, E. M. Freeman & Associates. Home: 2040 Elizabeth St. *Mail*: 416 Texas Eastern Bldg., Shreveport, La.

WILLIAM E. OWEN, (1946), *Electrical Engineer*, School of Engineering, Louisiana Polytechnic Institute, Ruston, La.

— P —

OTIS W. PAGE, (1948), *Mechanical*, Marine Engineer, Ingalls Shipbuilding Co. 911 Cherubusco St., Pascagoula, Miss.

PAUL P. PARETI, (1933), *Mechanical and Electrical Engineer*, Automatic Sprinkler Engineer, Herbert S. Hiller Co., 512 Gravier St. 2402 Pine St., N. O. 18.

THURLOW W. PARISH, JR., (1946), *Highway Engr., Asst. Construction Standards Engineer*, La. Dept. of Highways, Box 1852. *Mail*: 638 Pierce St., Baton Rouge, La.

ALBERT B. PATERSON, (1923), *Mechanical and Electrical Engineer*, President New Orleans Public Service Inc. 15 Audubon Place. *Mail*: 317 Baronne St., New Orleans 9.

JULES G. PATOUT (J), (1949), *Mechanical Engineer*, Hotel Frederic, New Iberia, La.

HAROLD J. PATTERSON, (1940), *Civil Engineer*, Andry & Feitel, Architects. *Mail*: 1637 Robert St., New Orleans 15.

T. ELLIS PEAK, (1941), *Mechanical Engineer*, Project Coordinator, Esso Standard Oil Co. *Mail*: 2028 Lakeshore Drive, Baton Rouge, La.

T. ELLIS PEAK, JR., (J), (1947), *Chemical Engineer*, Esso Standard Oil Co. *Mail*: 2192 Hollydale Ave., Baton Rouge, 15.

BRANDT PEDERSEN, (1946), *Mechanical Engineer*, Mech. Engr., Southern Alkali Corp., *Mail*: 11 Hibiscus Rd., Maplewood, La.

J. HOWELL PEEBLES, JR., (J), (1949), *Mechanical Engineer*, Asst. Professor of M. E., Tulane University, P. O. Station 20, New Orleans 18.

BOYKIN W. PEGUES (L.M.), (H. M.), (1907), *Civil Engineer, Registered La.* Professor of Civil Engineering Emeritus, Louisiana State University. *Mail*: 4604 Perkins Road, Baton Rouge 15, La.

NORVIN L. PELLERIN, (J), (1946), *Mechanical Engineer*, President Pellerin Milnor Corp., 8000 Edinburg St. *Mail*: 2706 Palmer Ave., New Orleans 15.

JOHN HENRY PENNY (J), (1949), *Electrical Engineer*, Cities Service Refining Corp. *Mail*: 2032 Ninth St., Lake Charles, La.

RHEA D. PERCY, (1949), *Civil Engineer, Registered La.* Partner, Percy & Phillips. Home: 842 Geranium St. *Mail*: 1724 Glenmore Ave., Baton Rouge, La.

CLAIBORNE PERRILLIAT, (1944), *Civil Engineer, Registered La.* Treasurer, Perrilliat-Rickey Construction Co., 1530 S. Rendon St. *Mail*: 1928 Octavia St., New Orleans, La.

HOWARD PERRILLIAT, (1946), President, Perrilliat-Rickey Construction Co., 1530 S. Rendon St. *Mail*: 833 Esplanade Ave., New Orleans 16.

FELICIEN PERRIN, (J), (1946), *Mechanical Engineer*, Engineer, Pan American Southern Co. *Mail*: 1640 Palmer Ave., New Orleans.

RALPH M. PERSELL, (1949), *Chemical Engineer, Registered Miss.* Chemical Engineer, Cost & Design Section, Southern Regional Research Laboratory, 2100 Robert E. Lee Blvd. *Mail*: 7216 Zimple St., New Orleans 18.

HARLUF C. PETERSEN, (1945), *Mining Engineer*, Mgr. Oil and Gas Division, Freeport Sulphur Co. Home: 119 E. Oakridge Park. *Mail*: 1804 American Bank Bldg., New Orleans, La.

JAMES BERNARD PETTEY, (1948), *Civil Engineer, Senior Project Engineer*, La. Dept. of Highways, Box 766, Tallulah, La.

L. E. PETTY, (J), (1949), *Electrical Engineer*, Marquez, Texas.

CHESTER A. PEYRONNIN, JR., (J), (1949), *Mechanical Engineer*, 420 Millaudon St., New Orleans 18.

CHARLES J. PHILLIPS, JR., (1941), *General Contractor* Partner, Percy & Phillips, Reg. C.E.'s & Contractors, 1724 Glenmore Ave., Baton Rouge 12, La.

EDWARD W. PHILLIPS, SR., (1948), *Office Engineer*, Union Sulphur Co., Sulphur, La. Home: 2626 Touchy St., Lake Charles, La.

R. L. PHILLIPS, SR., (1949), *Mechanical and Electrical Engineer*. General Supt. of Power, La. Power & Light Co., Sterlington, La.

JOSEPH J. PICARAZZI, (1948), *Mechanical Engineer*. Corrosion Engineer, Cities Service Refining Corp. Home: 417 Burnett St. *Mail*: Tutweiler Refinery, Lake Charles, La.

CLAUDE E. PICOU, (1949), *Civil Engineer*. Engineer, The Flintkote Co., 4500 N. Galvez St. *Mail*: 8327 Palm St., New Orleans 18.
tainer Corp., Bogalusa, La.

BRISTER B. PIERCE, (1929), *Electrical Engineer*, Chief Engineer, Gaylord Container Corp., Mill Division, Bogalusa, La.

FREDERICK F. PILLET, (1922), *Civil Engineer, Registered La.* Head of Civil Engineering Dept., Louisiana State University. Home: 730 N. 10th St. *Mail*: L. S. U., Baton Rouge 3.

ALAN S. PINCUS (J), (1949), *Electrical Engineer*. Junior Engineer, New Orleans Public Service Inc., 317 Baronne St. *Mail*: 4814 Dixon St., New Orleans 15.

DAVID F. PROBST, JR., (J), (1949), *Civil Engineer*, Turpin Lumber Co. *Mail*: Box 36, Bastrop, La.

ELISHA F. POLLAND, (1949), *Chemical Engineer*, Southern Regional Research Laboratory, 2100 Robert E. Lee Blvd. *Mail*: 1456 Calhoun St., New Orleans.

JOSEPH POMINSKI, (1941), *Chemical Engineer*, Southern Regional Research Laboratory, Engineering & Development Div., 2100 Robert E. Lee Blvd. *Mail*: 8400 Panola St., New Orleans 18.

ROBERT L. PONS (J), (1948), *Mechanical Engineer*. Graduate Assistant, Johns-Hopkins University. Home: 2526 Chartres St., New Orleans 17. *Mail*: Mech. Eng. Dept., Johns-Hopkins Univ., Baltimore, Md.

WYLEY D. POOLE, (1947), *Agricultural Engineer*, Associate Agri. Engr., La. State Experiment Station, L.S.U. Home: 4468 Cypress St. *Mail*: Agri. Eng. Dept., L.S.U, Baton Rouge 3.

ALBERT F. POOR, JR., (1949), *Mechanical Engineer, Registered Penn., Ga.* Draftsman, Firestone Tire & Rubber Co., Lake Charles. *Mail*: 79 Dogwood Road, Maplewood, La.

ARTHUR CLINTON PORTER, (1940), *Mechanical Engineer*, Process Engineer, Convair Corp., Fort Worth, Texas. *Mail*: 4817 Roanoke St., Fort Worth 7.

EARL PORTER, (1945), *Civil Engineer, Registered La.* Partner, Porter, Barry & Switzer, 545 Lafayette St., Baton Rouge, La.

JOHN L. PORTER, (L.M.), (1909), *Civil Engineer, Registered La.* Assisatnt Director, Division of Public Health Engineering, La. State Board of Health, Room 205 Civil Court Bldg. *Mail*: 8407 Panola St. New Orleans 18.

JOHN E. POTTHARST, (1937), *Mechanical Engineer*, President, Mechanical Equipment Co. and Peoples Utilities, Inc. Home: 20 Versailles Blvd. *Mail*: 861 Carondelet St., New Orleans 13.

JOHN E. POTTHARST, JR., (1943), *Mechanical Engineer*, Vice-Pres., Mech. Equipment Co. *Mail*: 23 Beverly Gardens, New Orleans 20.

HENRY T. POULON, (1949), *Electrical Engineer*. Owner, Poulan's Electrical Co., 501 Morris Ave. Home: 811 Orange St., Monroe, La.

E. REID POWELL, (J), (1947), *Petroleum Engineer*, Production Engineer, Mente & Co., Inc. *Mail*: Box 690. Home, 6434 Louisville St., New Orleans.

GEORGE A. PRICE, JR., (1948), *Electrical Engineer*, Hydraulic Engineer, U. S. Engineer Dept., New Orleans District. *Mail*: 1928 Mirabeau Ave., New Orleans, La.

KENNETH T. PRICE, (1944), *Mining Engineer*, General Superintendent, Freeport Sulphur Co., Port Sulphur, La.

HAMPTON PRIMEAUX (J), (1949), *Civil Engineer*, Party Chief, Louisiana Dept. of Highways. *Mail*: 300 St. Michael St., Lafayette, La.

LOUIS F. PRIMOS (J), (1949), *Civil Engineer*, Office Engineer, City of Shreveport Dept. of Water & Sewerage, City Hall. *Mail*: 3542 Hardy St., Shreveport, La.

ROBERT K. PROTHRO, (1949), *Chemical Engineer*, Sales Engineer, American Bitumuls Co. *Mail*: 2164 Ferndale Ave., Baton Rouge, La.

CHARLES S. PUGSLEY, JR. (1947), *Mechanical Engineer*, Group Head, Mech. Eng. Dept., Esso Standard Oil Co., La. Div. *Mail*: 4473 Whitehaven St., Baton Rouge 15.

WARD C. PURDUM, (1944), *Mechanical Engineer*, Sales Engineer, Equitable Equipment Co. *Mail*: 410 Camp St. Home: 520 S. Scott St., New Orleans 12.

IVAN H PURINTON, (1944),*Mechanical Engineer*, Operating Research Engr., New Orleans Public Service Inc. Home: Box 820, Waggaman, La. *Mail*: 317 Baronne St., New Orleans 9.

DEWITT L. PYBURN, (1941), *Civil Engineer*, Member Mississippi River Commission, U. S. Corps of Engineers. Home: 364 Steele Blvd. *Mail*: Box 267, Baton Rouge.

— Q —

J. H. QUINETTE (A), (1946), *Maintenance Engineer*, U. S. Naval Hospital, 7273 Calan Blvd. *Mail*: 2116 Dante St., New Orleans 18.

PAT H. QUINLAN, (1925), *Drainage Engineer*, Sewerage and Water Board, 526 Carondelet St. *Mail*: 1141 Philip St., New Orleans.

— R —

IRWIN A. RABEN, (1942), *Chemical Engineer*, Process Engr., Cities Service Ref. Corp. *Mail*: 1416 Kirkland St., Lake Charles, La.

JAMES C. RACHAL, (J), (1948), *Electrical Engineer*. Asst. Engineer, City of Pensacola, Fla. *Mail*: 1810 N. Reus St., Pensacola, Fla.

GROVER CLEVELAND RACKERBY, (1926), *Civil Engineer*, U. S. Engineers, N. O. District, Foot of Prytania St. *Mail*: 4021 Octavia St., New Orleans 15.

WALTER S. RAINVILLE, JR., (1934), *Transportation Engineer*, Director of Research, American Transit Association. *Mail*: 292 Madison Ave., New York 17. Home: 98-10 70th Ave., Forest Hills, N. Y.

AMBROSE K. RAMSEY, JR., (1946), *Electrical Engineer*, Assoc. Professor of E. E., Louisiana State University. Home: 709 Napoleon St. *Mail*: College of Eng., L.S.U., Baton Rouge 3.

PAUL E. RANDOL, (1945), *Electrical Engineer*, Operating Superintendent, Central Louisiana Electric Co., 229 W. Main St., Bunkie, La. *Mail*: 405 Rose St., Bunkie, La.

EDWARD S. RANDOLPH, (1937), *Civil Engineer, Registered La.* Retired. 301 Stanford Ave., Baton Rouge, La.

JAMES T. RANGELEY, (1947), *Construction Engineer*, Resident Engineer, Ebasco Services Incorporated. Home: 309 State Street. *Mail*:P. O. Box 112, Forrest City, Ark.

CHARLES FREDERICK RANTZ, (1924), *Refrigeration Engineer*, 436 Elmira Ave., New Orleans 14.

GEORGE W. RAPPLEYEA, c/o Central Santa Regina, Consulado No. 9, Habana, Cuba.

A. B. RATCLIFF, JR., (1944), *Civil Engineer*, Highway Engr., Dept. of Highways. *Mail*: 319 South 10th St., Baton Rouge 8.

WALLACE V. RATCLIFF, (1949), *Civil Engineer*. General Supt., L. M. Winford, Box 564, Minden. Home: 1035 Tillman St., Minden, La.

C. ESPY REED, (1947), *Electrical Engineer*, Vice-President, Reed Unit-Fans, Inc. Home: 1317 Octavia St. *Mail*: 1001 St. Charles Ave., New Orleans 8.

LYMAN C. REED, (1943), *Electrical Engineer*, President, Reed Unit Fans Inc., Home: 1317 Octavia. *Mail*: 1001 St. Charles Ave., New Orleans 8.

MARION B. REED, (1945), *Electrical Engineer*, Inspection Engineer, Standard Oil Co. of N. J., La. Div. *Mail*: 3238 Eaton St., Baton Rouge 5.

ROBERT N. REED, (J), (1941), *Electrical Engineer,* Standard Oil Co. of N. J., Louisiana Division. *Mail*: 3684 Winnebago St., Baton Rouge 5.

MICHAEL H. REILLY, (1940),*Construction Engineer,* Building Contractor,. 4402½ Canal St., New Orleans 19.

THOMAS J. RENNIE (J), (1940), *Civil Engineer, Registered La.* Planning and Design Engineer, City of New Orleans, Room 307, City Hall. *Mail*: 4614 Lafaye Street, New Orleans 22.

JAMES V. REUTER, JR., (J), (1947), *Mechanical Engineer,* Jr. Engineer Southern Regional Research Laboratory, 2100 Robert E. Lee Blvd., *Mail*: 933 Harding Drive, New Orleans, La.

FRANK L. REYNOLDS (L. M.), (1916), *Construction Engineer, Registered Prof. Engr. New York.* Executive Vice-President, Irons & Reynolds Inc. Home: 115 Ocean Ave., Brooklyn 25, N. Y. *Mail*: Graybar Bldg., New York 17, N. Y.

HAMPTON REYNOLDS, (1937), *Civil Engineer,* 2811 Dublin St., New Orleans 18.

WILLIAM H. RHODES, (1927), *Civil Engineer, Registered La.* 1531 Henry Clay Ave., New Orleans, La.

HARRY D. RICHARDSON, (1948), *Mechanical Engineer,* Assistant Professor of M. E., Louisiana Polytechnic Institute. *Mail*: Tech Station, Ruston, La.

I. MARSHALL RICHARDSON, (1949), *Petroleum Engineer, Registered Calif.,* Assistant to President, Keller Construction Corp., 7900 Palm St., Home: 480 Woodvine St., New Orleans 20.

ROBERT BRUCE RICHARDSON, (1937), *Civil Engineer,* Director, Louisiana Dept. of Highways. Home: 1019 Ingleside Drive, Baton Rouge. 4.

W. PAT RICHARDSON, (1945), *Mechanical and Electrical Engineer,* Service Engr., Johns-Manville Sales Corp: Home: 223 Brockenbraugh Court. *Mail*: P. O. Box 1050, New Orleans 1, La.

GEORGE J. RICHAUD, (1937), *Civil Engineer,* Supt. of Roadways, New Orleans Public Service Inc. Home: 710 Third St., New Orleans 20. *Mail*: 317 Baronne St.

CLAIRE WILLIAM RICKER, (1929), *Electrical Engineer,* Professor and Head, School of Electrical Engineering, Tulane University. Home: 717 St. Peter St. *Mail*: College of Engineering, Tulane University, New Orleans 18.

GRANTLEY B. S. RICKETTS, (1948), *Electrical Engineer, Registered Miss.* Electric Supt., Mathieson Chem. Corp., Lake Charles. *Mail*: 38 Pointsettia Road, Maplewood, La.

FRANK RIESS, (1944), *Civil Engineer,* Design Engr., Equitable Eqpt. Co. Inc. *Mail*: 924 Audubon St., New Orleans 18.

JOHN RIESS, (L. M.), (1906), *Civil Engineer and Contractor,* 17 Audubon Blvd. *Mail*: Carondelet Bldg., New Orleans 12.

JOSEPH S. RIORDA, (1948), *Electrical Engineer,* Sales Engineer, New Orleans Public Serviice Inc. Home: 4402 La Salle St. *Mail*: 317 Baronne Street, New Orleans 9, La.

FRANK M. RITCHIE, (1943), *Surveyor, Registered La.* Chief Engineer and Supt. of Lands, The Louisiana Land & Exploration Co. *Mail*: 1904 American Bank Bldg., New Orleans 12. Home: 642 Broadway.

CHARLES L. RITTENBERG, (1937). *Civil Engineer,* Insurance Engineer. Meyers, Whitty & Hodge, 1308 Canal Bldg. *Mail*: 429 Lowerline St., New Orleans 18.

ANDERSON B. RITTER, (1947), *Civil Engineer, Registered La.* Regional Sanitary Engr., La. State Health Dept., Box 576, Lafayette, La. *Mail*: 936 Broadway, New Orleans 18.

WILLIAM S. ROATEN, (1940), *Mechanical Engineer,* Erecting Supt., Worthington Pump & Machinery Corp., Buffalo, N. Y. *Mail*: Box 512, Waterproof, La.

GEORGE P. ROBBINS, JR., (1927), *Mechanical and Electrical Engineer,* Owner, Robbins & Robbins. Home: 3333 Napoleon Ave. *Mail*: 504 Howard Ave., New Orleans 12.

WARREN M. ROBBINS (J), (1949), *Civil Engineer, Registered La.* Civil Engineer, La. State Dept. of Public Works, State Capitol Bldg. *Mail*: 861 North 6th St., Baton Rouge, La.

LOUIS L. ROBEIN, JR., (J), (1948), *Chemical Engineer,* Junior Technologist, Shell Oil Co., Inc., Norco, La.

JAMES M. ROBERT, (L. M.), (H. M.), (1908), *Mechanical Engineer,* Dean, College of Engineering, Tulane University. Home: 2141 State St. *Mail*: College of Engineering, Tulane University, New Orleans 18.

KEARNY ROBERT, (1946), *Geophysical Engineer,* Home: 2141 State St. *Mail*: 829 Hibernia Bank Bldg., New Orleans 12.

CLARENCE J. ROBERTS, JR., (A), (1949), *Agricultural Engineer,* Junior Farm Representative, Gulf States Utilities Co. *Mail*: 833 Camellia Ave., Baton Rouge, La.

FRANCIS M. ROBERTS (J), (1949), *Civil Engineer.* Chief of Party, La. Dept. of Highways, Opelousas, La.

ROBERT JOHN ROBERTSON, (1946), *Operating Engineer.* Supt. La. Station, Gulf States Utilities Co. *Mail:* 6130 Government St., Baton Rouge, La.

ERNEST T. ROBINSON, JR. (1949), *Civil Engineer.* Asst. Pipe Line Supt., Texas Eastern Trans. Corp. Home: 1625 Centenary Drive. *Mail:* P. O. Box 1612, Shreveport, La.

OTHA C. RODDEY, (1949), *Corrosion Engineer.* Superintendent, Interstate Natural Gas Company, P. O. Box 1482. Home: 1705 N. Sixth St., Monroe, La.

A. R. RODRIGUEZ, (1938), *Civil Engineer* and *Naval Architect,* Private Practice, 601 American Bank Bldg. *Mail:* 1628 N. Dupre St., New Orleans 19.

EDWIN J. H. RODRIGUEZ, (L.M.), (1918), *Chemical Engineer,* Johns-Manville Sales Corp., 143 Sherwood Forest Drive, New Orleans 19.

WALTER W. RODY, (J), (1948), *Civil Engineer,* Eastern Venezuelan Oil Camps. *Mail:* Apartado 45, Barcelona, Venezuela, S. A.

LOUIS H. ROEGER, (1949), *Structural Engineer,* E. M. Freeman & Associates, 416 Texas Eastern Bldg. Home: 3444 Beverly Place, Shreveport, La.

EVERETT G. ROESSLE, (1926), *Civil Engineer, Registered La.* Associate, S. V. Applewhite Consulting Engineer, 424 Millaudon St. *Mail:* 1019 Leontine St., New Orleans 15.

CHARLES M. ROGERS, (1944), *Mechanical Engineer,* Industrial Engineer N. O. Public Service Inc. 6042 Prytania St. *Mail:* 317 Baronne St., New Orleans 9.

J. ROBERT ROMBACH, (1947), *Electrical Engineer,* N. O. Public Service Inc. Home: 6979 Memphis St. *Mail:* 1600 S. Peters St., New Orleans 13.

WESLEY B. ROOT, JR. (J), (1948), *Mechanical Engineer,* Engineer Inspector, Esso Standard Oil Co. *Mail:* 2520 Fairfield Ave., Baton Rouge, La.

LOUIS J. ROSENBOHM, (J), (1944), *Civil Engineer, Registered La.* Engineer Inspector, American Sugar Ref. Co. *Mail:* 4143 Canal St., New Orleans.

A. M. ROSENTHAL, JR., (J), (1946), *Electrical Engineer.* Soils Engineer, Dept. of Highways, Testing and Research Div. *Mail:* 286 Kenwood Ave., Baton Rouge 12.

JOSEPH ELLIS ROSS, (1944), *Highway Engineer,* Project Engr., La. Dept. of Highways. *Mail:* 303 Browning St., Monroe, La.

NORMAN H. ROSS, (A), (1938), *Sales Engineer,* Secretary, Ole K. Olsen, Inc., 4516 S. Johnson St. *Mail:* 823 Perdido St., New Orleans 12.

ALFRED J. ROTH, JR., (1938), *Civil Engineer, Registered La.* Lt. Cmdr., C.E.C. Public Works Officer. Naval Air Station, New Orleans.

RALPH K. ROTHROCK, (1938), *Mechanical Engineer,* Private Practice, 5316 Dryades St., New Orleans 18.

ALBERT T. ROWAN, (1946), *Mechanical Engineer.* Supt., Asbestone Corp., 5372 Tchoupitoulas St., New Orleans 15, La. Home: 1511 Louisiana Ave., Apt. 7. *Mail:* Box 5257-B, New Orleans, La.

TILLMAN J. RUCKER, (1949), *Civil Engineer.* Field Engineer, E. M. Freeman & Associates, 416 Texas Eastern Bldg. Home: 203 Arthur St., Shreveport, La.

THOMAS F. RUFFIN, (J), (1947), *Mechanical Engineer,* Dist. Representative, Acme Brick Co., Refractories Div., P. O. Box 1124, Baton Rouge. *Mail:* 3845 North Blvd., Baton Rouge.

RALPH A. RUSCA, (1947), *Senior Cotton Technologist,* Supt. of Machinery and Development Sec., Southern Regional Research Laboratory, 2100 Robert E. Lee Blvd. *Mail:* 2201 Calhoun St., New Orleans 18.

CHARLES J. RUSSELL, (1949), *Highway Engineer.* Senior Project Engineer, La. Department of Highways. Home: 1314 Johnston St. *Mail:* P. O. Box 595, Lafayette, La.

J. D. RUSSELL (J), (1949), *Mechanical Engineer.* Senior Bridge Detailer, La. Dept. of Highways. *Mail:* 5826 Saurage Drive, Baton Rouge, La.

AUGUST J. RYBERG, (1949), *Surveyor, Registered La.* Private Practice. Lock Drawer 392, Mansfield, La.

—S—

HENRY DAY SALASSI, (1944), *Engineering Draftsman,* Squad Leader, La. Dept. of Highways. *Mail:* 1070 Glenmore Ave., Baton Rouge.

CARLTON C. SALLEY, (1950), *Civil Engineer.* Partner, W. C. Salley, Contractor, 511 Ouachita Bank Bldg. Home: 1016 North Second St., Monroe, La.

HARRY S. SALZER, (1927), *Civil Engineer,* Cmdr., U. S. Coast Guard, Chief, Civil Engineering Section. Home: 2286 Yale Ave., Maplewood, Mo. *Mail:* 240 Old Custom House Bldg., St. Louis 1, Mo.

R. M. SANDERFORD, JR., (J), (1942), *Electrical Engineer*, 2608 Parrott Ave., Waco, Texas.

ROLAND L. SAUCIER, JR. (J), (1949), *Civil Engineer*. Engineering Draftsman, E. M. Freeman & Associates, 416 Texas Eastern Building, Shreveport, La.

HORACE A. SAWYER, (1945), *Civil Engineer*, Vice-President and Manager, Lone Star Cement Corp. Home: 901 Burdette St. *Mail*: 1120 Hibernia Bank Bldg., New Orleans 12.

WALTER HOWARD SCALES, (1929), *Architectural Engineer, Registered Ind., Ill.* Southern Manager, Bldg. Code Consultant, National Lumber Manufacturers' Association, 550 Canal Bldg. Home: 1822 Valence St., New Orleans, La.

HERBERT A. SCHAEFFER, JR., (J), (1947), *Electrical Engineer*, Flintkote Co., 4500 N. Galvez St. *Mail*: 3152 St. Bernard Ave., New Orleans 19.

HARRY SHAFER, (A), (1948), *Marine Engineer*, Supt., Strachan Shipping Co. *Mail*: 4538 St. Ann Street, New Orleans, La.

J. GILBERT SCHEIB, (1935), *Construction Engineer*, Executive Director, Housing Authority of New Orleans, 705 Carondelet Bldg., *Mail*: 2412 General Pershing St., New Orleans 15.

CLYDE U. SCHENNAILDER, (1947), *Electrical Engineer*, Design and Estimating Engineer, Cit-Con Oil Corp. *Mail*: 32 Magnolia Road, Maplewood, La.

JOSEPH M. SCHEYD, (J), (1947), *Mechanical Engineer*, 6733 Catina Street, New Orleans 19.

JOHN H. SCHLUTER, (J), (1948), *Mechanical Engineer*, Design Engineer, New Orleans Dock Board, 2 Canal St. *Mail*: 2514 Monroe St., New Orleans 18.

GAYLE SCHNEIDAU, JR., (1947), *Mechanical Engineer*, Field Inspector, Gulf Refining Co., Maison Blanche Bldg. *Mail*: 1935 General Pershing St., New Orleans 15.

CARL SCHNEIDER, (1940), *Consulting Engineer, Registered La.* 764 S. Liberty St. *Mail*: 7711 Plum St., New Orleans 18.

EDWARD L. SCHNEIDER, (J), (1944), *Chemical Engineer*, Sales Engineer, Southern Surgical Supply Co., Inc., 741 St. Charles St. *Mail*: 221 S. Genois St., New Orleans 19.

GEORGE A. SCHNEIDER, JR., (J), (1948), *Mechanical Engineer*, Lone Star Cement Corp. 342 Madison Ave., New York, N. Y. *Mail*: 110 Darwin Ave., Rutherford, N. J.

ROBERT E. SCHNEIDER, JR., (J), (1943), *Mechanical Engineer*, Salesman, Surgical Supply Co., 741 St. Charles St. *Mail*: 8423 Apple St., New Orleans 18.

ROBERT W. SCHUPP, (1943), *Mechanical Engineer*, Production Mgr. Jordy Engineering Co., Inc., 2801 Frenchmen St. *Mail*: 1551 Webster St., New Orleans 15, La.

EUGENE M. SCHWARTZ, (1949), *Mechanical Engineer*. Design Engineer, Southern Alkali Corp., Box 900, Lake Charles. *Mail*: 53 Beauregard, Maplewood, La.

C. N. SCHWARZ, (1949), *Registered Professional Engineer, Texas*. Purchasing Agent, Union Sulphur Co., Inc., Sulphur, La.

WALTER J. SCHWARZ, (1948), *Chemist*, Chief Chemist, The Flintkote Co. Home: 837 Short St., *Mail*: 4500 N. Galvez St., New Orleans 4.

ARTHUR M. SCOTT, (1938), *Structural Engineer*, Partner, Ole K. Olsen, Inc., 823 Perdido St. *Mail*: 2824 Dante St., New Orleans 18.

ROBERT MALLARD SEAGO, (1938), *Mechanical Engineer*, Efficiency Engineer. Market St. Generating Station, New Orleans Public Service Inc. Home: 3411 Octavia St. *Mail*: 1600 So. Peters St., New Orleans 13.

PAUL T. SEASHORE, (1934), *Civil Engineer*. Vice-President and Manager, Louisiana Land & Exploration Co., 1904 American Bank Bldg., New Orleans 12.

GEORGE A. SEAVER, JR., (J), (1948), *Civil Engineer, Registered La.* Boh Bros. Construction Co., 2400 Cypress St. *Mail*: 1219 Eleanore St., New Orleans 15.

RICHARD M. SEE (J), (1950), *Mechanical Engineer*, Junior Engineer, Cities Service Refining Corp. *Mail*: 746 Kirkman St., Lake Charles, La.

JOHN C. SEEGER, JR., (J), (1948), *Sanitary Engineer*, Assistant Professor of C. E., Louisiana Polytechnic Institute, Ruston, La. Home: 105 Everett St. *Mail*: Mech. Eng. Dept., L.P.I.

EDMUND O. SEIDEL, (J), (1949), *Civil Engineer*. Asst. to Resident Engineer, E. M. Freeman & Associates, 416 Texas Eastern Bldg. *Mail*: 2511 Malcolm St., Shreveport, La.

SOLIS SEIFERTH (1927) *Architect, Licensed La., Miss., Tex.* Partner, Dreyfous & Seiferth. Home: 1838 Jefferson Ave. *Mail*: 328 Audubon Bldg., New Orleans 16.

JOHNNY B. SELLERS (J), (1949), *Civil Engineer*. Engineer, La. Dept. of Highways, P. O. Box 105, Clarks, La.

J. MURRAY SEMMES, (1943), *Civil Engineer,* Maint. Engineer, Louisiana Department of Highways. *Mail*: 759 Concordia St., Baton Rouge, La.

ROBERT IRA SENN, (1942), *Civil Engineer.* Address unknown.

J. P. SESSIONS, (1948), *Civil Engineer and Surveyor, Registered La., Miss.* Private Practice. *Mail*: Vidalia, La.

ROY T. SESSUMS, (1946). *Civil Engineer, Registered La.* Dean, School of Engineering and Prof. of Civil Engineering, La. Polytechnic Institute. Home: 615 W. Alabama Ave. *Mail*: Tech Station, Ruston, La.

FRANCIS X. SHAUGHNESSY, (1949), *Engineer,* Louisiana Power & Light Co., Sterlington, La.

GEORGE E. SHAW, (1944), *Mechanical Engineer,* President and Gen. Mgr., Petro Chemical Equipment Co., 407 Scanlan Bldg., Houston 2, Texas. Home: 4032 Law Drive, Houston, Texas.

RICHARD M. SHAW, (1937), *Civil Engineer, Hydraulic Section Head,* U. S. Eng. Dist. Foot of Prytania St. *Mail*: 7438 Dominican St., New Orleans 18,

GEORGE F. SHELLEY, (1944), *Electrical Engineer,* Manufacturer's Agent. *Mail*: 28 Beverly Gardens Dr., New Orleans 20.

EMILE S. SHERRARD, (J), (1948), *Electrical Engineer,* Application Engineer, Analytical Division, General Electric Co. *Mail*: 1368 Clifton Park Rd., Schenectady, N. Y.

SANTOS V. SHIELDS (J), (1942), *Civil Engineer, Registered La., Tex.* Engineer Asst., Construction, Texas Highway Dept. *Mail*: 112 Dewey Place, Orange, Tex.

HERBERT M. SHILSTONE, (1931) *Chemical Engineer,* Vice-Pres., Shilstone Testing Lab., Inc. Home: 1662 Valmont St. *Mail*: 510 Gravier Street, New Orleans 12.

DALTON B. SHOURDS, (1943), *Civil Engineer,* Partner Shourds-Mogabgab-Bean, and Associated Management Consultants, 642 Audubon Bldg., New Orleans. *Mail*: P. O. Box 676, Gulfport, Miss.

ELMER E. SHUTTS, (1918), Box 655, Lake Charles, La.

FRED N. SHUTTS, (1913), *Civil Engineer,* Partner, F. Shutts' Sons Consulting Engineers. P. O. Box 732, Lake Charles, La.

HARRY H. SHUTTS, (1934), *Civil Engineer, Registered La.* Partner, F. Shutts' Sons Consulting Engrs., P. O. Box 732, Lake Charles. *Mail*: 915 Cleveland St., Lake Charles, La.

GORDON L. SIBILLE (J), (1949), *Mechanical Engineer,* Sunset, La.

L. ROYDON SIBILLE (J), (1949), *Electrical Engineer,* 236 Olivier St., New Orleans 14.

VIVIAN E. SICKS, (1947), *Mechanical and Chemical Engineer.* Superintendent, Butadiene Plant, Cities Service Ref. Corp. Home: Route 2, Box 255. *Mail*: Cities Service Refining Corp., Lake Charles, La.

NED E. SIMES, (J), (1949). *Civil Engineer, Registered* La. Jr. Assistant Engineer, United Gas Pipe Line Co., P. O. Box 1628. *Mail*: 1423 First St., New Orleans.

ERNEST C. SINGLETARY, (J), (1947), *Mechanical Engineer,* Instructor of Mechanics, Ohio State Univ., Columbus, Ohio. *Mail*: 2108 Plank Road, Baton Rouge, La.

ROY SINGLETARY, (1949), *Civil Engineer.* Asst. District Maintenance Engineer, La. Dept. of Highways, Box 595, Lafayette, La.

LAUREN W. SINGLETON, (1948), *Civil Engineer,* Assistant Professor of C. E., Louisiana Polytechnic Institute. *Mail*: 206 Bonner St., Ruston, La.

SUREY R. SLOVENKO, (J), (1948), Junior Membership Award Winner, graduate Tulane University. *Mail*: 2529 Jefferson Avenue, New Orleans 15, La.

SAM B. SMART, JR. (J), (1949), *Mechanical Engineer,* General Delivery, Belleville, Tex.

THOMAS E. SMART, (1947), *Civil Engineer, Registered La.* Office Engr., La. Dept. of Public Works. *Mail*: 2020 Hiawatha St., Baton Rouge 7, La.

BARNEY R. SMITH, (1947), *Civil Engineer, Registered La.* Maint. Engr., Gaylord Container Corp. *Mail*: 641 Avenue G., Bogalusa, La.

FREDERICK E. SMITH, (1946), *Civil Engineer, Registered La.* Partner, Carnegie & Smith Consulting Engrs., 3000-A Dalrymple Drive. Home: 1662 Lee Drive, Baton Rouge, La.

GLENDON L. SMITH, (1947), *Mechanical Engineer,* Sr. General Engr., Cities Service Rfg., Corp., Lake Charles. *Mail*: 96 East End, Maplewood, La.

HARRELL R. SMITH, (1947), *Mechanical Engineer,* General Supt. of Tutweiler Refinery, Cities Service Refg. Corp., 716 Hodges St. *Mail*: 816 Sixth St., Lake Charles, La.

HUBERT L. SMITH, JR., (A), (1947), Supt. of Shipping, Freeport Sulphur Co., Port Sulphur, La.

JAMES M. SMITH, (1949), *Electrical Engineer*, Corrosion Engineer, Interstate Oil Pipe Line Co., Box 1107, Shreveport. *Mail*: 420 Waller St., Bossier City, La.

LAWRENCE L. SMITH, JR., (1949), *Chemical Engineer*. Engineer, Gaylord Container Corp. *Mail*: 907 Florida St., Bogalusa, La.

LLOYD B. SMITH, (1949), *Chemical Engineer*. Administrative Assistant, Esso Standard Oil Co. *Mail*: P. O. Box 1086, Baton Rouge 2, La.

RICHARD A. SMITH, (1948), *Civil Engineer, Registered La., Va.*, Asst. Professor of Ch. E., Louisiana Polytechnic Institute. Home: 128 S. Pinecrest Drive. *Mail*: Box 255, Tech Sta., Ruston, La.

S. C. SMITH, (1940), *Civil Engineer, Registered La.*, District Engineer, Dept. of Public Works. Home: 213 Helen St. *Mail*: Box 696, Tallulah, La.

SPENCER G. SMITH, (J), (1947), *Mechanical Engineer*, Marine Surveyor. American Bureau of Shipping, 403 Hibernia Bldg. *Mail*: 5512 Wickfield Drive, New Orleans.

T. BAKER SMITH, (L.M.), (1919), *Civil Engineer*, Consulting Engineer, P. O. Box 266, Houma, La.

WILLIAM D. SMITH, JR., (1948), *Petroleum Engineer, Registered Tex.*, Chief Petroleum Engr., Union Sulphur Co., Inc. Home: 1817 Fifth St., Lake Charles. *Mail*: c/o Union Sulphur Co., Pioneer Bldg., Lake Charles, La.

JOHN YOUNG SNYDER, (1946), *Mechanical & Chemical Engineer*, President, Wedgeplug Valve Co., Inc. Home: 2319 Fern St. *Mail*: 1300 South Broad St., New Orleans 13.

MILLARD P. SNYDER, (1948), *Civil Engineer, Registered La.*, Petroleum Engineer, Partner and Manager, J. Y. Snyder Interests, 217 Ricou-Brewster Bldg., Shreveport, La. Home: 3532 Greenway Place.

C. M. SOLBERG, (1947), *Mining Engineer*, Sales Representative, Erie City Iron Works. *Mail*: Kentwood, La.

ALBERT L. SOULE III, (J), (1947), *Electrical Engineer*, New Orleans Public Service, Inc. *Mail*: 2342 Wirth Place, New Orleans 15.

W. C. SORENSEN, (1949), *Civil and Structural Engineer, Registered La., Tex.* Chief Engineer, Neild Somdal Associates. Home: 275 Leo Ave. *Mail*: 300 Texas Eastern Bldg., Shreveport, La.

WESLEY H. SOWERS, (1947), *Chemical Engineer*, Vice-President, Bay Chemical Co. Home: 525 Hector Ave. *Mail*: 1048 Constance St., New Orleans 9, La.

WILLIAM HOBSON SPAAR, (1934), *Civil Engineer*, Asst. Chief, Military and Hospital Branch, U. S. Engineer Office, 2301 Grant St. Home: 1414 Brown St. *Mail*: P. O. Box 177, Mobile 2, Ala.

MATTHEW McC. SPANGLER, (J), (1948), *Civil Engineer*, Chief of Party, La. Dept. of Highways. *Mail*: 1617 Eighth St., Lake Charles, La.

J. COOPER SPENGLER, (1942), *Chemist*, Gas Dist. Engineer, Gulf States Utilities Co. *Mail*: 833 North 8th St., Baton Rouge, La.

WESLEY J. SPERIER, (1949), *Mechanical Engineer*, Corps of Engineers, N. O. District, Foot of Prytania St. *Mail*: 131 Lavergne St., New Orleans 14, La.

RAMON D. SPILMAN (J), (1950), *Draftsman*, Cities Service Refining Corp. *Mail*: 321 W. Thomas St., Sulphur, La.

A. D. STANCLIFF, Jr., (J), (1943), *Civil Engineer*, Designing Engr., S. V. Applewhite, 424 Milliaudon St. *Mail*: 4735 Carondelet St., New Orleans 15.

WILLIAM F. STANDKE, (1940), *Civil Engineer, Registered La.*, 530 Atkins St., Shreveport, La.

SAMUEL SHELTON STANTON, (1946), *Mechanical Engineer*. Home: 525 E. State St. *Mail*: Gen. Delivery, Port Isabel, Tex.

DAVID STAYER, (1926), *Electrical Engineer*, Design Engr., U. S. Army Engr. Corps, P. O. Box 59. *Mail*: 2822 W. Kentucky St., Louisville 11, Ky.

REINHARD A. STEINMAYER, (1942), *Geologist*, Professor and Head, Dept. of Geology, Tulane University. *Mail*: 7933 Oak St., New Orleans 18.

ORLANDO W. STEPHENSON, JR., (1946), *Mechanical Engineer*, Associate Professor of Mechanical Engineering, Tulane University. Home: 5903 Gen. Haig St. *Mail*: Tulane Univ., New Orleans 18.

FRED W. STEVENS, (L.M.), (1904), Allis-Chalmers Manufacturing Co. Home: 3380 State St. Drive. *Mail*: 724 Canal Bldg., New Orleans 12, La.

GEORGE F. STEVENSON, (1942), *Civil Engineer, Registered La.*, Sr. Project Engr., La. Dept. Highways, Baton Rouge, La. *Mail*: 640 Laurel St., Baton Rouge, La.

CHESTER A. STEWART, (1945), *Mechanical Engineer*, Pipe Line Dist. Supt., United Gas Pipe Line Co. *Mail*: 2420 Metairie Road, New Orleans 20.

DAVID WHYTE STEWART (L.M.), (1919), *Mechanical Engineer*, Chief Engineer, Market Street Power Station, New Orleans Public Service Inc., 1600 S. Peters St. *Mail*: 1623 Pine St., New Orleans 13, La.

JAMES M. STEWART, JR., (J), (1948), *Mechanical Engineer*, Jr. General Engineer, Cities Service Refining Corp., Butadiene Plant. *Mail*: 1917 Sixth St., Lake Charles, La.

FELTUS B. STIRLING, (1944), *Electrical Engineer*, Engineer, Gulf States Utilities Co., *Mail*: 2005 Ferndale Ave., Baton Rouge 15.

CHARLES W. STOKES, (1947), *Mechanical Engineer*, General Supervisory Engr., Cities Service Refg. Corp. *Mail*: 1311 Eleventh St., Lake Charles, La.

SAMUEL J. STOKES, (J), (1944), *Civil Engineer*, Asst. Engineer, City of New Orleans. *Mail*: 4233 Fontainbleau Drive, New Orleans, La.

A. D. STRANGE-BOSTON, (1949), *Structural Engineer*. Chief Draftsman, Interstate Oil Pipe Line Co., Southern Division, P. O. Box 1107. *Mail*: 824 Oneonta St., Shreveport, La.

HAROLD H. STREAM, JR., (J), (1942), *Chemical Engineer*, Leaseman, Union Oil Co. of Calif. *Mail*: 870 Chester Ave., San Marino, Calif.

PAUL S. STUART, JR., (J), (1948), *Mechanical Engineer*, Sewerage & Water Board of New Orleans, 526 Carondelet St. *Mail*: 3419 La. Ave. Parkway, New Orleans 18, La.

CURTIS D. STUBBS, (A), (1946), *Mechanical Engineer*, Chief Engineer, Southern Electric Appliance Corp., 800 St. Charles St. *Mail*: 4039 Piedmont Drive, New Orleans 17, La.

HERBERT C. SWAN, (1933), *Electrical Engineer*, Sewerage and Water Board of New Orleans. *Mail*: 366 Pine St., New Orleans 18, La.

JACOB B. SWANSON, JR., (J), (1947), *Mechanical Engineer*, Maint. and Construction Engineer, Esso Standard Oil Co. *Mail*: 4712 Frey St., Baton Rouge, La.

LEONARD R. SWINNEY, (1943), *Civil Engineer*. Address unknown.

ALLAN H. SYKES, (1949), *Civil Engineer*, Shell Oil Co. *Mail*: 3433 St. Charles Ave., New Orleans, La.

— T —

PAUL J. TARANTOLO, (J), (1948), *Mechanical Engineer*, Estimator, Sales Engineer, Beaumont Iron Works, 1300 Crockett St. *Mail*: 1740 Corley St., Beaumont, Texas.

CHARLES W. TAYLOR, *Electrical Engineer*. Div. Industrial Engineer, La. Power & Light Co., 433 Metairie Road, New Orleans 20.

DAYTON R. TAYLOR, (1948), *Mechanical Engineer*, General Manager, Baton Rouge Water Works, Inc. *Mail*: Drawer 2391, Baton Rouge, La. Home: 163 Virginia St.

FRANCIS M. TAYLOR, (1938), *Chemical Engineer*, Professor and Head School of Chemical Engineering, Tulane University. Home: 1312 Fern St. *Mail*: College of Engineering, Tulane University, New Orleans 18, La.

JAMES TENNY TAYLOR, (J), (1947), *Mechanical Engineer*, McDonnell Aircraft Corp. *Mail*: 219 Day Drive, Ferguson, Mo.

JOHN D. TAYLOR, (1948), *Electrical Engineer*, Sales Engineer, General Electric Co., 1004 Richards Bldg., New Orleans 12, La. Home: 2117 Labarre Road.

WILLIAM W. TENNANT, (1937), *Civil Engineer*, Manager La. Div. Inland Waterways, Esso Standard Oil Co. *Mail*: 520 Convention St., Baton Rouge, La.

L. W. TERRY, (1940), *Civil Engineer*, Owner and Operator, Terry Lumber Co., DeRidder, La. Junior Field Engineer, M. W. Kellog Co. *Home*: 802 Port St. *Mail*: P. O. Box 349, DeRidder, La.

S. A. THEARD, (L.M.), (1920), *Civil Engineer*, Engineer and Sales Manager, Oyster Shell Products Corp., Morgan City, La. *Mail*: 8114 Freret St., New Orleans 18.

ROBERT L. THEAUX, (J), (1948), *Civil Engineer*, Cit-Con Oil Corp., Lake Charles. *Mail*: P. O. Box 63, Sulphur, La.

ARTHUR C. THIGPEN, (1949), *Electrical Engineer*, Instructor, La. Polytechnic Institute. *Mail*: Tech Station, Ruston, La.

JOSEPH J. THIGPEN, (1948), *Mechanical Engineer*, Assistant Professor of M. E., La. Polytechnic Institute. Home: Marbury Drive. *Mail*: Box 255, Tech Station, Ruston, La.

P. B. THIGPEN, JR. (A), (1949), *Civil Engineer*, Junior Instrumentman, La. Dept. of Highways, Tallulah, La.

FRED W. THOMASON (J), (1949), *Electrical Engineer*, Junior Engineer, Gulf States Utilities Co. *Mail*: P. O. Box 322, Beaumont, Texas.

ABIJAH W. THOMPSON, (1945), *Civil Engineer*, Consulting Engineer, Private Practice. Home: 5126 Prytania St. *Mail*: 217 N. Peters St., New Orleans 16.

HORACE A .THOMPSON, JR., (1948), *Chemical Engineer*, Owner, Thompson Equipment Co., 407 Industries Bldg. *Mail*: 3737 Napoleon Ave., New Orleans.

W. L. THOMPSON, (1939), *Civil Engineer*, Dist. Engineer, Louisiana Department of Highways, P. O. Box 572, Hammond, La.

STEWART TICKNOR, (1922), *Civil Engineer*, 345 S. Magnolia St., Pascagoula, Miss.

EUGENE F. TIMS, (J), (1948), *Electrical Engineer*, Asst. Professor of E. E., Louisiana State University. *Mail*: 3155 Lakeshore Drive, Baton Rouge 15.

JAMES M. TODD, (1923), *Mechanical and Electrical Engineer, Registered Ala., Miss., Texas*, Consulting Engineer, James M. Todd & Associates. Home: 17 Richmond Place. *Mail*: 217 N. Peters St., New Orleans 16.

JACK S. TOLER, (1949), *Civil Engineer, Registered La.* Asst. Div. C. E., Humble Oil & Refining Co. *Mail*: 242 Brockenbraugh Court, New Orleans 20.

EVERETTE E. TONEY, (J), (1950), *Electrical Engineer*. Draftsman, Cities Service Refining Corp. *Mail*: 512½ Kirkman St., Lake Charles, La.

CHARLES W. TONKIN, JR. (J), (1948). *Mechanical Engineer*, Esso Standard Oil Co. *Mail*: 661 Franklin St., Baton Rouge, La.

RICHMOND J. TOURNE (J), (1949), *Electrical Engineer*. Lighting Specialist, Interstate Electric Co., 1001 So. Peters St. *Mail*: 2219 Gravier St., New Orleans 19.

ALBERT B. TRICHE (J), (1949), *Electrical Engineer*, 4729 Magazine St., New Orleans 15, La.

SIDNEY E. TROUARD, (1928), *Electrical Engineer*, Electrolysis Engineer, New Orleans Public Service Inc. Home 2328 General Taylor St. *Mail*: 317 Baronne St., New Orleans 9.

JOSEPH R. TROXLER, (1948), *Mechanical Engineer*, Assistant Professor of M. E., Southwestern Louisiana Institute. *Mail*: Box 64, S.L.I., Lafayette, La.

JAMES D. TUFTS, (1948), *Mechanical Engineer*, Asst. Supt., Pan-American Petroleum Corp. Box 97, Destrehan, La.

WILLIAM NEWTON TULLER, (1937), *Chemical Engineer*, Supervisor of Laboratory, Freeport Sulphur Co. *Mail*: P. O. Box 691, Port Sulphur, La.

MALCOLM J. TUOHY, (J), (1949), *Physicist. Sales Engineer*, Sperry Gyroscope Co. *Mail*: 8029 Sycamore St. New Orleans 18.

W. O. TURNER, (1931), President and General Manager, Louisiana Power and Light Co. 142 Delaronde St., Algiers 14, La.

WILLIAM T. TURNER, JR., (J), (1948), Junior Membership Award Winner, graduate of Louisiana Polytechnic Institute in Chemical Engineering. *Mail*: Apt. 204, 3140 S. Michigan Ave., Chicago 16, Ill.

—V—

ROBERT L. VACCARO, (J), (1948), *Civil Engineer*, Board of Commissioners, Port of New Orleans, 2 Canal Street. *Mail*: 8230 Stroelitz St., New Orleans 18.

L. F. VALENTINE, (1949), *Draftsman*. Office Engineer, Draftsman, City of Shreveport, Eng. Dept. Home: 2900 W. College St. *Mail*: City Hall, Shreveport, La.

JAMES J. VANHOOF (J), (1949), *Civil Engineer, Registered La.* Inspector, United Gas Pipe Line Co., Box 1407, Shreveport 92, La.

ROBERT H. VAUGHAN, (1942), *Civil Engineer*, Asst. District Construction Engineer, La. Dept. of Highways. Home: 1508 East Kings Highway. *Mail*: P. O. Box 38, Shreveport, La.

WALTER J. VERLANDER, (J), (1942), *Mechanical Engineer*, Sales Engr., A. M. Lockett & Co., 308 Whitney Bldg. *Mail*: 1140 Louisiana Ave., New Orleans 15.

WALTER P. VILLERE, (1946), *Civil Engineer*, Partner, Walter P. Villere. *Mail*: 725 Ursulino St., New Orleans 16.

BAILEY C. VINCENT, (1949), *Civil Engineer*, Project Engineer, La. Dept. of Highways, Box 1482. *Mail*: 1114 Banks St., Lake Charles, La.

LUCIEN T. VIVIEN, JR., (1930), *Mechanical Engineer*, Vice-President and Engineer, Bryant Beaumont Co. Home: 3129 Derby Place. *Mail*: 3041 Paris Ave., New Orleans 19, La.

CHRISTIAN M. VOELKEL, JR., (J), *Mechanical Engineer*, Dixie Machine Welding & Metal Works, 1031 Annunciation St. 2762 Wisteria St., New Orleans 17.

JOHN F. VOGT, JR., (1948), *Electrical Engineer*, New Orleans Public Service Inc., 317 Baronne Street. *Mail*: 3816 Jena Street, New Orleans 15.

ALVIN C. VOLK, (1949), *Civil Engineer, Registered La.* Consulting Civil Engineer. Home: 328 W. Hickory St. *Mail*: 109 W. Jefferson St., Bastrop, La.

ALVIN A. VOSS, (1927), *Civil Engineer, Registered La.* U. S. Naval Air Station, Pensacola, Fla. *Mail*: 3825 North 10th Ave., Pensacola, Fla.

— W —

GEORGE D. WADDILL, (L. M.), (1911), *Civil Engineer,* Retired. *Mail*: 7433 Maple St., New Orleans 18.

BATTAILLE HARRISON WADE, (1942), *Civil Engineer, Registered La., Miss.* Dist. Construction Engr., La. Dept. Hwys., Lake Charles. *Mail*: Box 307, Jennings, La.

RICHARD E. WAGNER, (1933), *Civil Engineer,* Construction & Mtce. Engr., U. S. War Dept. N. O. P. E., 4400 Dauphine St. *Mail*: 4201 Elba St., New Orleans 15.

FRANK H. WALK, (1947), *Mechanical Engineer,* Vice-Pres., Dunham-Wilson Co., Inc. P. O. Box 748, *Mail*: 2225 Wisteria St., Baton Rouge 11.

ARTHUR L. WALKER, (1943), *Civil Engineer,* Manager, Great Lakes Dredge and Dock Co. Home: 211 W. Maple Drive, New Orleans 20. *Mail*: 417 International Trade Mart, New Orleans.

J. D. WALKER, (L. M.), (Jan. 8, 1908), *Civil Engineer,* Engineer, Lang Co., 2500 Poydras St., New Orleans 19.

JOHN E. WALKER, (J), (1948), *Civil Engineer,* 7223 Freret St., New Orleans 18.

CHARLES WM. WALL, (J), (1948), *Mechanical Engineer,* Mtce. & Construction Engineer, Esso Standard Oil Co., La. Div. *Mail*: 1609 Moreland Ave. Baton Rouge, La.

JOHN E. WALLACE, (1948), Field Engineer, Gaylord Container Corp. *Mail*: 817 Avenue B, Bogalusa, La.

WAYNE PAUL WALLACE, (1936), *Civil Engineer, Registered La.* Associate Professor of Civil Engineering, Louisiana State University. Home: 444 Burgin Ave. *Mail*: Atkinson Hall, L. S. U., Baton Rouge 3.

STEPHEN J. WALLBILLICH, (1926), *Civil Engineer, Registered La.* Chief, General Planning Br., Eng. Div., U. S. Engineer Office, Foot of Prytania St., New Orleans. *Mail*: 4212 State St. Drive, New Orleans 15.

C. PERCY WALTERS, (1947), *Operating Engineer,* Gulf States Utilities Co. *Mail*: 4333 Broussard St., Baton Rouge 12, La.

GEORGE B. WALTHER, JR., (1948), *Agricultural Engineer,* Sr. Design Engineer, Cities Service Refining Corp., Tutweiler Refinery. *Mail*: 1804 Hodges St., Lake Charles.

JOHN L. WANTLAND (J), (1949), *Mechanical Engineer.* Instructor, Louisiana Polytechnic Institute. Home: Roberts St. *Mail*: L. P. I., Ruston, La.

KYLE WARD, JR., (1941), *Chemical Engineer,* Head, Cotton Fibre Research Division, Southern Regional Research Laboratory. *Mail*: 937 Wilson Drive, New Orleans 19.

RICHARD R. L. WARD, (1947), *Registered Texas.* Chief Office Engineer, Cit-con Oil Corp., *Mail*: P. O. Box 1578, Lake Charles, La.

ALFRED O. WARE (J), (1949), *Chemist,* Louisiana Power & Light Company, Sterlington, La. *Mail:* 711 Rochelle Ave., Monroe, La.

FRANCIS J. WARREN, JR. (J), (1950), *Electrical Engineer,* Industrial Sales Engineer, Gulf States Utilities Co. Home: 2021 Terrace Ave., *Mail*: Box 2431, Baton Rouge, La.

CALVIN T. WATTS, (1948). *Civil Engineer, Registered La.* Associate Professor of C. E., La. Polytechnic Institute. *Mail*: Tech Station, Ruston, La.

JESSE C. WATSON, (1950), Asst. State Maintenance Engineer, La. Dept. of Highways, 716 Evangeline Drive, Lafayette, La.

MAX P. WATSON, (1944), *Mechanical and Electrical Engineer,* District Engineer, United Gas Pipe Line Co. and Union Producing Co., 707 Canal Bldg. Home: 524 Lauricella Ave. *Mail*: P. O. Box 1628, New Orleans 11.

THOMAS A. WATSON, (1942), *Civil Engineer,* Industrial Sales Engineer, Gulf States Utilities Co., 340 Florida St. 541 N. Seventh St. *Mail*: P. O. Box 2431, Baton Rouge 2.

CHARLES H. WEATHERLY, (J), (1945), *Mechanical Engineer,* Test Equipment Design Engr., General Electric Company, Lynn, Mass. *Mail*: 35 Baltimore St., Lynn, Mass.

JOHN H. F. WEBERT, (1928), *Structural Engineer,* Chief Draftsman, Jones & Laughlin Steel Corp., P. O. Box 66. *Mail*: 4115 Clermont Drive, New Orleans 22.

LEO S. WEIL, (L. M.), (1920), *Consulting Engineer,* Partner, Leo S. Weil and Walter B. Moses. 478 Broadway. *Mail*: 801 Audubon Bldg., New Orleans 16.

LEON C. WEISS, (L. M.), (1918), *Civil Engineer,* Weiss, Dreyfous & Seiferth, Architects. 7425 Dominican St., New Orleans 18.

FRED E. WELCH, (1949), Asst. Maintenance Engineer, La. Dept. of Highways. *Mail*: 201 Bossier St., Natchitoches, La.

JOSEPH B. WELDON, (1950), *Civil Engineer, Registered La.* Draftsman, Cities Service Refining Corp., Lake Charles. *Mail*: 170½ Starlin St., Sulphur, La.

ROBERT K. WELLS, (1948), Captain, U.S.N., Industrial Manager, 8th Naval District, USN. *Mail*: U. S. Naval Station, New Orleans 14, La.

WILLIAM WENNER, (1947), *Civil Engineer,* Cities Service Refining Corp. *Mail*: 1325 12th St., Lake Charles, La.

WILLIAM WHIPPLE, (1936), *Mechanical Engineer,* Professor of Steam Engineering, Louisiana State University. 4666 Vanderbilt Drive. *Mail*: P. O. Box 8524, University Station, Baton Rouge 3.

WILL A. WHITAKER, (1945), *Mechanical Engineer,* Asst. Head, Engineering Dept. Standard Oil Co. of N. J., La. Div. *Mail*: 1167 Main St., Baton Rouge, 8, La.

J. LESTER WHITE, (1937), *Civil Engineer,* Asst. to Mgr. Plant and Employee Services, The Ethyl Corp. Home: 1041 Camellia Ave. *Mail*: Box 4155, Capitol Station, Baton Rouge, La.

WARREN N. WHITE, (1949), *Mechanical Engineer.* Assistant Professor of C. E., Louisiana Polytechnic Institute. Home: 601 Calvin Ave. *Mail*: Box 255, Tech Station, Ruston, La.

ANDREW P. WHITMAN, JR., (J), (1945), *Civil Engineer, Registered La.* Instructor, College of Engineering, Tulane University. *Mail*: 5243 Constance St., New Orleans 15.

CARL B. WHYTE, (1946), *Civil, Electrical and Mechanical Engineer, Registeerd Texas, Ill.,* Chief Construction Engineer, Universal Oil Products Co., 310 S. Michigan. Home: 5539 Blackstone. *Mail*: 310 S. Michigan Ave., Chicago, Ill.

CHARLES Q. WIGGINS, JR., (1946), *Mechanical and Electrical Engineer,* Asst. Electrical Engineer, Godat & Heft, Terminal Station Bldg. *Mail*: 2915 Elysian Fields Ave., New Orleans 17.

RICHARD KNOWLES WILKERSON, (1943), *Chief Engineer,* Gulf States Utilities Co. *Mail*: 5912 Robertson St., Baton Rouge, La.

EDWIN R. WILKINSON, (1947), *Electrical Engineer,* Asst. Mgr. of Employee Relations Esso Standard Oil Co. (La. Div.) *Mail*: 306 Richland Ave., Baton Rouge, La.

JOHN D. WILKINSON II (J), (1949), *Surveyor, Registered La.* Private Practice. Home: 219 E. Slattery St. *Mail*: 305 1st National Bank Bldg., Shreveport, La.

LAWRENCE V. WILLEY, (1939), *Civil Engineer,* Bridge Construction Engineer, La. Dept. of Highways. *Mail*: 430 Centenary Drive, Baton Rouge, 14, La.

AARON D. WILLIAMS, JR. (1949), *Civil Engineer.* Chief Engineer, Columbian Gasoline Corp. Home: 602 Glenmar. *Mail*: P. O. Box 1562, Monroe, La.

GERALD C. WILLIAMS, (1940), *Mechanical Engineer,* Zone Engineer, Standard Oil Co. of N. J., La. Div. Home: P. O. Box 3082 I.S.T. *Mail*: Box 551, North Baton Rouge, La

R. L. WILLIAMS, (1947), *Mechanical Engineer,* Freeport Sulphur Co., Port Sulphur, La.

ROBERT MILTON WILLIAMS (J), (1949), *Civil Engineer,* W. Horace Williams Co. Home: 519 Iona St. *Mail*: 833 Howard Ave., New Orleans 13.

ROBERT W. WILLIAMS, (1940), *Chemical Engineer,* Process Engineer, Standard Oil Co. of N. J., Louisiana Division. *Mail*: 2123 Cedardale Ave., Baton Rouge 7.

W. HORACE WILLIAMS, (L. M.), (1908), *Civil Engineer, Registered La., Tex.,* President and General Manager, W. Horace Williams Co. Home: 519 Iona St., Metairie. *Mail*: 833 Howard Avenue, New Orleans 13.

W. HORACE WILLIAMS, Jr., (1943), *Civil Engineer,* Member of Firm, W. Horace Williams Company. *Mail*: 833 Howard Ave. Home: 207 Vincent Ave., New Orleans 20.

CHARLES S. WILLIAMSON, JR., (L. M.), (1916), *Chemical Engineer,* Consulting Engineer, 1739 Marengo St., New Orleans 15, La.

GEORGE F. WILLIAMSON, (1939), *Civil Engineer, Registered La.* Member of Firm, George P. Rice Consulting Engineer, 408 Audubon Bldg. *Mail*: 7830 Burthe St., New Orleans 18, La.

VICTOR L. WILLOZ, (L. M.), (Jan. 1, 1900), *Electrical Engineer,* Retired. N. O. Public Service Inc. *Mail*: 4439 S. Miro St., New Orleans 15.

JAMES NORMAN WILSON, SR., (L. M.), (1911), *Mechanical Engineer,* Sewerage & Water Board of New Orleans, 526 Carondelet St. *Mail*: 2425 Audubon St., New Orleans 18.

TROY L. WILSON, JR., (J), *Civil Engineer, Registered La.* Asst. to Coordinator of New Projects, Esso Standard Oil Co. (La. Div.) *Mail*: 464 Riveilon St., Baton Rouge, La.

W. W. WILSON, (1949), *Civil Engineer*, Chief Draftsman, United Gas Pipe Line Co., P. O. Box 1407, Shreveport, La.

A. R. WINGATE, JR., (1925), *Civil Engineer*, Manager Fabricating Sales Dept. Jones & Laughlin Steel Corp., Home: 1624 Napoleon Ave. *Mail*: P. O. Box 66, New Orleans 6.

WILLIAM A. WINTZ, JR., (1942), *Civil Engineer, Registered La.* Asst. Prof. of Civil Engineering Louisiana State University. Home: 3029 Highland Road. *Mail*: College of Eng., L.S.U., Baton Rouge, 3.

BURRIS D. WOOD, (1947), *Civil Engineering Aide*, La. Dept. of Public Works. *Mail*: 822 North 8th St., Baton Rouge, La.

CARROLL L. WOOD, JR., (1946), *Civil Engineer*, Perrilliat-Rickey Construction Co. *Mail*: 4510 S. Prieur St., New Orleans 15.

JOHN WRIGHT WOOD, (1948), *Mechanical Engineer*, Design Engineer, Cities Service Refining Corp., Lake Charles. *Mail*: 102 Madison, Hollywood, La.

EDWIN R. WOODMAN, (1947), *Highway Engineer*, District Construction Engineer, La. Dept. of Highways, Home: 1112 S. Second. *Mail*: P. O .Box 1852, Monroe, La.

CHARLES S. WOODRUFF, (1950), *Industrial Engineer*. Partner, Ogden & Woodruff, Consulting Engineers, 3170 Florida St., Baton Rouge, La.

A. ALFRED WOODS (L.M.), (1914), *Civil Engineer, Registered La.* Retired Chief Engineer M. of W. & S. Western Lines, Southern Railway System. *Mail*: 1923 State St., New Orleans 18.

DURALD F. WOODS, (1922), *Civil Engineer*, Lutcher, La.

JOHN KING WOOLF, (1943), *Civil Engineer*, Member of firm, W. Horace Williams Co. Home: 298 Walnut St. *Mail*: 833 Howard Ave., New Orleans 12.

GORDON B. WOOSTER, (1948), *Civil Engineer*, Asst. Supt. Butadiene Plant, Cities Service Ref. Co., Lake Charles, La.

GRANVILLE J. WYATT, JR., (1949), *Mechanical Engineer*, Design Draftsman, Cities Service Refining Corp., Lake Charles. *Mail*: 13 East End, Maplewood, La.

CHARLES J. WYLER, (L.M.), (1919), *Mechanical Engineer*, Assistant Chief Engineer, A. M. Lockett & Co., Ltd., 308 Whitney Bldg., *Mail*: 530 Jackson Ave., New Orleans 13.

JOHN D. WYMAN, (1947), *Mechanical Engineer*, Chief Inspector, Cities Service Refining Corp., Lake Charles. *Mail*: 1820 Seventh St., Lake Charles, La.

ROBERT S. WYNN, (1947), *Electrical Engineer*, Professor of Electrical Engineering, La. Polytechnic Institute. *Mail*: Tech Station, Ruston, La.

—Y—

WADE H. YAWN, Jr., (1947), *Civil Engineer*, Project Engineer, La. Dept. of Highways. Home: 402 8th St. *Mail*: Box 446, DeRidder, La.

JOSEPH A. YAZBECK (J), (1949), *Industrial Engineer*, Sales Engineer, Cunningham Machinery Corp. *Mail*: 404 Washington St., Shreveport, La.

LOVETT YOUNG, (1943), *Chief Chemist*, Gulf States Utilities Co. *Mail*: 2404 Hale St., Baton Rouge, La.

VERTREES YOUNG,(1949), *Mechanical Engineer*. Executive Vice-President and Manager Mill Div., Gaylord Container Corp., Bogalusa, La.

GEORGE L. YOUSKO, JR., (J), (1949), *Mechanical Engineer*, Statistical and Planning Engr. Esso Standard Oil Co. *Mail*: 2015 North Blvd., Baton Rouge.

—Z—

MARIO G. ZERVIGON, (1943), *Electrical Engineer*, Associate, L. N. Goodman, Consulting Electrical Engineer, 409 Audubon Bldg. *Mail*: 732 Third St., New Orleans 21.

ANTHONY MICHAEL ZIBILICH, (1941), Capt., U. S. C. G., Retired. 5646 Canal Blvd., New Orleans 19.

ROBERT W. ZIIFLE, (1937), Engineer, Supt. of Equipment, New Orleans Public Service, Inc., 2838 Iberville St., New Orleans. *Mail*: 715 Pelican Ave., New Orleans 14, La.

T. H. ZUMWALT, (1944), *Civil Engineer, Registered, Tex.* Asst. to Chief Engr., Freeport Sulphur Co., Box 663, Port Sulphur, La.

Student Members

THOMAS J. ADAMS, Box 6252, University Station, Baton Rouge 3, La.
AUSTIN ARDOIN, Rt. 2, Box 356, Cottonport, La.
ALFRED AUSTEN, 511 Johnston Street, Lafayette, La.
RAYMOND BABAZ, Box 137, New Iberia, La.
JOSEPH L. BALCH, P. O. Box 369, Breaux Bridge, La.
ELLIS L. BEGNAUD, P. O. Box 213, Breaux Bridge, La.
JOSEPH G. BENOIT, Box 326, S.L.I., Lafayette, La.
PAUL BERCEGEAY, General Delivery, S.L.I., Lafayette, La.
CLEVELAND J. BERGERON, JR., Box 47, S.L.I., Lafayette, La.
DEWEY D. BILLODEAU, R.F.D. Box 298, Jeanerette, La.
LEE J. BLANCHARD, Rt. 1, Box 61, St. Martinville, La.
T. A. BRASSETTE, Box 376, S.L.I., Lafayette, La.
OLIVER BROUSSARD III, 307 N. Polk St., Rayne, La.
JOHN ATKINS BROWN, JR., 330 Cleveland St., Lafayette, La.
S. A. CALLAHAN, Jr., R.F.D. No. 2, Box 129, Lafayette, La.
CARROLL A. CLARK, 217 Olivier St., Lafayette, La.
RALPH E. COOPER, Box 77, S.L.I., Lafayette, La.
ALBERT CREWS, P. O. Box 205, S.L.I., Lafayette, La.
BRENNO F. DE CAMARGO, Box 375, S.L.I., Lafayette, La.
CESIR JOSEPH DECAREAUX, 117 E. Convent St., Lafayette, La.
FRANK V. DAIGLE, JR., 301 Clinton St., Lafayette, La.
HOWARD L. DICKIE, 600 Stevenson St., Lafayette, La.
CLAIBORNE J. DUHON, 331 N. Mouton St., Lafayette, La.
EDMOND E. DUPRE, JR., 124 S. Court St., Opelousas, La.
WILLIAM J. DORMAN, Box 574, S.L.I., Lafayette, La.
ELBERT J. DRAGON, P. O. Box 20, Berwick, La.
L. M. FALCONER, 638 Charles St., New Iberia, La.
KENNETH H. FAULK, 122 St. Landry St., Lafayette, La.
MELVIN S. FISCHER, 718 E. Main St., New Iberia, La.
J. W. FLESHMAN, 626 Harding St., Lafayette, La.
L. M. FALCONER, 638 Charles St., New Iberia, La.
JAMES FAYARD, Box 432, S.L.I., Lafayette, La.
GEORGE J. GLAUBRECHT, Rt. 1, Box 124, Jeanerette, La.
CHARLES GIBSON, Box 163, Washington, La.
GERALD M. GOSSEN, P. O. Box 818, Lafayette, La.
THOMAS T. GRACE, Box 7152, Baton Rouge, La.
ELMER P. HALL, General Delivery, S.L.I., Lafayette, La.
WILLIE R. HARRIS, Box 562, S.L.I., Lafayette, La.
CHARLES R. HENRY, General Delivery, S.L.I., Lafayette, La.
WILLIAM M. HOWE, General Delivery, S.L.I., Lafayette, La.
CHARLES W. HOGG, JR., 2034 Cedardale Ave., Baton Rouge, La.
ROBERT O. HINCKLEY, P. O. Box 333, Opelousas, La.
RICHARD L. JOHNSON, Jr., 557 Prospect Ave., Shreveport, La.
ROSCOE B. JONES, Box 329, S.L.I. Station, Lafayette, La.
H. M. KING, P. O. Box 473, S.L.I., Lafayette, La.
CALVIN B. KLOTZ, General Delivery, S.L.I., Lafayette, La.
J. I. KOTTER, Box 203, S.L.I., Lafayette, La.
FRANK I. KIEFER, Box 432, S.L.I., Lafayette, La.
RUDOLF M. LEMKE, 128 Mildred St., Lafayette, La.
WHITMEL E. LAZARUS, Jonesville, La.
JAMES O. LYSOGHT, Box 246, S.L.I., Lafayette, La.
WALTER A. LANDRY, Box 146, S.L.I., Lafayette, La.
JOSEPH C. MEHRHOFF, Box 416, S.L.I., Lafayette, La.
JAMES R. MESTEPEY, General Delivery, S.L.I., Lafayette, La.
R. E. MILLER, General Delivery, S.L.I., Lafayette, La.
LAMON L. MOODY, General Delivery, S.L.I., Lafayette, La.
EDWIN W. MYERS, Sunset, La.

ALEXANDER McCOOL, Box 246, S.L.I., Lafayette, La.
GEORGE P. MORESI, 537 E. Main St., Jeanerette, La.
WALLACE J. MORGAN, Box 472, S.L.I., Lafayette, La.
CHARLES F. NEGLEY, Box 386, S.L.I., Lafayette, La.
RIDLEY A. NAQUIN, Box 442, S.L.I., Lafayette, La.
JOHN A. NEPUEUX, Box 234, Breaux Bridge, La.
JAMES R. NORMAN, General Delivery, S.L.I., Lafayette, La.
DONALD J. O'ROURKE, 612 G. Mouton Ave., Lafayette, La.
ROLAND R. OTTO, 302 Cherry St., Lafayette, La.
ROBERT W. O'BRIEN, Box 329, S.L.I., Lafayette, La.
FRED J. PAUL, General Delivery, S.L.I., Lafayette, La.
JOHN H. PERE, Box 261, S.L.I., Lafayette, La.
GEORGE L. PORTER, JR., 319 Brook Avenue, Lafayette, La.
EMETERIO I. RAMIREZ, Box 305, S.L.I., Lafayette, La.
VICTOR RANDALE, 405 General Mouton St., Lafayette, La.
HORACE H. RAY, 319 Brooks Ave., Lafayette, La.
W. O. RAY, 319 Brooks Ave., Lafayette, La.
FELIX L. REXACH, 1704 Johnston St., Lafayette, La.
LARRY F. REYNAUD, Star Rt. B, Box 27, New Iberia, La.
WARREN G. ROTHKAMM, 116 Howard Ave., Lafayette, La.
FRANK ROBERT, JR., Box 525, S.L.I., Lafayette, La.
LEONARD JAMES ROMERO, Box 279, S.L.I., Lafayette, La.
ELMORE G. RUSSELL, Box 313 S.L.I., Lafayette, La.
ROBERTO SALAZAR, Box 575, S.L.I., Lafayette, La.
ROBERT E. SEILEY, Box 150, S.L.I., Lafayette, La.
VERNON Q. SIBILLE, Sunset, La.
CECIL S. SONNIER, 709 Wilson St., Lafayette, La.
A. M. SPENCER, Box 27, S.L.I., Lafayette, La.
LLOYD A. STOCKFLETH, General Delivery, S.L.I., Lafayette, La.
M. A. STEELE, 1428 Johnston St., Lafayette, La.
REUBEN D. STOGNER, General Delivery, S.L.I., Lafayette, La.
CHARLES SELLERS, 909 W. Convent St., Lafayette, La.
SIDNEY N. TANNER, Box 199, S.L.I., Lafayette, La.
NEIL J. TOUPS, 515 Lagarde St., Thibodaux, La.
JAMES A. TOCHO, Box 417, S.L.I., Lafayette, La.
JOHN R. TOCHO, JR., 905 E. Sixth St., Crowley, La.
JOHN C. UPTON, 955 Jane St., New Iberia, La.
LEO VAN AMERONGEN, 401 Adams Ave., Rayne, La.
JOHN PAUL WALSH, Box 296, S.L.I., Lafayette, La.
ROY J. WASKO, Box 325, S.L.I., Lafayette, La.
CARLTON E. WOODS, Box 217, S.L.I., Lafayette, La.

Summary

HONORARY MEMBERS		4
CHARTER MEMBERS		1
LIFE MEMBERS		57
MEMBERS:		
Local	322	
State	398	
Non-Resident	48	
Address Unknown	6	774
AFFILIATE MEMBERS		32
JUNIOR MEMBERS:		
Local	94	
State	116	
Non-Resident	24	234
STUDENT MEMBERS		98
TOTAL		1200

Past Presidents

*Sidney F. Lewis.....1898
*Thos. L. Raymond.....1899
Henry J. Malochee.....1900
*Frank M. Kerr.....1901
*Alf. F. Theard.....1902
*Alf. Raymond 1903
*J. F. Coleman.....1904
W. B. Wright.....1905
*W. H. Hoffman.....1906
*G. W. Lawes.....1907
*C. W. Wood.....1908
*J. T. Eastwood.....1909
*W. B. Gregory.....1910
*J. C. Haugh.....1911
D. S. Anderson.....1912
*A. M. Shaw.....1913
W. H. Williams.....191
*L. C. Datz.....1915
*Samuel M. Young.....1916
A. T. Dusenbury.....1917
*John Klorer 1918
Ole K. Olsen.....1919
John Riess 1920
R. S. Manley.....1921
Donald Derickson 1922
*J. S. Bareli.....1923
James M. Robert.....1924
Marcel Garsaud 1925
*Farrar P. Hamilton 1926
*Edward S. Lanphier.....1927
John L. Porter.....1928
Frederick H. Fox.....1929
James M. Todd.....1930
*Frank G. Frost.....1931
Frederick N. Billingsley.....1932
John H. O'Neill.....1933
A. L. Dunlap.....1934
Edward S. Bres.....1935
Allen S. Hackett.....1936
C. S. Williamson.....1937
Bernard H. Grehan.....1938
David W. Godat.....1939
William H. Rhodes.....1940
David W. Stewart.....1941
C. Glenn Cappel.....1942
Karl P. Kammer.....1943
Charles M. Kerr.....1944
Reinhard A. Steinmayer.....1945
Leo Jos. Lassalle.....1946
Clayton L. Nairne.....1947
W. Stone Leake.....1948
Herman L. Lehmann.....1949

* Deceased.

FINANCIAL REPORT OF THE SECRETARY-TREASURER FOR 1949

RECEIPTS:			
Advertising		$ 698.00	
Income from sale of Certificates		31.11	
Dividends and Interest		195.09*	
Dues		5,781.25	
Registration Act		150.00	
Total Operating Income			$ 6,855.45
EXPENDITURES:			
Deficit from 1949 Annual Meeting		$ 215.32	
Deficit from 1949 Annual Outing		39.73	
Floral Offerings		54.87	
Miscellaneous:			
Ass'n. of Commerce Dues	$ 72.00		
Auditor's Fee	100.00		
Golf Trophy	66.63		
Presents	111.05		
Other	284.36	634.04	
Library Service		16.00	
Cost of Monthly Meetings		549.25	
Cost of Proceedings		1,859.30	
Salaries		1,500.00	
Stationery, Printing and Postage		930.47	
Telephone and Telegrams		91.36	
Taxes		35.00	5,925.34
Increase in Tangible Assets			$ 930.11

*Includes increase in book value of stocks and bonds.

STATEMENT OF ASSETS
December 31, 1949

Cash, Whitney National Bank Checking Account			$ 5,964.21
U. S. Savings Bonds, Series F:			
1942		$ 848.00	
1943		835.00	
1945		786.00	
1946		767.00	3,236.00
Investments:			
Columbia Homestead Association		$ 366.21	
Commonwealth Bldg. & Loan Ass'n.		305.97	
Greater N. O. Homestead Ass'n.		1,652.28	
Security Bldg. & Loan Ass'n.		500.00	
Sixth District Bldg. & Loan Ass'n.		500.00	
Union Savings & Loan Ass'n.		500.00	3,824.46
Total			$13,024.67
Total Available Assets at beginning of Year			12,094.56
Increase in Liquid Assets during the Year			$ 930.11

MEMBERSHIP REPORT FOR 1949

Members Elected:	
New Members	131
Reinstated Members	6
Affiliate Members	6
Junior Members	51
Student Members	61
	255
Changes in Grade of Membership:	
Student Member to Junior Member	52
Junior Member to Member	27
Members Lost:	
Resignations	35
Dropped for Delinquent Dues	34
Deceased	9
	78
Net Gain in Membership	177
Membership at beginning of year	1,023
Total Membership December 31, 1949	1,200

MINUTES OF THE MEETINGS AND BUSINESS OF THE SOCIETY

Minutes of Meeting of the Board of Direction held on Monday, November 14, 1949, in a Private Dining Room at Arnaud's Restaurant

The meeting was called to order by President Lehmann, with Messrs. Abrahm, Cucullu, Hill, Mire and Fernandez present. Former President Leo J. Lassalle also was present by invitation. Minutes of the preceding meeting were accepted as read.

President Lehmann gave a report of the chapter presentations to the Monroe and Shreveport Sections, and copies of the charters were shown to the board members.

The Treasurer's report for the third quarter of 1949 was presented, as was a financial report on the Annual Outing held in October.

The Secretary read correspondence with the attorney for the Southwest Louisiana Electric Membership Corporation.

Resignations of Messrs. Leon E. Savage and Gabriel Aurioles were accepted with regret.

Tentative procedure for presenting an award to Louisiana engineers for civic enterprise was read, and the secretary was instructed to communicate with Mr. James M. Todd, Chairman of the committee in charge of the matter, with reference to one of the suggestions made.

The election of Mr. Osborn J. Dykes, Sr. was considered void in accordance with the constitution, since more than 90 days have elapsed since his election to membership and no acceptance has been received from him.

The following student members recently transferred to Junior grade have not accepted their transfers; in accordance with the constitution they are considered as having resigned: Kenneth R. Barbay, Francis X. Barry, Sidney I. Daigle, C. J. Couvillon, James D. Cunningham, John S. Diamond, Leo J. Gaudin, Calvin Glaubrecht, Robert Klestil, Raymond J. Hebert, Roy Lee Jones, Floyd E. Keeney, Anthony J. Lungaro, Thomas R. Long, Patrick J. Nain, Al Schnyder, S. Thibodeaux, Allen Vaughan.

Mr. Hill moved that the Louisiana Engineering Society invite its board members, officers of state sections, and contact representatives to attend a dinner on Friday, January 13 during the annual meeting, expenses of the occasion to be borne by the Society. The motion was seconded by Mr. Mire and carried.

Mr. Mire moved that the date of the December meeting be advanced to the 5th of the month, and that the evening be designated as "President's Night." The motion was seconded by Mr. Abrahm and carried.

The secretary announced that members of L.E.S. had been invited by the American Chemical Society to attend their meeting to be held on November 18. There being no further business, the meeting adjourned.

JOHN P. FERNANDEZ, Sec.-Treasurer

Minutes of Meeting of the Louisiana Engineering Society held Jointly with The N. O. Section, American Society of Mechanical Engineers, on Monday, November 14, 1949

The meeting was called to order by President Lehmann, with approximately 125 members and guests present. President Lehmann welcomed members and guests of the A.S.M.E. Mr. F. W. Macdonald moved that the reading of minutes of the preceding meeting be dispensed with, seconded by Mr. Waldemar S. Nelson and carried.

President Lehmann announced that charters had been presented to the Monroe and Shreveport Sections. He then read a paragraph from the meeting notice relative to the nominating committee and urged members at large to send their suggestions to Chairman Leake.

The secretary announced that the American Chemical Society would hold a meeting on November 18 and that members of the Louisiana Engineering Society were invited to attend. Following this, the chair was relinquished to Mr. R. M. Seago, Chairman, New Orleans Section, American Society of Mechanical Engineers. Mr. Milton E. Kirkpatrick then introduced the speaker of the evening, Mr. James M. Todd, prominent New Orleans engineer and

national president of A.S.M.E. Mr. Todd's lecture, entitled "Dollars and Sense" dealt with the Hoover Report, with which Mr. Todd is closely familiar in his capacity as a member of the Citizens Committee for the Reorganization of the Executive Branch of the Federal Government.

Following this most informative talk, the chair was returned to President Lehmann, who adjourned the meeting with a rising vote of thanks to the speaker.

JOHN P. FERNANDEZ, Sec.-Treasurer

Baton Rouge Section of Louisiana Engineering Society

Minutes of tenth annual meeting: Date, December 15, 1949; Time, 7:30 p. m.; Place, Pallud's Restaurant.

The following officers were present: W. P. Wallace, president; A. J. Mary 1st vice-president; F. A. Hannaman, Jr., 2nd vice-president; and Louis Duclos, secretary-treasurer.

There were 90 members and guests present. After enjoying an excellent steak dinner, the business meeting was opened by President Wallace.

President Wallace announced that Mr. H. L. Lehmann, President of the Parent Organization, had expressed his regrets at being unable to attend as he was out of the state on business. President Wallace then introduced Mr. Lionel J. Cucullu, 1st vice-president, Mr. Harry P. Newton, 2nd vice-president, Mr. John P. Fernandez, secretary-treasurer, and Mr. Michael C. Abrahm, director, of the Parent Organization.

The past presidents of the Baton Rouge Section who were present were then introduced: Mr. T. E. Peak, 1947; Mr. J. T. O'Brien, 1945; Mr. F. F. Pillett, 1943; Mr. N. E. Lant, 1942; and Mr. B. W. Pegues, 1940.

This was a joint meeting with the Baton Rouge Chapter of the Women's Auxiliary to the Louisiana Engineering Society, and President Wallace then turned the meeting over to Mrs. George T. DeLaMatyr, president of the Baton Rouge Chapter, who introduced Mrs. Gayle Schneiday, president of the Women's Auxiliary, and the officers of the Baton Rouge Chapter. After making a brief talk outlining the aims of the Auxiliary, Mrs. DeLaMatyr turned the meeting back to Mr. Wallace.

President Wallace called for and received the various committee reports as follows:

Mr. George T. DeLaMatyr, chairman, Entertainment Committee, spoke briefly expressing his gratitude for the cooperation his committee had received from the members.

Due to the absence of Mr. W. D. Morris, Chairman, the report of the Membership Committee was read by the Secretary. On December 1, 1948 the membership consisted of 154 members, 31 junior members, 3 affiliate members, and 2 student members. During the year 44 members of all grades were added, but 34 members were lost through death, changes in grade, non-payment of dues, moving, and resignations. On December 1, 1949, therefore, the total membership was 200, composed of 158 members, 34 junior members, 4 affiliate members, and 4 student members.

Mr. Wiley D. Poole, chairman, Publicity Committee, reported on the activities of his committee.

Mr. W. A. Wintz, chairman, Student Activity Committee reported on the meeting held annually at which all of the speakers are Louisiana State University students.

President Wallace then called for the reading of the minutes of the previous meeting. The secretary was actually permitted to read the minutes.

The Treasurer's report was then called for. The balance on December 1, 1948 was $166.17, receipts for the year were $434.48, expenditures were $397.06, leaving a balance on December 1, 1949 of $203.59.

President Wallace then called for the report of the 2nd vice-president who serves as chairman of the Technical Papers Committee. Mr. Hannaman spoke briefly on the activities of his committee.

Mr. A. J. Mary, 1st vice-president, then reported on the activities of the 1st vice-president.

President Wallace then presented his report on the activities on the Rouge Section for this year. Six meetings were held during the year.

President Wallace then called for the report of the Nominating Committee. Mr. T. E. Peak, chairman of the Nominating Committee, which was composed of Mr. Peak, Mr. J. T. O'Brien, and Mr. H. L. Lehmann, submitted the following nominations: for president, Mr. A. J. Mary; for 1st vice-president,

Mr. Fred A. Hannaman, Jr., for 2nd vice-president, Mr. Louis Duclos, and for secretary-treasurer, Mr. Henry L. Landry.

President Wallace then called for nominations from the floor. There being no nominations, it was moved by Mr. N. E. Lant and seconded by Mr. B. W. Pegues that the nominations be closed and the nominees submitted by the Nominating Committee be declared elected by acclamation. Motion carried.

Mr. Mary then announced that the Section wished to present the retiring president with a gift as a token of appreciation for his work during the year. Mr. Wallace thanked Mr. Mary and the entire Section for the gift.

Mr. Wallace then turned over the chair to President-elect Mary. There being no further business to come up, the meeting was turned over to Mr. Hannaman who introduced the Esso Male Quartet, Mr. Dix, Mr. Cooter, Mr. Sellen, and Mr. Jones. After several numbers which were enthusiastically received, the pictures of the L. S. U.-Tulane football game were shown.

The meeting was then jointly adjourned by Mrs. DeLaMatyr and Mr. Mary.

LOUIS DUCLOS, Sec.-Treasurer

Minutes of Meeting, Baton Rouge Section, Louisiana Engineering Society

Date, January 18, 1950; time, 7:30; place, Highway Laboratory Building. Officers present: A. J. Mary, president; F. A. Hannaman, Jr., 1st vice-president; Louis Duclos, 2nd vice-president; Henry L. Landry, sec'y.-treasurer.

The meeting was called to order by Mr. A. J. Mary at 7:30 p. m. in the Highway Laboratory Building. The above officers and approximately 50 other members and guests were present.

Mr. Mary called on the members to introduce their guests.

It was moved and seconded that the reading of the minutes of the last meeting be dispensed with.

Mr. Mary gave a short report on the annual meeting of the society in New Orleans.

There being no further business Mr. Mary turned the meeting over to Mr. Louis Duclos. Mr. Duclos introduced the speakers of the evening. First: Mr. Fred B. White, Sales Engineer with the Tennessee Coal Iron and Railroad Company, who gave an interesting talk on "The Romance of Steel". Second: Mr. C. C. Greulich, Consulting Engineer, Carnegie-Illinois Steel Corporation, who made a talk on "Foundation Problems in the Heavy Construction Field" followed by an interesting question period. These two talks were followed by a film entitled "Uses and Application of Carnegie-Illinois Specialty Products".

The meeting was adjourned with a rising vote of thanks to the speakers.

HENRY L. LANDRY, Sec.-Treasurer

PROCEEDINGS
OF THE
LOUISIANA ENGINEERING SOCIETY

VOL. XXXVI APRIL, 1950 NO. 2

CONTENTS

EDITORIAL NOTES AND COMMENTS

Our Baton Rouge Section was formed a number of years ago—1939 to be exact. It has had during that time many able presidents. Under its present capable and energetic President Mary it will undoubtedly continue to grow in membership and influence.

President Austin J. Mary is a native son of the Baton Rouge area, but unlike his three fellow Sections Presidents (all of whom are civils) is an electrical engineer.

He completed his graduate and undergraduate work at L. S. U. During the war, in the Signal Corps, he served in both European and Pacific areas. At present he is supervisor of the Electric Transmission & Distribution Engineering Department of the Gulf States Utilities Company.

Mr. Ray E. Burgess, President of the Lake Charles Section appears ready to tackle the problems at hand.

President Burgess is a native of Missouri. He has a background of a civil engineering degree; has taught mathematics, and has owned and operated a technical school in Texas. His engineering experiences are railroading, construction of power facilities, and appraising oil properties.

Construction work in the oil industry landed him in the position of Technical Assistant to the Chief Engineer, Cities Serive Refinery, Lake Charles.

President Burgess possesses a warm and genial personality, and we are confident that under his administration the Section membership will grow, reflecting the industrial and port expansion of Lake Charles.

Dean Roy T. Sessums is the President of the Monroe Section. He is a native of our state, and for the past ten years has been Dean of Engineering at Louisiana Polytechnic Institute, Ruston. He holds a master's degree in civil engineering, and is a registered engineer of Louisiana.

During the war he served four years with the Air Force, and now holds a reserve commission as Lieutenant Colonel.

Dean Sessums is active in engineering circles, being a member of A.S.C.E.; A.S.E.E.; S.A.M.E.; N.S.P.E.

The Monroe Section is fortunate in having so able a person for its President. Aided by his many friends, and under his guidance, the membership will undoubtedly experience a steady growth.

The President of the Shreveport Section is Ernest M. Freeman. Certainly he can look back over the tremendous progress and changes in that community, since he came there in 1925.

Mr. Freeman has enjoyed a wealth of engineering experiences in the line of civil engineering work. He holds a Certificate of Qualification from the National Bureau of Engineering Registration. His recent consulting work covers the twelve million dollar veteran's hospital at Shreveport, State Charity Hospital in the same city, numerous airport projects.

Our Shreveport Section President is also a member of some nineteen organizations, many of a civic or public service nature. Needless to say, it would have been difficult to find a man better suited to this office in the Society.

Lake Charles Annual Meeting. On February 6 the Annual Meeting was held at the Majestic Hotel. The speaker following the dinner was Walter M. Casey. His subject, "Price of World Leadership Is Higher Than High." The topic was discussed in the light of his recent European trip. Mr. L. F. Riegel introduced the speaked. Retiring President Goodloe made a report.

Installation of officers for 1950 was the next order of business, Ray E. Burgess as president; W. M. Larkin as vice-president; V. E. Sicks, secretary-treasurer. Hostesses were Mrs. R. R. L. Ward, Mrs. R. E. Burgess, Mrs. G. B. S. Ricketts, Mrs. V. E. Sicks, Mrs. C. W. Stokes.

The co-chairman of the meeting were G. B. S. Ricketts and S. D. Nolan.

New Members. The following were elected to membership in the Society in a recent ballot. We welcome these new members, and look forward to having them participate fully in the affairs of the society.

FOR MEMBER

C. F. BLANK, Shreveport; age 46. Endorsed: J. S. Broyles, T. F. Cash, J. P. McCullough. Louisiana Polytechnic Institute, B.S.M.E., 1931. United Gas Pipe Line Co., 1931-date, presently in charge of Inventory Section, Engineering Dept.

JAMES WESLEY BROWN, Denham Springs; age 48. Endorsed: B. M. Dornblatt, J. M. LeDoux, E. G. Roessle. University of Mississippi Eng. School, 1922-24, 1924-25. Barnard & Burk, Baton Rouge, Resident Engineer, present position. S. V. Applewhite, New Orleans, Instrumentman, 8 mos. City Engineer, McComb, Miss., 8 yrs. Private practice, McComb, 5 yrs. Licensed Engr., Miss. Member ASCE, Miss. Society Prof. Engrs.

JOHN D. CALHOUN, Ruston; age 27. Endorsed: J. C. Seeger, R. T. Sessums, C. T. Watts. Louisiana Polytechnic Institute, B.S.M.E., 1943. Boeing Aircraft Co., Seattle, Wash., Engineer Tooling Dept., 1943-46. Hardwicke-Etter Co., Sherman, Tex., Draftsman, Feb.-June 1946. Boeing Aircraft, Seattle Engr. Power Plant, June-Dec. 1946. La. Polytechnic Inst., Asst. Professor Engr. Dept., Feb. 1947-date.

VERNE CLAWSON, New Orleans; age 66. Endorsed: K. P. Kammer, D. W. Stewart, International Correspondence School. U. S. Reclamation Service, Boise, Idaho, Chief Engr. & General Supt. City of Salt Lake, Utah, Dam construction, General Supt. Miami Consevancy Dist., Dayton, Ohio, General Supt. Chas. B. Howley Co., Dam & Power House Construction, Dayton, Gen. Supt. Ebasco Services, N. Y., Steam Power Plant Construction, General Supt., past 25 years.

JOHN M. CONDREN, JR., Maplewood; age 35. Endorsed: R. S. Clark, E. N. Schwartz, G. H. Cox. Cornell University, E. E., 1936. Otis Elevator Co., N. Y., Design & Application Engr., 1936-38. National Geophysical Co., DeRidder, La., Field Party Eng., Computer & Interpreter, 1938-41. Navy Dept. Bur./Ordance, Washington, D. C., Design & Dev. Eng., 1941-42. U. S. Coast Guard, Naval Eng. Div., Washington, D. C., Civilian and USCGR, Design Engr., 1942-46. U. S. Veterans Admin., Atlanta, Ga., Supervisor Eng. Unit, 1946-48. Southern Alkali Corp., Lake Charles, Mech. Design Engr., 1948-50. Licensed M & E Engr., Georgia. Member AIEE, National Society Prof. Engrs.

RICHARD L. DAVIS, New Orleans; age 40. Endorsed: H. L. Lehmann, B. J. Lehmann, J. A. Carville, Jr. Louisiana State University, B.S.Ch.E., 1932. Shell Oil Co., 1932-date, now Area Mgr. Gas Dept., approximately 3 states.

FRED L. GOODMAN, Baton Rouge; age 37. Endorsed: H. J. Gillum, G. T. de la Matyr, J. T. O'Brien. Purdue University, C. E. Degree 1934. Indiana Dept. of Highways, Survey Party Chief, 1935-40. Portland Cement Ass'n, 1941-45, Technical Advisor construction. Barber Bros. Co. Contractors, Technical Engineer, 1946-date. Licensed Prof. Engr., Indiana.

A. R. KUZEL, Baton Rouge; age 64. Endorsed: L. Duclos, J. T. Huey, S. A. Nasca. Graduate Polytechicum, Zurich, Switzerland. Avondale Marine Ways, M. E., 2 yrs. Hyde Windlass Co., Bath, Me., M. E., 6 yrs. American

Enc. Co., Philadelphia, M. E., 8 yrs La. Dept. of Highways, Mechanical Designer, present position.

CHARLES F. LACK, Shreveport; age 62. Endorsed: E. M. Freeman, C. A. Frey, L. H. Roeger. University of Missouri, B.S.C.E., 1905. Licensed New Mexico. M. & O. R.R. & Midland Bridge Co., Construction Engr., 1909-13. Private practice, 1914-15. Construction Engr. for several firms, 1915-23. Contracting in Alabama, bridges & drainage structures, 1923-25. Florida State Road Dept., Project Engr., 1926-29. Consulting Engr., Gallup, N. M., 1937-41. Construction Supt., Silas Mason & Co. and Mason & Hangar, Ordnance Plants, 1941-42. Construction Engr., E. M. Freeman & Associates, 1946-47. Inspector, Neild & Somdal, 1948-49. Resident Engineer, E. M. Freeman & Associates, Sept. 1949-date.

DAVID R. M. LOVELACE, Shreveport; age 40. Endorsed: G. P. Forman, E. M. Freeman, T. W. Parish, Jr. La. Dept. of Highways, 1929-33, 1935-40, 1946-48, Instrumentman, Estimates & Specifications, Resident Engineer. United Engineers & Contrs., Instrumentman, Plant Construction, 1933. U. S. Army, War Dept., Computer & Surveyman, 1933-34; Military Engineer, 1941-45; Revetment Engineer, 1948-49. E. M. Freeman & Associates, Field Engineer, 1949-date.

JAMES McGREGOR NEWLANDS, New Orleans; age 36. Endorsed: W. H. Rhodes, A. H. Sykes, Royal Technical College, Glasgow, Scotland, M. E., 1933. Harland & Wolff, Ltd., Glasgow Shipbuilders 1933-35. Shell Oil Co., Venezuela, Field Engr., 1936-39. Ira S. Bushey & Co., Shipbuilders, Brooklyn, N. Y., Engr., 1940-43. War Service, Maritime Service, 1943-45. Shell Oil Co., Field Engr., 1946-date. Engr. Licenses from 3rd Asst. to Chief (Marine). Member Society of Military Engineers.

RAYMOND S. OSBORN, New Iberia; age 35. Endorsed: H. L. Lehmann, J. E. Jarman, R. T. Brooks. Shell Oil Co., Rodman, Chainman, Jr. Instrumentman, 1940-43. La. Dept. of Highways, Rodman, Levelman, Jr., Sr. Instrumentman, Chief of Party, Jr. & Sr. Project Engineer 1943 to date, now Asst. Dist. Maintenance Engineer.

RHETT S. PARKER, Shreveport; age 47. Endorsed: E. M. Freeman, L. H. Roeger, C. A. Frey. Alabama Polytechnic Institute, 2 yrs. C. E., 1921-23. U.S. & D. Wilson, Surveyman, 1924-25. Miss. River Commission, Party Chief, 1929-30. La. Highway Commission, Party Chief, 1931-33. C.W.A. & F.E.R.A., District Engineer, 1933-35. Soil Conservation Service, Supt. C.C.C. Camp, 1938-42. E. M. Freeman, Party Chief, 1942. M. W. Kellog Co., Party Chief, 1943. E. M. Freeman, Party Chief, 1943-45. Voorhies & Smith, Water Main Layout, 1945-46. Carnegie & Smith, Construction Engineer, 1947-49.

FRANK W. QUIN, JR., Shreveport; age 32. Endorsed: E. M. Freeman, E. M. Gillen, J. P. McCullough. Louisiana State University, B.S.M.E., 1946; ½ yr. Arch. Eng. Engineer Officer, Corps of Engrs., U.S.A., 5½ yrs. Lubrication Engineer, Sinclair Refining Co., 1½ yrs. Process Engr., Stone & Webster Eng. Corp., 9 mos. Eng. Officer, C.E., U.S.A., 3 mos. Engineering Estimator, The Texas Eastern Transmission Corp., 3½ mos.

RAYMOND J. SIMMONS, JR., Ruston; age 26. Endorsed: T. F. Cash, J. P. McCullough, W. W. Wilson. Arkansas Polytechnic College, 1940-42, C.E. Certificate. Louisiana Polytechnic Institute, 1942-44, B.S.C.E. United Gas Pipe Line Co., 1944-date, Surveyman, Jr. Asst. Engr., Asst. Engr., Job Engineer on pipe line construction. Registered C.E., La.

ALBERT R. WALTON, Shreveport; age 30. Endorsed: E. M. Freeman, F. W. Grant, T. J. Rucker. Louisiana Polytechnic Institute, 1 yr. engineering. Geo. E. Dutton, Rodman, Chairman, 3 mos. M. W. Kellog Construction Co., Rodman, Chairman, Instrumentman, 1½ yrs. La. Dept. of Highways, Surveyman, 1 yr. 4 mos. The Carter Oil Co., Instrumentman, Draftsman, 5 yrs. 3 mos.

FOR AFFILIATE MEMBER

WALTER C. LEHIGH, New Orleans; age 36. Endorsed: B. J. Lehmann, W. H. Rhodes, H. L. Lehmann. Rutgers University, B. S. Science 1935. Shell Oil Co., 1935-41 U. S. Army, Infantry, 1941-46, retiring rank major. Shell Oil Co., 1946-date, now Division Asphalt Manager.

RUSSELL JAMES WILDEY, Monroe; age 40. Endorsed: C. E. Dickey, W. B. Jordan, A. O. Ware. Grand Rapids, Mich. Junior College, Engineering Course, 1928-30. International Correspondence School, "Principles of Steam-Electric Power Plants", 1947-48. U.S. Army, Company Commander, 1940-46. Louisiana Power & Light Co., Sterlington Station. Installation, Maintenance & Repair of Power House Instruments, 4 years.

FOR TRANSFER FROM JUNIOR TO FULL MEMBER

WALTER C. BYRNE, JR., age 28. Tulane University, B. E. in M. E. 1942. Jr. Engineer, U. S. Engineers. Lt. in U.S. Naval Reserve, 1942-46. Jr. Engi-

neer, U.S. Engineers, New Orleans District, 1946-47. Physicist, Tulane University Biophysics Laboratory, 1947 to date.

ALVIN G .GOTTSCHALL, age 27. Tulane University, B. E. in M.E. 1943. 3½ years in U.S. Navy, Engineering Department. Four years, Lubrication Engineer with Gulf Refining Co., in southern Mississippi.

NEILL P. JEFFREY, JR., age 27. Tulane University, B. E. in C. E. 1943. U.S. Navy, Lt. (S. G.) Ship Const. & Repair 1943-46. George J. Glover Co., Field & estimating 1946-47. Harvard University. M. S. in Structure Design. A. W. Thompson & Assoc., structural Design, 1948 to date.

ROY E. JOHNSON, age 29. Tulane University B. E. in C. E. 1943. U. S. Engineers, Airport Design, 1942. Douglas Aircraft, California, Design & Research Department, 1943-44. U.S. Navy, Civil Engineer Corps, 1944-46. Industrial Steel Co., Structural Steel. Design & Detailing, 1946-48. Sales Engineer with H. H. Robertson Co. of Pittsburgh, Pa. Louisiana & Mississippi territory, 1948 to date.

EDWIN A. LAFAYE, JR., Age 28. Tulane University, B. E. in M. E. 1943. U.S. Navy 1943-46 Production Division (Aircraft). Sales Engineer, Murray Baker Frederic, Inc. 1946 to date.

RUSSELL A. MATHERNE, age 29. Louisiana State University, B. S. in M. E. 1943. Boeing Aircraft Co., 1943-44. Standard Oil Co. of New Jersey, 1944-45. Barnard & Burk, Consulting Engineers, 1945 to date. Licensed Eng. C.E., La.

SAMUEL J. STOKES, age 30, Tulane University, B. E. in C. E. 1944. Humble Oil Co., 1944-46. District Engineer, City of New Orleans, Maintenance, 1946 to date.

HAROLD H. STREAM, JR., age 29. Tulane University, B. E. in C. E. 1942. Engineer, Union Oil Co. of California, in San Marino California. Has applied for non resident membership.

FOR JUNIOR MEMBER

THOMAS L. AUBIN, JR., Shreveport; age 25. Endorsed: J. S. Broyles, T. F. Cash, Clarence Durham. Louisiana State University, B.S.M.E., 1946. United Gas Pipe Line Co., Jr. Draftsman, Jr. Asst. Engr., Asst. Engineer, July 1946 to date.

TRUMAN A. BOURGEOIS, Baton Rouge; age 25. Endorsed: C. E. Abrahamson, J. B. Carter, Louis Duclos. Louisiana State University, B.S.M.E., 1949. La. Dept. of Highways, Bridge Detailer, to date. Member ASME.

WILLIAM H. BUTTS, Shreveport; age 29. Endorsed: F. H. Fox, T. J. Rucker, E. M. Freeman, Tulane University, B.S.C.E., 1949. E. M. Freeman & Associates, Engineer, June 1949 to date. Junior Member A.S.C.E.

JULIUS W. COLE, Baton Rouge; age 22. Endorsed: C .E. Abrahamson, J. B. Carter, Louis Duclos. Louisiana State University, B.S.C.E., 1949. La. Dept. of Highways, Sr. Bridge Detailer, Sept. 1949-date. Licensed C.E., Member ASCE, American Wood Preservers Ass'n.

CHARLES H. EDWARDS, JR., Ruston; age 25. Endorsed: R. T. Sessums, C. T. Watts, J. C. Seeger. Louisiana Polytechnic Institute, B.S.C.E., 1947; University of Texas, M.S.C.E., 1949. Louisiana Polytechnic Institute, Assistant Professor of C.E., Sept. 1949 to date. Licensed C.E.,La.

NOEL JAMES EVERARD, New Orleans; age 26. Endorsed: D. W. Godat, F. F. Pillet, W. P. Wallace. Louisiana State University, B.S.C.E., 1948. Louisiana State University, Instructor in C.E., Sept. 1948-Feb. 1949. David W. Godat & Associates, C.E., Feb. 1949 to date. Registered C.E., La. Member TIME (Honorary Math Fraternity), American Concrete Institute, Civil Eng. Fraternity.

SIDNEY L. GRILLOT, JR., Shreveport; age 28. Endorsed: G. A. DeWolf, R. D. Morgan, L. M. Odom. Louisiana State University, 4 yrs. C.E. Delta Shipbuilding Co., Draftsman, 1 yr. U.S. Geological Survey, Baton Rouge, 1 yr. La. Dept. Public Works, Shreveport, 1 yr.

ROBERT H. GREHAN, New Orleans ;age 22. Endorsed: L. J. Cucullu, B. H. Grehan, F. W. Macdonald. Tulane University, B.E. in C.E., 1948. N.O. Public Service Inc., Asst. Engineer, 1948 to date. Member ASCE, Am. Public Works Ass'n. Licensed C.E., La.

CHARLES W. HILL, Baton Rouge; age 21. Endorsed: C. E. Abrahamson, J. B. Carter, Louis Duclos. Louisiana State University, B.S.C.E., 1949. La. Dept. of Highways, Bridge Detailer, June 1949-date. Jr. Member ASCE.

EDWARD MARTIN JOLLY, Shreveport; age 24. Endorsed: E. M. Freeman, F. W. Grant, L. H. Roeger. Louisiana Polytechnic Institute, B.S.M.E. E. M. Freeman & Associates, Civil Engineer, 5 mos.

ROBERT D. LAW, JR., Baton Rouge; age 25. Endorsed: C. E. Abrahamson, J. B. Carter, Louis Duclos. Three years of College Civil Engineering,

1946-7-8. Rittiner Construction Co., Head Architectural Draftsman & Junior Surveyor, 1946-48 (full time job while attending school). La. Dept. of Highways, Sr. Bridge Detailer, 1948-date. Member La. Highway Engineers Society.

HAROLD MELVILLE, JR., New Orleans; age 26. Endorsed C. G. Cappel, R. G. Cappel, W. H. Williams, Jr. Louisiana State University, B.S. Pet. Eng. Jan. 1949. Halliburton Oil Well Cementing Co., 4-1-49 to 1-1-50, Trainee. Callery & Hurt Production Co., present employers. Member Geology & Mining Society of American Universities.

ROY E. MITCHELL, JR., Plain Dealing; age 24. Endorsed: F. E. Hogan, H. L. Lehmann, R. H. Vaughan. Louisiana Polytechnic Institute, B.S.C.E., 1949. La. Dept. of Highways, Chief of Party, 1949-date. Licensed C.E., La.

LAWRENCE V. O'CONNOR, New Orleans; age 25. Endorsed: G. R. Hammett, R. P. Lockett, Jr., D. W. Stewart. Rensselaer Polytechnic Institute, 1943-44, 1946-48, B.M.E. New York University, 1944-45. A.S.T.P. in C.E. Asst. Field Engineer, Koppers, 1942-43. Field Engineers, Koppers, June-Sept. 1947. Babcock & Wilcox, Field Erector, 1948-49. A. M. Lockett & Co., Field Erector, 1949-date. Former student member of SAE, ASME.

MICHAEL S. PENDERGAST, JR., Lafayette; age 22. Endorsed: G. G. Hughes, H. R. Mason, W. G. Leibe. Southwestern Louisiana Institute, B.S.M.E., 1946; B.S.E.E., 1947. Ohio State University, M.S.E.E., 1949. Southwestern Louisiana Institute, Instructor in E.E., Sept. 1946-date. Member AIEE.

WADE M. SANDERS, West Monroe; age 29. Endorsed: R. T. Sessums, C. T. Watts, S. E. Huey. Louisiana Polytechnic Institute, B.S.C.E., 1949. U.S. Engineers, Chief Clerk of Admin., U.S. Army Construction, 1941-42, also in 1946 following discharge from active service. Licensed C.E., Louisiana. Jr. Member, ASCE, American Concrete Institute.

JULES E. SIMONEAUX, JR., New Orleans; age 23. Endorsed: W. E. Blessey, J. E. Hassinger, Jr., J. P. Fernandez. Tulane University, B.E. in C.E., 1948. Offshore Navigation, Inc., June-Oct. 1948. Now employed Henry A. Steckler Co., Insurance General Agent., some appraisal work and review of Rating Bureau engineer reports. Licensed C.E., La.

HARVEY J. SIMS, JR., Maplewood; age 22. Endorsed: Roy Best, R. E. Burgess, G. L. Smith. Louisiana State University, B.S.M.E., 1949. Cities Service Refining Corp., Draftsman, present position, 6 mos. R. E. Heidt & Carruth Const. Co., Instrumentman, summers 1947-48.

JOHN P. ST. RAYMOND, New Orleans; age 25. Endorsed: W. K. Bankston, R. M. Seago, D. W. Stewart. Tulane University, B.S.M.E., 1948. N.O. Public Service Inc, 1½ yrs. Member ASME.

GUY E. TEMPLET, Baton Rouge; age 30. Endorsed: J. B. Carter, Louis Duclos, A. J. Loup, Jr. Louisiana State University, B.S.M.E., Feb. 1948. Stone & Webster Eng. Corp., Asst. Design Engineer, 1948-49. La. Dept. of Highways, Road Design Section, Sept. 1949 to date.

GERALD R. YORK, Fairbanks; age 27. Endorsed: C. E. Dickey, W. B. Jordan, F. X. Shaughnessy. Northeast Jr. College, 1941. Univ. of North Dakota, Engineering, 1943. U.S Air Force Pilot School, graduate Feb. 1945. Northeast Jr. College, 1946. La. Power & Light Co., Sterlington, Technician, 1946 to date.

OBITUARY OF CECIL S. CAMP

The engineering world and the Louisiana Engineering Society suffered an irreparable loss in the tragic and untimely death of Mr. Cecil S. Camp in an automobile accident near Ferriday, La., on October 16, 1949. The accident also claimed the lives of his wife, the former Anita Pettit of Stuttgart, Arkansas and his two sons, Arthur, age 9 and Robert Louis, age 10.

Mr. Camp, son of Mr. and Mrs. L. A. Camp, was born in Marche, Arkansas, on September 17, 1907. He attended elementary and high schools in Arkansas and was graduated from the University of Arkansas with the B. S. degree in Civil Engineering on June 3, 1929. He later attended the State University of Iowa and was awarded the M. S. degree in Mechanics and Hydraulics by that institution on June 7, 1937.

Mr. Camp's professional life covered a wide range of activities He had served with distinction as a member of the faculties of Civil Engineering at Oregon State College, Mississippi State University, Syracuse University, The University of Tennessee, and Louisiana State University. His academic record was marked by rapid promotion from the rank of Instructor to that of Professor and culminated in his appointment as Director of the School of Hydraulic Engineering at Louisiana State University in September 1948. In this position, he demonstrated his remarkable administrative and organizational abilities. In the brief span of one year, he was well on his way to making the Hydraulic School widely known and recognized throughout the South and in the nation. Graduate students had already come to study at the school from many states and from a number of foreign countries. At the time of his death, he was occupied with plans for a larger and better equipped hydraulic laboratory. He was well aware of the great service that the school could render to the state of Louisiana in connection with flood control and river and harbor works.

Mr. Camp brought to the teaching profession a broad and varied experience in engineering practice. His background included positions in the Arkansas Highway Department involving highway and construction surveys; he also served as structural draftsman and estimator and had been employed by the U. S. Corps of Engineers in levee construction. He served, at one time, as Employment Examiner for the Tennessee Valley Authority in Knoxville and for the U. S. Housing Authority in Washington. Mr. Camp maintained a vigorous consulting practice in Hydraulic and Sanitary Engineering, which enabled him to speak with authority to his students about actual engineering projects.

Mr. Camp was an enthusiastic member of many technical and professional societies, among which were the American Society of Civil Engineers, the American Geophysical Union, the American Water Works Association, the American Society for Engineering Education and the Louisiana Engineering Society. In all of these, he participated actively and was elected to many of their important offices. He was a member of Tau Beta Pi and Sigma Xi, and was a registered professional engineer in the States of New York, Tennessee, and Louisiana.

Mr. Camp had an infective enthusiam which he communicated to his fellow workers. His energy seemed endless. His multitude of friends will not soon forget his sympathetic help, his cheerfulness, and his zest for life.

Be it resolved that on behalf of the Louisiana Engineering Society, this memorial be adopted in tribute to the memory of our late member Cecil S. Camp.

Bt it further resolved that these resolutions be spread upon the minutes of the Society and that copies be sent to the surviving members of his family with expressions of sympathy and condolence.

Leo J. Lassalle, Chairman
F. F. Pillet
F. J. Germano

OBITUARY OF ALBERT H. GUILLOT

When Albert H. Guillot died on December 20, 1949, the Louisiana Engineering Society suffered the loss of a Life Member and a loyal worker. His passing leaves a void, but also a treasury of memories of good work, good will and good deeds.

He leaves a wife, the former Emma Collins, a daughter, Nell Evelyn, and a son, Albert Collins Guillot.

Albert Guillot was a credit to his profession and to his native city. He was born in New Orleans on September 6, 1890. After completing high school, he continued his education with night school and correspondence courses in business administration, practical electricity and civil engineering.

His employment began in the services of J. F. Coleman, Consulting Engineer, in 1905, where he advanced from Rodman to Draftsman. In 1912, he became connected with the U. S. Engineers in New Orleans, where he advanced to Junior Engineer. In 1920, he became a member of the Roadway Department of the New Orleans Public Service Inc. and advanced to Principal Roadway Engineer, which position he held at his death—just a few days short of thirty years of continuous service with that company.

He served his country during World War I and had been active in American Legion affairs ever since. He was a member of the American Society of Civil Engineers, the Louisiana Engineering Society, the American Welding Society, and served as Secretary and as President of the New Orleans Chapter, American Public Works Association. He was an active member of the Board of Directors of the Krewe of Nor.

It is, therefore, fitting that we honor his memory by adopting the following resolution:

BE IT RESOLVED, that the Louisiana Engineering Society record its feeling of loss and extend its sincere sympathy to the bereaved family, and

BE IT RESOLVED that this resolution be included in the minutes and published in its proceedings and that copy be sent to his family.

George Elmer May, Chairman
L. H. Hiers
Carl Schneider

PAPERS AND DISCUSSIONS

APPLICATION OF ALLOY STEELS TO HIGH TEMPERATURE STEAM TURBINE SERVICE*

The subject of this talk, "The Application of Alloy Steels to High Temperature Steam Turbine Service," may appear rather specialized. However, it is my desire to give first a general survey of the field of the behavior of metals and alloys at high temperatures. Then, in the reduction of the principles to practice, I shall confine myself to the application of alloy steels to high temperature steam turbines, because I am more familiar with those machines than with boilers or chemical equipment.

This talk can be divided into the following two major chapters to show the way how and why we arrive at certain alloys.

(1) This paper will outline and define the significant high temperature properties.

(2) It will explain the reason for the use of certain alloys in steam turbines.

The High-Temperature Behavior of Metals implies to one concerned with mechanical design that the extension produced by even a small stress does not stay constant or permanent, as is the case for room temperature loading of steel, but that the extension graudally increases with time. We say the metal creeps and the increment of extension beyond the portion commonly called elastic, is spoken of as plastic strain. Furthermore, it has been learned that fracture of a metal can be expected upon prolonged loading at high temperature, even at loads considerably less than the high temperature tensile strength. This high-temperature fracture is commonly referred to as rupture.

Both creep and rupture have been known for a considerable length of time, but the temperature ranges over which our commercial alloys were used did not necessitate exhaustive studies. Since the late 20's, this picture has changed, and today the flow and fracture behavior of commercial alloys are studied at temperatures ranging from room temperature for some nonferrous alloys to high temperatures (2000F) for the high-melting-point metals.

The design value generally needed for an application of metals at a temperature where creep may occur is the time-accumulated

Presented before the Louisiana Engineering Society, New Orleans, January 13, 1950.

* By W. L. Fleischmann, Steam Turbine and Generator Engineering Divisions, General Electric Company, Schenectary, N. Y.

strain (or plastic strain) as a function of three independent variables, namely stress, temperature, and time. Since fracture may terminate the constantly progressing plastic deformation, it is also necessary to know the stress causing fracture as a function of time and temperature.

Just as a cartographer can show the earth's surface in different projections, each one having its own advantage, so have various ways been evolved in high-temperature material testing, to portray the behavior of metals. Therefore, when talking about application of high-temperature alloys, it is necessary to make a few statements about the significance of the different ways the tests are conducted and reported.

The creep and rupture tests are basically the same. In both cases a bar is held loaded in uniaxial tension at constant temperature. In the creep test the changes of length or deformation are recorded with greater accuracy than in the rupture test where the main emphasis is placed on the time it takes to fracture. The test-results from one bar are not enough to establish the behavior in creep and rupture, even for one temperature, with one important exception about which a few words will follow later Therefore, the creep or rupture test is in reality a series of single-bar tests in which the behavior of bars under different loads at one temperature is observed.

The object of those tests is to establish the magnitude of the stress which will limit the deformation so as not to exceed a certain permissible range in a specified time at a specific temperature and to avoid fracture under these conditions. Though the purpose of such tests appears explicit, difficulties arise from the fact that such tests are supposed to describe the flow and fracture behavior of the material for long periods. The properties of turbine materials are usually compared on the basis of 100,000 hours (11¼ years) though it is fully realized that no limit can be assigned to the life expected from a modern steam turbine. On an arithmetic scale, the difference between 100,000 hours and for instance 252,800 hours (that is, 30 years) looks large. Yet when using a logarithmic time scale, as is done, the difference is only between 5.00 and 5.4. The use of the logarithmic time scale is not arbitrary but has its justification in that any metallurgical changes which may occur are rate processes which follow a logarithmic law. However, good experimental procedure requires that a curve should not be extrapolated beyond one or two cycles. The essence of this discussion is that long-time tests running into the thousands of hours are required.

For assistance in the discussion of creep tests which follows a 100,000-hour-creep test conducted by the General Electric Company

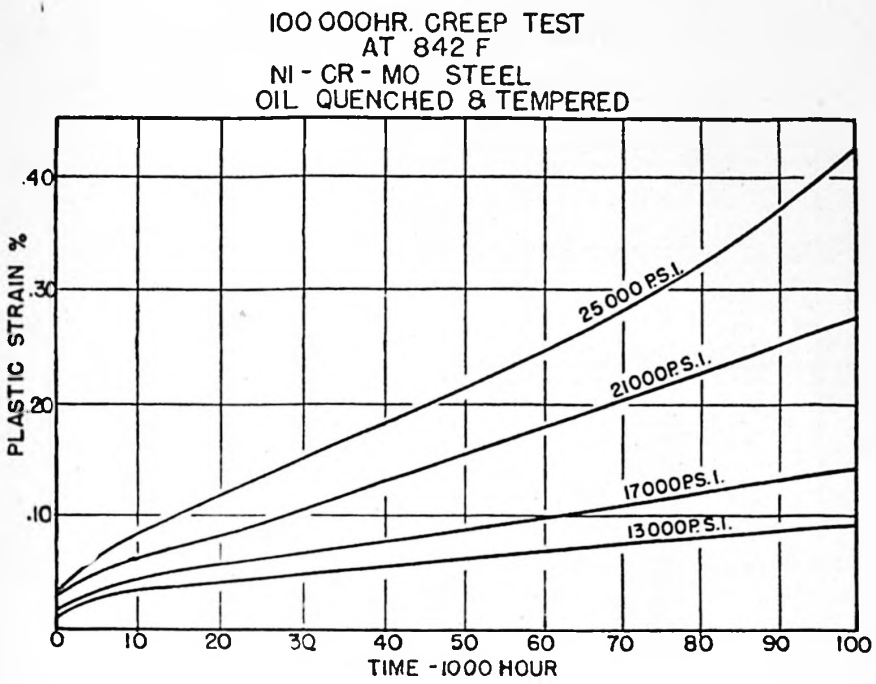


Figure 1

may be conveniently used (1)* (Fig. 1). It comprises a series of 4 bars stressed 13,000, 17,000, 21,000, and 25,000 psi at 842F. The rate and extent of the plastic strain are controlled by the load on each bar. The individual creep curves look similar; first, a rapid increase in strain, which rate gradually slows down. For the bar stressed at 25,000 psi, however, an increase in the rate of straining occurs after the slowing down period. Here we have an example of a creep test exhibiting the first stage of creep—the period of rapid straining—the second stage, where the creep rate settles down to a constant (minimum) value followed by the third stage, where the creep rate is continually increasing. The data of this 100,000 hour creep test can be used directly for setting allowable stresses. Points of constant plastic strain can be plotted as a function of time and stress or more conveniently at their logarithmic values. It is found then that a stress of 14,750 psi is required to cause a plastic strain of 0.1% in 100,000 hours. As a matter of interest, the change of strain value in the life time of a turbine is measured in terms of lengths of tens of one per cent.

Looking back at the test data which show the plot of deformation as a function of time, it is noticeable that the rae of creep

* Numbers in parenthesis refer to bibliography appended to the paper.

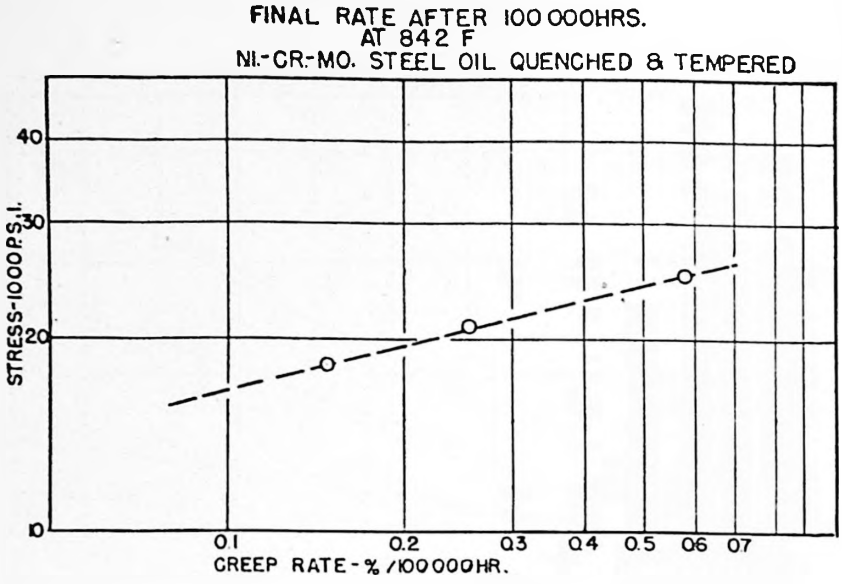


Figure 2

settles down to a constant value. If now the log of the creep rate which is the slope of the strain-time curve is plotted as a function of the log of stress, we arrive at a stress of 16500 psi which causes a creep rate of .1%/100,000 hour (10^{-8} hr^{-1}) (Fig. 2). In using this rate definition, for setting the allowable creep stress, it has to be remembered that it does not take into account the elastic extension caused by the applied stress nor the first portion of the creep curve, usually called the primary stage of creep.

The steam power industry in this country commonly uses the stress causing a given creep rate as a measure of creep strength.

A further simplification in creep testing has been adopted by the General Electric Company in that the number of creep test bars required to establish the creep strength for one temperature has been reduced to one. This is the so-called "Flowrate Test." (3) A number of GE data obtained by this method have been reported in the literature. In the flow-rate test, the test specimen is loaded to a definite extension at temperature and allowed to creep to a specified greater extension. The load on the bar is then decreased until the bar has contracted to its original extension. In this cycle, the bar creeps under the second lighter load until the specified final extension is reached. This is followed by a succession of load decrease-creep cycles. Strain rates are obtained in each load cycle and can be plotted in the conventional log stress—log strain rate or creep rate diagram. The data can be extra-

polated to give the stress corresponding to a creep rate low enough for turbine work.

Also, in this flowrate test the relaxation of the material is measured since it gives the relief of stress in a member held at constant extension, like a bolt. When the test is used that way, the plot, log stress versus log time, gives the so-called residual stress, which is used to determine the material or size of bolts or dimensions of springs or eventual tightness of shrink fits. A rather complete survey of "High Temperature Bolting Materials" was recently published by E. L. Robinson (3) all based on tests of the described type.

With increases in temperature, fracture of metals which cannot be predicted from a creep test as usually conducted, may occur at rather low strains. This gap is filled by the rupture test in which the effect of a constant load on the time to fracture is observed. To protect against fracture of our designs, the working stress is set as a fraction of the 100,000-hour rupture strength. In these constant load to fracture tests, the test bars produce a complete creep curve (Fig. 3). In contrast to the transcrystalline fracture ob-

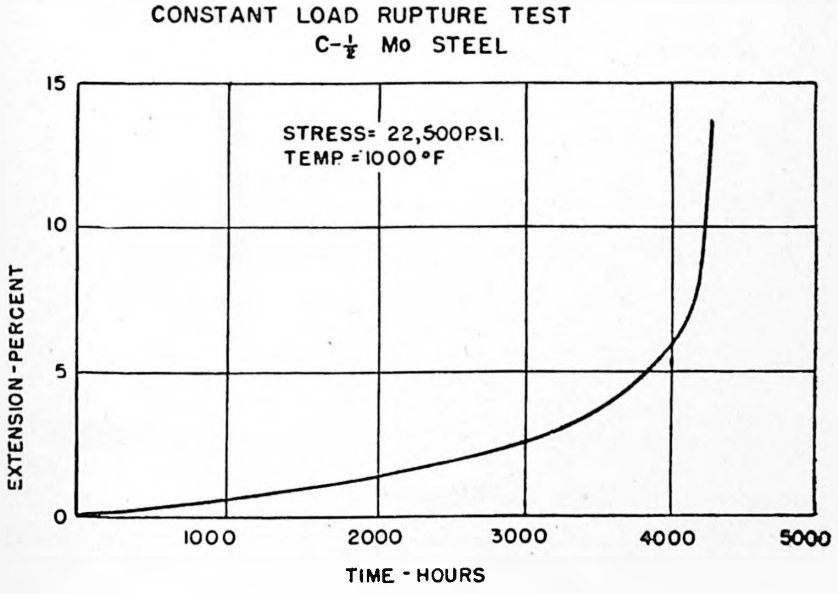
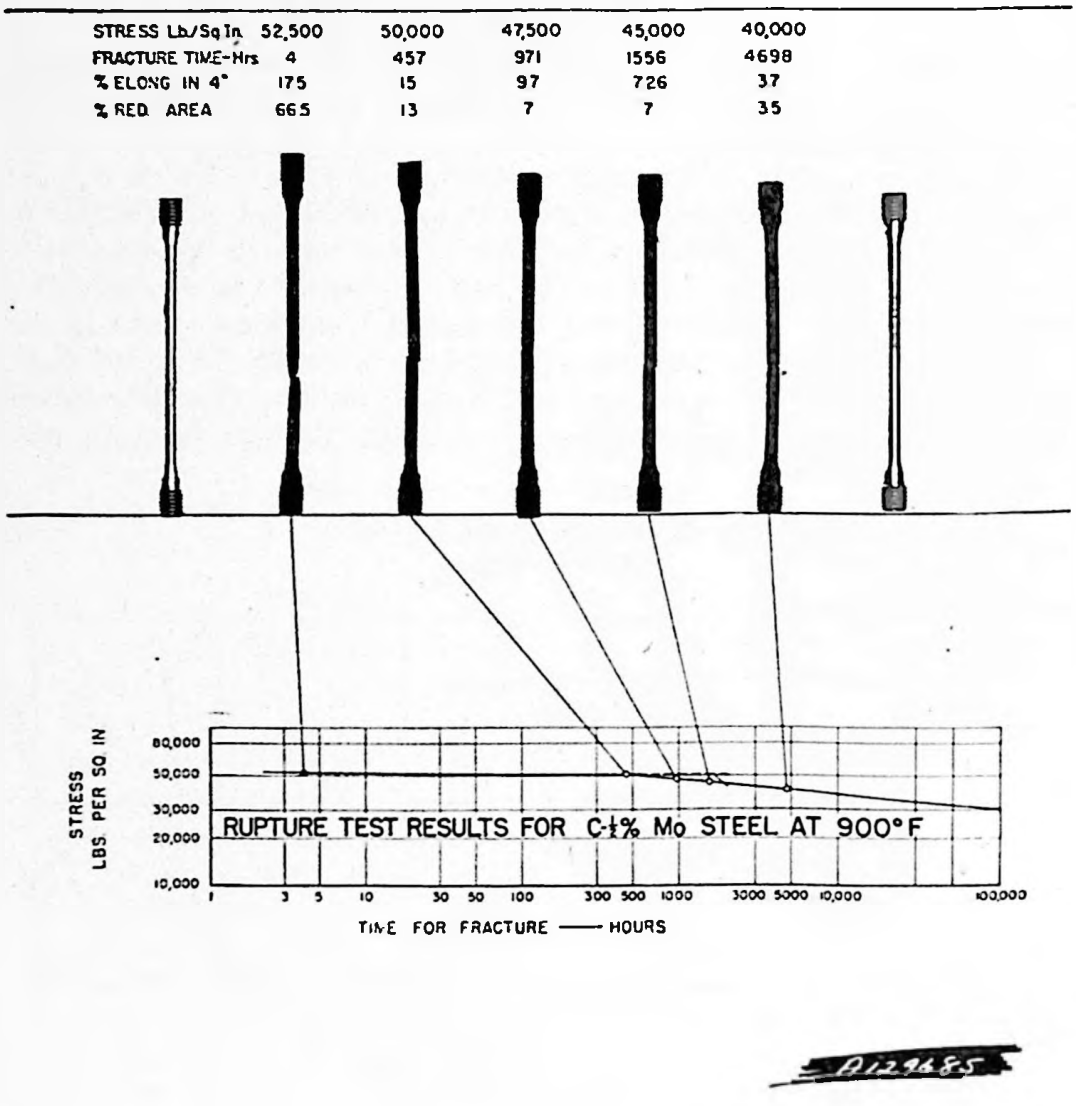


Figure 3

served at room temperature and at high temperatures under fast strain rates, fracture caused by long time loading at high temperatures is intercrystalline.

CONSTANT STRESS RUPTURE TESTS ON
C-½ % Mo PIPE AT 900°F

COMPOSITION: Mn-.44, C-.14, Si-.16, Mo-.46



A12985

Figure 4

Since, by fortuitous circumstances, the time to fracture seems to be again a function of stress or log stress (Fig. 4) the rupture date can be extrapolated. However, a knee in the log stress-log fracture time curve may be observed. It occurs relatively early and can be traced back to the change from transcrystalline to intergranular type of failure.

The change from transcrystalline to intergranular fracture as exhibited in rupture tests, shows that two modes of fracture can

exist. It has been shown (4) that strain rate and temperature are the causes for this difference in behavior. These same two mechanisms also exist in the way the metal deforms. At relatively high strain rates and low temperatures it is slip within the grain, while, at higher temperatures and low rates of straining a process called grain rotation (5) causes deformation. In this respect, the term creep is rather ambiguous (6) since it does not distinguish between deformation by slip or grain rotation.

Concurrently with the temperature effect on the mechanical properties there exists the temperature influence on the microstructure of the metal or alloy. This general effect manifests itself by the removal of the result of strain hardening, by tempering —that is spheroidization and coagulation of dispersed phases—and by the formation of new phases or precipitates. By alloying and heat treating, the response of alloys to the effects of temperature can be widely modified.

The approach to the design of heat resistant alloys is to develop within the matrix a finely divided precipitate which by its appearance hardens the alloy and so offsets the effect of tempering. In plain carbon steel, for instance, the as-quenched hardness drops immediately upon exposure to a tempering temperature, since no precipitation hardening occurs counteracting the tempering. That is not so in steels containing chromium, molybdenum or vanadium, which soften less rapidly than carbon steel (7).

This same phenomenon can also be demonstrated by creep testing. (8 (Fig. 5). For a given temperature and load, a normalized chromium molybdenum alloy is less creep resistant than the same alloy in the tempered condition. In this case, the appearance of a precipitate, a new phase, has a strengthening effect. Excessively long tempering time, however, decreases the creep strength below that of the normalized bar.

However, under the influence of temperature, other phases may have a tendency to decompose and adversely affect the high temperature strength. An example, of such a phase change is the appearance of graphite in alloy steels. The harmful effects of such a phase change are well illustrated by the pipe failure at Springdale. (9).

There, an aluminum killed one-half per cent molybdenum steel pipe ruptured through a weld heat affected zone. The metallurgical cause of this failure was the decomposition of carbide into iron and graphite, the latter arranged in a chainlike fashion. Chromium and molybdenum stabilize the carbides at high temperature. Other elements, however, such as aluminum, may cause decomposition of the carbide. However, one should not attribute exact effects solely to the addition of alloying elements. The heat treatment, including post-weld stress relief, exerts an important influence

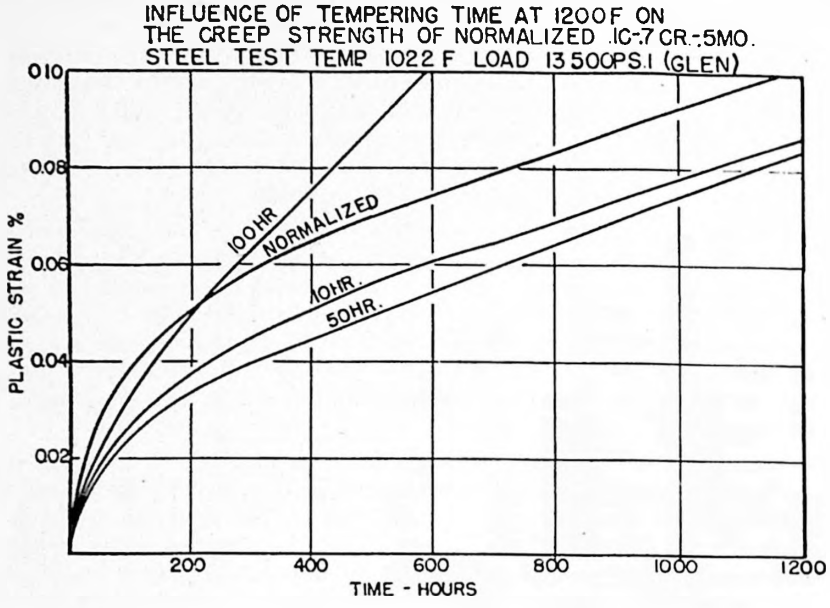


Figure 5

since the more stable alloy carbides are formed at high tempering temperatures. Crafts and Lamont (10) show the reason why a post-weld treatment of Mo containing steels is necessary for developing graphitization resistance. A molybdenum iron carbide forms at about 1100F, whereas at lower temperature the carbide is practically all iron carbide. Consequently, to produce graphitization resistance in the heat affected zone of mo-containing steels, a post-weld treatment is given. We explain the slight amount of modular graphite observed in a molybdeum vanadium laboratory sample, to be due to the omission of the post-weld treatment which, however, is always given in practice. Adequate graphitization resistance can be obtained either by the prohibition of aluminum deoxidization, proper heat treatment including post-weld treatment, or by the addition of chromium. Even in aluminum deoxidized steels, graphitization is ,conservatively speaking, considerably retarded by chromium in amounts as low as one half per cent.

Dangerous chain type graphite formation in alloy steels has only been observed in the weld heat affected zones of .5% mo-steels and only when these were deoxidized with aluminum. Due to the better creep resistance of coarse grained molybdenum steels at temperatures above 900F, the General Electric Company discontinued the use of aluminum in molybdenum containing steels, early in the 1940's, prior to the pipe failure at Springdale. Up to

the present date(see also 11), no chain-type graphite has been detected in coarse grained .5% Mo pipe and 1% Molybdenum castings, which were given a heat treatment designed to prevent graphitization, that is a high austenitizing temperature and long post-weld treatments.

Though the process of the formation of chain graphite from carbides is not fully understood, it appears that there now exists enough metallurgical knowledge to avoid dangerous graphitization by proper heat treatment and alloying.

This brief discussion of the problems involved in the design of a heat resistant steel shows the complexity of the problem to obtain a strong lasting steel. The design stress which is chosen for room temperature application is about 1/3 to 1/5 the tensile strength. In turbine design, we deal with allowable stresses based on creep and rupture around 5000 psi at 1000F and at 900F around 10,000 psi. The 100,000 hour rupture strengths are in the neighborhood of three times that value, and the .1%/100,000 hour creep strength are in that region. Instead of talking about strength levels of 100,0000 psi tensile and 80,000 psi yield, we have, at 1000F, 100,000 hour rupture strengths ranging from 12,000 to 30,000 psi with creep strengths 0.1%/100,000 hours in the range of 6000 to 12,000 psi.

Design values at such relatively low stress levels require heavy sections to withstand the high loads of 1200 to 2000 psi steam acting on a large surface.

This illustrates the metallurgical problem which cannot fail to take mass into account, because the physical properties are controlled by microstructure which should be uniform throughout the section. The microstructure, in turn, is a function of alloying constituents, mass and heat treatment, which includes the austenitizing temperature, cooling rates, tempering and post-weld treatments.

What are the sizes? Four inch diameter bolts, 36" diameter forgings, cast sections varying from 2½" to flanges 8 to 12" high. Looking at these sizes, one can only say that we are fortunate that, contrary to room temperature properties, the strongest high temperature properties are not developed in a quenched, fully martensitic steel. Generally speaking: for high service temperature, those structures are the most stable which are developed at high temperatures. Therefore, the choice of the best structure for high temperature service has to specify operating temperature and life. A series of tests made on ½ mo steel pipe reported by Weaver (12, 13) shows that at 900F an air cooled structure is stronger than an annealed. At 1000F, the material heated to a high austenitizing temperature (coarse grained) is stronger for long time service irrespective of whether it is air-cooled or annealed.

To attribute this increase of the high temperature properties to the larger grain size formed at higher austenitizing temperature

is an over simplification since at higher heat treating temperatures, the austenite becomes richer in carbon and alloys due to the solution of the alloy carbides. Therefore, the ferrite which forms below the critical is richer in alloys and offsets tempering by its greater precipitation hardening potential.

Variations considered usually not too important can influence the creep behavior. Two ½ Cr - ½ Mo heats, (14, 2) one silicon killed heat and the other deoxidized with 1¼ lb. of aluminum per ton, had about identical creep and rupture strength at 900 and 1000F in the hot rolled and stress relieved condition. However, when air-cooled or furnace-cooled from 1700F and stress relieved, the silicon killed heat was stronger both in creep and rupture at 900 and 1000F. Comparing the microstructures, they were identical for both steels in the hot rolled condition, but a finer grain size was found in the heat treated alumnium deoxidized heat, than in the silicon killed steel. This means that even the effect of residual elements on the response to heat treatment have to be taken into account. Also the manner in which alumnium is added has to be considered. Malcolm (15) states that less residual aluminum is present in a heat when instead of broken up aluminum ingots, shot is used, which on account of its larger surface to volume ratio, is a more efficient deoxidizer.

Steels used in steam turbines have to be designed to be temper resistant, strong and heat treatable to the desired structure in the heavy sections. Molybdenum and chromium molybdenum steels are universally used not only in this country, but also abroad. The molybdenum content in heat resistant steels is higher than in the AISI steels where it is added to increase hardenability and for the avoidance of temper brittleness. The range of molybdenum for heat resistant steels is a minimum of .45% to around 1½%. One per cent molybdenum gives, besides a slightly higher creep strength claimed by some users, a better response in heat treatment. Steels of the Mo and, in particular, Cr-Mo type are used up to the highest steam temperature, 1050F at present. Stronger alloys were required in the design of bolts. Higher creep, or what is the same, relaxation strength was required. So, in the search for an element which could strengthen the molybdenum, vanadium was added which had proved its value in tool steels to maintain hot hardness.

Comparing a number of alloys AISI 4140-, Cr-Mo and Cc-Mo-V steels, the 10,000 hour residual stress is highest for the Cr-Mo-V steels. (Fig. 6). Naturally, this led to further investigations to determine the effect of Vanadium for other applications in the lower carbon level, lower on account of welding. As reported by Robinson in 1947, the vanadium containing steels also showed their superiority in the .10-.20 carbon range (16).

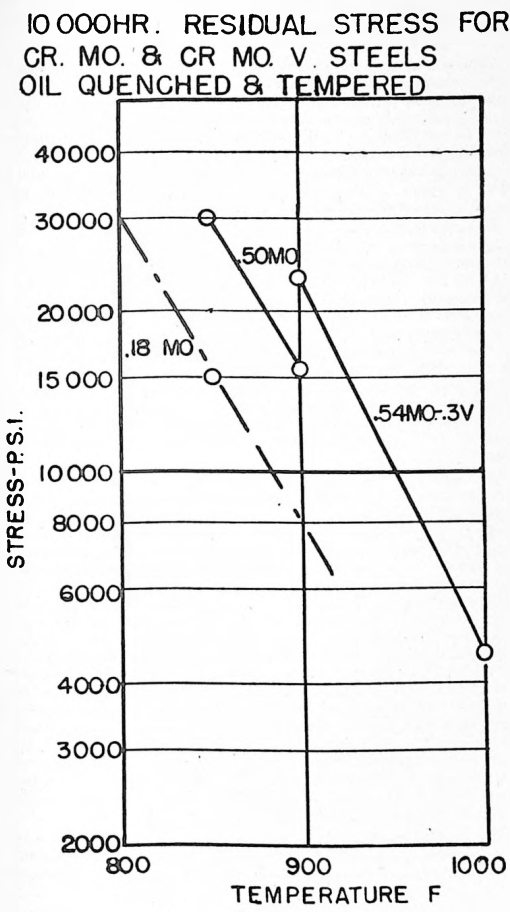

10 000HR. RESIDUAL STRESS FOR
CR. MO. & CR MO. V. STEELS
OIL QUENCHED & TEMPERED
40000
30000
20000
15 000
10 000
8000
6000
4000
3000
2000
STRESS-P.S.I.
.50MO
.18 MO
.54MO-.3V
800
900
1000
TEMPERATURE F

Figure 6

Although we metallurgists in General Electric have been sponsoring vanadium containing steels for almost ten years, we cannot claim to have started this trend nor that we alone have used them. Such steels were used in the Valve Industry before we took them up for turbines. In the 1947 edition of Materials and Piping issued by the Edison Electric Institute giving a survey of materials used in the American Power Industry, one large valve manufacturer mentions molybdenum vanadium steels as most promising for 1000 and 1050F steam temperature applications. (17)

The advantages of vanadium containing heat resistant steels are well documented in a British paper by Glen (8) from which the following quotation is taken (8) "The stress temperature relationship for 0.1 and 0.2% of deformation is 100,000 hours for molybdenum-vanadium steel shows it to be superior to 0.5% molybdenum steel or chromium-molybdenum steel. The tempered molybdenum-vanadium steel is rather superior to the same steel in the normalized condition and shows greater ductility before fracture. The short-time creep tests confirm these results and demonstrate the fundamental importance of proper heat treatment. Similarly, the stress/temperature relationship for rupture in 100,000 hours also shows that molybdenum-vanadium steel is superior to 0.5% molybdenum steel or chromium-molybdenum steel."

The reason for the good high temperature behavior of V-containing steels is due to the precipitation hardening effect which counteracts the tempering. Alloy steels, even when alloyed specifically for high temperature service, become too weak at some temperature depending upon the required stress level and expected life. Here, then, is the place for the higher alloyed materials, like the stainless, or as we refer to these, the austenitic steels. The 18% chromium 8% nickel austenitic steel is such an alloy. An alloy modified by an addition of columbium is used for forgings and pipes (between stop valves and turbines) and some others with molybdenum-columbium for castings and tungsten-columbium for bolting in the recent large 1050F-1600 psi and 2000 psi turbines. The station piping is 2¼ or 3% chromium—1% molybdenum. This only shows the dependence of alloy selection not only on temperature and service life, but upon design considerations, as the station piping can be less flexible per unit length than the relatively short connection between stop valve and turbine. Lower pressures than 1600 psi or 2000 psi even at 1050F allow, already today, the application of the less expensive ferritic steel in places where austenitic steels have been used.

The application of alloy steels to high temperature steam turbine service relies on the accumulation of metallurgical data which are unique in some respects. Where it can usually be assumed

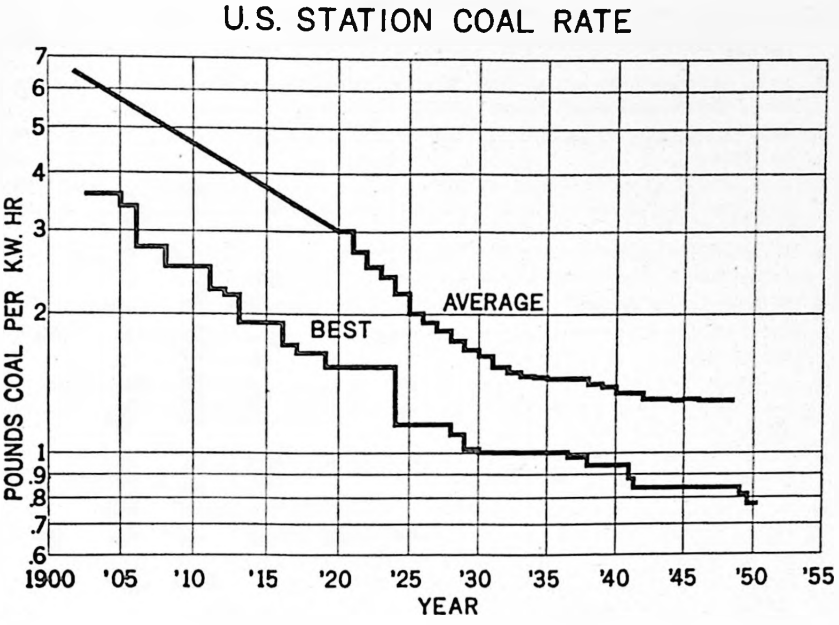


Figure 7

that the properties of metals do not change, under the influence of high temperature continuous changes take place. Where, ordinarily, it is correct to assume that plastic deformation will only occur beyond a certain stress, at high temperatures even low loads cause constantly increasing deformation.

With a long life turbine, the data obtained from laboratory tests are then in reality only guides which by extrapolation become the bases on which the alloy is formulated and the design stress set.

To allow extrapolation, one constantly has to search for indications which may be small in even a year long test, but may become important in the long life of a turbine. Constant refinements in the test procedures and the theories of the mechanical and thermal behavior of metals under the influence of stress and temperature are, therefore, necessary to enable us to design the heat resistant steels.

We are confident that this approach is sound based upon the year improvement in thermal efficiency to 37% caused in no small measure by the average yearly advance of 12F in steam temperature maintained for 40 years. (Fig. 7). These metallurgical developments benefit all of us, since, with the modern efficient turbines the power industry is able to deliver electricity at low cost to the consumer.

BIBLIOGRAPHY

1. E. L. Robinson: 100,000 Hour Creep Test Mech. Engr. Vol. 65 (1943) Pg. 166-168.
2. E. L. Robinson: Metals at High Temperature—Test Procedure and Analysis of Test Data ASME Trans. (APM) Vol. 55 (1933) Pg. 145-150.
3. E. L. Robinson: High Temperature Bolting Materials. Proc. ASTM Vol. 48 (1948).
4. R. F. Miller, G. V. Smith, G. L. Kehl: Influence of Strain Rate on Strength and Type of Failure of Carbon Molydenum Steel at 850, 1000, 1100F. Trans. ASM. Vol. 31, (1943) Pg. 817-848.
5. H. Moore, B. Betty and C. Dollins: The Creep and Fracture of Lead and Lead Alloys, University of Illinois Bulletin No. 272, (1935).
6. F. Seitz: The Physics of Metals, Pg. 133 1st. Ed. McGraw Hill (1943).
7. E. C. Bain: Functions of the Alloying Elements in Steel, Am. Soc. of Metals 1939.
8. J. Glen: The Creep Properties of Molybdenum, Chromium-Molybdenum and Molybdenum-Vanadium Steels Journal Iron and Steel Inst. Vol. 158 (1948) Pg. 37-80.
9. G. V. Smith: Graphitization of Low Carbon Low Alloy Steel An Appraisal of the Literature, Welding Journal Vol. (1948) Pg. 277s-284s.
10. W. Crafts, J. L. Lamont: Secondary Hardening of Tempered Martensite Alloy Steels Trans. AIME Vol. 180 (1949) Pg. 471-512.
11. W. G. Conant, W. A. Reich: Graphitization Studies of Materials for High Temperature Service in Steam Plants. Paper of 1946 Ann. Meeting ASME (1947) (Pamphlet: Graphitization of Steel Piping.)
12. H. S. Weaver: The Effect of Carbide Spheroidization Upon the Creep Strength of Carbon Molybdenum Steel. Proc. ASTM Vol. 41 (1941). Pg. 608-628.
13. H. S. Weaver: The Effect of Carbide Spheroidization upon the Rupture Strength and Elongation of Carbon-Molybdenum Steel. Proc. ASTM Vol. 46 (1946) Pg. 846.
14. R. C. Fitzgerald, A .B. Wilder, G. V. Smith and A. F. White: A Study of the Properties of 0.5% Chromium — 0.5% Molybdenum Pipe Steel Trans. ASME Vol. 70 (1948) No. 8, Pg. 867-878.
15. V. T. Malcolm, S. Low: The Structural Stability of Several Cast Low Alloy Steels at Elevated Temperatures. Trans. ASME Vol. 70 (1948) No. 8, Pg. 879-884.
16. E. L. Robinson: Some 1000F Steam Pipe Materials Trans. ASME Vol. 70 (1948) No. 8, Pg. 855-866.
17. Edison Electric Institute: Metallurgy and Piping 1947 EEI Publication No. P-4, Sept. 1948.

TO YOUR HEALTH—ENGINEERING SCIENCE AND MEDICAL SCIENCE COOPERATE TO BRING YOU BETTER LIVING

By L. M. N. BACH*

In ancient Greece there were two famous and antagonistic cities, Sparta and Athens. The Spartans had a philosophy, which had as its basis the exaltation of physical strength and health whereas the Athenians believed that meditation and mental exercise were the most conducive to ultimate happiness. Today we also have our football teams and our academic ivory towers, perhaps our most highly developed forms of physical and intellectual education. Sometimes one has the impression that our economic, social, and scientific Athenians amuse themselves by creating involved situations for the presumed Spartan masses of population to work their way into. Thus a bag of popcorn or a candy bar may be wrapped in the most moisture-proof, vermin-proof, heat-proof packaging devised. Unfortunately sometimes these packagings are also human-proof and it takes a veritable Spartan to get the wrapper off so that the confection can be eaten.

We are all acquainted with the habit of preceding generations of telling us that in their day men were men and women were women and I am sure none of us would ever want it any other way, but the rigors of the past, in my opinion, while different in quality, are in no way comparable in quantity to the vissicitudes of our present highly complicated society. For example, who has not seen the cartoon of the so-called country hick newly arrived in the big city and attempting to comprehend the use of traffic lights, escalators, subways, and all the other impedimenta of our modern life?

The ingenuity of the engineering profession in all of its various specialties is expressed in overwhelming numbers of structural and process designs intended to make life more efficient, and presumably more tolerable. Yet we must keep in mind that people must live up to this increased efficiency—life becomes more complicated in the process of becoming more easily lived. One must fill out a long form to be sent to Washington for his money these days instead of going out to earn it with his hands. We have become and continue to become a highly dependent race of people. We depend on our parents when we are children, we depend on our teachers when in school, we depend on our friends in our social situations, we depend on our boss for our job—but in all these instances we are more or less free to select our dependencies as well as those upon whom we wish to be dependent. Make no mistake about it—these dependent relationships are vital for our sense of emotional stability and security—in both directions—in the sense of having dependents and of being dependent. These relation-

* Department of Physiology, Tulane University School of Medicine.

ships are valuable only insofar as we can be independent about our selections. There is one dependency about which we are not independent and that is on the mechanical and electrical marvels of our present society. Kitchen appliances, electronic entertainment devices, mechanical means of transportation, industrial processes for mass production of food products, and drugs are some examples of things which are at one time luxuries and are now regarded by everyone as necessities of life. Engineers have made society highly dependent upon their efforts and thus have a moral responsibility to sustain and improve, but not abuse this dependency. We could mention certain economic dependencies which are being encouraged and which are highly susceptible to abuse but time is limited. Our responsibilities to ourselves and our dependencies are highly involved and many of my psychiatrist friends tell me that they sincerely wonder how we can put up with our modern complicated society and still retain our sanity. Truly we are all mental Spartans today and Athenians as well—life requires fortitude and ingenuity in the highest degree. But many physicians believe that the nervous strain involved in coping with our complicated society is eventually responsible for the degenerative diseases of old age such as ulcers, heart attacks, kidney trouble, high blood pressure. Yet how marvelously medical science has extended our life span in spite of these environmental difficulties. We are Spartans but are we spartan enough to cope with the future? That is where the enigneer finds the limitation in the workability of his design.

One of the highlights of the front page of the paper these days is the news about jet-propelled airplanes and rockets. With supersonic speeds we are conquering the curse of slowness, still we must face the limitations of the human body during the operation of such devices. Now as long as a rapidly propelled vehicle maintains a constant speed and constant direction, the operator is under no difficulty—as a matter of fact at supersonic speeds the pilot has no idea that he is even moving unless he can see the ground or some relatively stationary object with which to compare his speed. Whenever his direction does change, however, then tremendous physiological changes occur which may be quite serious unless they are compensated for. Now we are all familiar with the sensation of jerking when a streetcar starts off suddenly or of falling to one side when a car in which we are riding suddenly turns. This effect is due to a phenomenon called inertia which expresses itself because the substance of our bodies must change its speed or direction of movement with but after the vehicle changes. At high speeds this effect of inertia becomes quite serious, and tremendous gravitational forces are developed. A pilot who weighs 150 pounds at normal gravity will suddenly weigh over one ton if a sudden turn is made through a circle having a radius of 700 feet in a plane

traveling at 600 miles per hours, well below supersonic speed. In an effort to get there fustest with the mostest, the pilot becomes the limiting factor in operating the plane because while he may be tightly strapped in his seat so that he does not move, his blood is not strapped to his body and tends to pool down at his feet. At such high speeds, forces are operating which are seven to ten times the force of gravity and the pilot's arm may be so heavy that he cannot raise it. But the most dangerous effect is the pooling of blood at the lower levels of the body because this takes blood away from the brain and renders the pilot unconscious—he is said to "blackout." There are several simple ways of getting around this trouble—the pilot may strain and grunt and thus tend to keep blood from running away from the head—those of us who have stoop and squat troubles always grunt when we stand up suddenly so that we may keep from passing out. Or the pilot may crouch with his head downwards as the plane changes direction. The German stuka or dive bomber pilots did this during the war. But at the high velocities of supersonic speeds this type of thing is ineffective and neither time nor cockpit space permit these maneuvers. One device used to study these effects is the "human centrifuge." Here the subject sits in a cockpit and is whirled around, a constantly changing direction at tremendous speeds (approaching 10 times the force of gravity) while many instruments measure various bodily functions. Records taken during such propulsion can measure respiration, heart rate, electrocardiogram, pulsation of blood in the ear, volume of blood in the ear, (these last two being criteria of blood supply to the brain), the force exerted in terms of gravity, and finally responses of the eye to light stimuli. These records show tremendous loss of blood from the head—blood pressure in the arm held above the head under these conditions may be almost zero, whereas when the arm is held down low near the feet, the pressure may reach 350—contrasted to the normal of 120 mm Hg pressure. Now the obvious way to control this difficulty is to prevent the blood from accumulating in the lower parts of the body. To combat this effect there has been developed the "antigravity suit." It has a bladder system which compresses air around the legs and abdomen and is operated by the forces developed by the plane in flight, so is entirely automatic. I understand that the suit was titled G-3 in the Army and Z-3 in the Navy although unification has probably changed it now to jeez-3. Recordings show that the effect of this antigravity suit causes the blood content of the ear to remain nearly normal and thus the blood supply to the head and the brain remains sufficient to maintain consciousness.

Another important problem in aviation has been the attainment of high altitudes. The pressure of the oxygen component of our atmosphere is exceedingly important for maintaining normal

oxygen supply to the tissues of the body, including the brain. At high altitudes, the oxygen supply becomes insufficient because of reduced pressures. The result of this is temporary mental and physical deterioration. The gradual deterioration of a subject's intellect and physical ability can be expressed by his writing. At sea level his writing remains perfectly legible and sensible but as he ascends to simulated altitudes, the writing not only becomes less legible but makes less sense. Thus at 25,000 feet, without adequate oxygen, one subject wrote—"Would qualify for next polar expedition, pal I'd be good up the pole with flag. My fat would keep me warm." Would you trust a pilot to drive a plane safely under these conditions? Fortunately these effects have been largely overcome with pressurized cabins which maintain an adequate oxygen supply at simulated sea level pressures no matter how high the plane is flying.

Another problem in any type of transportation, but especially aviation, is the matter of vibration. Commercial transportation is concerned with carrying passengers and must therefore strive to make the passage as comfortable and as free from annoyances to the passenger as possible. Further, many of the pilot maneuvers depend upon a sense of touch and of pressure which require the use of certain types of organ receptors in the skin, tendons, ligaments, and joints. It has been shown how vibrations from various component parts of airplane structures can be perceived by different types of receptors in the body and thus confuse a perception depending on hearing, on touch, on vibration sense. It devolves upon the aeronautical engineer to select materials and structures which will show the least response to engine vibrations for passenger comfort and for pilot efficiency.

Seating is of great importance in all forms of transportation and as well in theaters, schoolrooms, and offices. Are you by this time aware of the seat you are sitting in? You should not be if the seating has been properly designed. There is no excuse for many of the pictures which come out of Hollywood but neither is there any excuse for backaches and leg cramps which occur while watching them. Most of us are primarily sitting down sort of people—we spend a good part of our lives in chairs. We should have chairs which are designed from the viewpoint of construction and material selection, spring location, and so forth which do not tire us out by sitting in them. A close study of the body form facilitates designing of chairs as a matter of simple preventive medicine. There has been developed a chair which was constructed and used to measure certain critical body dimensions involved in seating in trains. Thousands of subjects were selected at certain large train depots and measured with this type of instrument. Following consultation with orthopedic specialists, we now have bus and train seats so designed that they are a real comfort to ride

in. Of course one must make the measurements on the type of people who will most probably use the chair for the prupose for which it is designed.

To this end, Dr. Darrell B. Harmon, a schoolroom planning expert who recently spoke here, has conducted a very extensive investigation of seating and lighting in schoolrooms. Illustrations show very aptly the situation in the old type of schoolroom which I am sure we are all acquainted with. The crouching squinting efforts of these children to avoid glaring light from the windows and to carry out visual and manual tasks on desk tops and from chairs not at all suited to the purpose are all very familiar to us. The beginning of permanent postural and visual defects are well illustrated in the typical student from this very type classroom writing with the use of only one eye, the other eye being completely unutilized because he has learned to crouch around in such a visual position because of the window glare, that he no longer has use for that eye. We can also observe how the beginnings of permanent postural defects are beginning as his head and visual axes deviate from the perpendicular. No wonder the physical examinations for induction into our armed forces showed up so many poor postures and so many visual defects. We forget that a child is in school from age 6 to at least age 18, 5 days a week, 32 weeks of the year at least all during his formative years. It is almost analogous to the old Chinese practice of binding the feet of little girls to make them tiny when they are older. Such schoolroom practices are inducing deformities. We can see and almost sense the vast amount of relief obtained with proper lighting and proper seating. These newer seats are designed to move so as to provide adequate body support for the child in whatever he does. The desk tops are also adjustable so that he can read on a tilted top or write on a flat top without bringing about postural strains. Furthermore, arrangement of the desk positions in the room and rectification of glaring window illumination has resulted in a uniform lighting all through the room as evidenced by the same posture for reading of every child.

One of the principal problems of illumination engineering is the elimination of glare and provision for adequate contrast between the focal visual task and the background. This calls for proper background illumination and sufficient illumination of the visual task, two problems. We can observe several varieties of visual contrast and poor visual acuity for dark objects on a dark background or light objects on a light background. What do you catch yourself doing when you try to look at one of these poor contrast areas—squinting, frowning? With poor contrast we need high illumination and with high contrast, less illumination is needed. Thus sewing black thread on black cloth calls for high illumination intensities and good background illumination too if we are to avoid

the disagreeable effects of too great contrast. The headaches and eyestrain of workers in offices and in industrial plants may be directly referable to poor illumination—the squinting and frowning that occurs with poor contrast visual tasks undoubtedly is a direct source of such physical aches and pains. Physiologically we can see the basis of adequate contrast illumination on a diagram of the sensitive receptors of the retina of the eye which are activated by light and send impulses back to the brain. With poor contrast illumination few receptors are activated in the retina. As the illumination is increased, we can see that more and more receptor elements in the retina become active and provide us with a better basis for detecting the contrast as far as the eye and eventually the brain is concerned.

Another interesting development in illuminating engineering has been the use of germicidal lamps. These are of high frequency waves, such as ultra-violet light which kill bacteria. These effects are measured in dishes of culture media growing bacteria. Samples of air at two different levels of the room were collected and exposed to the plate before the lamp is turned on and after successive intervals of burning the lamp. We can see how there are fewer and fewer organisms in the collected air. The efficiency of these lamps in rendering static air free of bacterial contamination is unquestioned but problems of temperature changes, humidity changes, circulation of the air and so forth render their use equivocal in every situation.

Such lamps are used in hospitals routinely and in food processing plants either these lamps or now, experimentally, supersonic waves are used to kill bacteria, and act as food preservers. Supersonic generators have a bacteriostatic or bactericidal effect because they alter the physical nature of bacterial protein in such a way that the organism can no longer survive. In spite of the mechanical perfection of our food processing industries, there is still recognized the human element—the target at whom the engineering process is aimed as exemplified by the fact that tasters are employed to assay samples of food as it is being produced much as control assays are made in metallurgical industries.

Of course, the problem of maintaining infection-free sources of water and wood is the main problem of the sanitary engineer—his is the problem of prevention of infection—of maintaining steady bacterial counts and measures of organic material in water and milk to insure high standards of health in the community. The problem of eliminating infection after it does appear, regardless of the source, is the problem of the physician. He has been aided in this problem almost immeasureably by the development of the famed antibiotics; these materials are derived from molds which kill bacteria on contact. To supply these antibiotics in sufficient quantities for the medical profession has of course required mass

production, and for this is required the services of the chemical engineer. Continuous assay of the streptomycin as it is produced from the mold growths is carried out with a turbidity measuring device which depends on a photoelectric cell and measures the density or thickness of the suspended antibiotic in the fluid which contains it. In filling of the vials with the antibiotic solution or bottles in which the material is dispensed, all conditions are sterile to prevent contamination of the bottles and the solutions with bacteria from the personnel.

Other pharmaceutical products that we hear a lot about today are the antihistamine drugs for combatting the symptoms of a cold. While chemical engineers again must supervise, design, and control the production of such a drug, its potency must be assayed at all times to insure standardization of the product. For assaying or measuring the potency of the drug, a setup similar to that found in any medical school laboratory of physiology or pharmacology is used. In this container is a piece of intestinal muscle from an animal—remember that animals are essential for medical research—and the contractions of this muscle are recorded. A record of the movements of the intestinal piece brought about by injection of histamine into the solution bathing the muscle is studied (histamine being the substance which helps make the cold symptoms what they are). The injection of the antihistamine drug prevents the action of histamine and thus its strength is accurately determined by further study of the record. I might say here that as far as is known at this time, antihistamine drugs won't do anything to affect your digestion one way or the other—intestinal muscle just happens to be a convenient type of tissue to test the drug on.

One factor which is often accused of being productive of colds is air conditioning. I am at present engaged in a project investigating the effects of air conditioning on school children and so far we have found, as have many other investigators, that air-conditioning has no effect on catching colds. Air conditioning has as its objective ideally to control temperature, humidity, circulation, distribution, dust, bacteria, odors, and toxic gases so as to insure the maximum of human health and comfort. We have certain intrinsic temperature controlling devices, such as sweating and panting to cool by evaporation, and flushing of the skin to cool by radiation of heat, whereas for cold weather we react by causing the blood vessels of the skin to constrict and prevent the blood from radiating body heat to the outside, by shivering which increases body heat production, and by erection of the hairs, or gooseflesh, which in hairy individuals at least, provides a blanket of insulation. All of these functions are very precisely controlled by a temperature controlling center in the brain but many times they become uncomfortable—sweat, shivering and so forth are not particularly

enjoyable experiences. Thus we try to control our outside temperatures to prevent extremes. The American Society of Heating and Ventilating Engineers maintains a laboratory at Pittsburgh to study the effects of varying air conditions about us. A similar laboratory is maintained by the John Pierce Foundation at Yale University where Dr. C. E. A. Winslow was director for many years. One part of this laboratory has walls which are of copper with high reflecting surfaces for radiating heaters, a chair which rests on a balance used to calculate the loss in weight due to sweating—the factors of convection, radiation, can be separately measured, and the effects of clothing of different types under all possible variations of temperature, humidity, and air movements can be studied. A bicycle-like arrangement or ergometer is used to measure the amount of work performed. We know certainly, as the result of studies in laboratories such as these, how temperature is important in establishing working conditions. At climates with mean temperatures of about 65 degrees and mean relative humidities of about 75%, industrial production, and intellectual and social achievements reach their maximum, mortality due to extremes of temperature are at their minimum, infectious diseases are transmitted most poorly. We are truly spartans in New Orleans—I myself feel spartan in living here, since, if you will forgive my provincialism, my home town of San Francisco, is a city that very closely approximates the figures I gave above.

One of the most important factors in air conditioning of course is the construction of the walls and ceilings and floors to provide for insulation against loss of heat and yet to provide for adequate ventilation and light source if these are to be provided by other than artificial means. Our most recent difficulty in construction of buildings and houses is the matter of protection against the possibility of an atomic bomb explosion. I really think that the greatest danger lies in the people who control the bomb; they are our first difficulty. What makes an atomic bomb more pernicious than any other type of bomb is the added hazard of dangerous radiations. Protection against such radiations ordinarily is provided by concrete walls of a thickness of perhaps three feet for the more powerful types. The lethal effects of atomic radiations lies in their destructive effect on the blood forming tissues of the bone marrow and other areas of the body. For example, at the Oak Ridge laboratories workers fill containers with radioactive phosphorus compound to be used in medical research. The radiations from this sample are sufficient to require remote control handling devices behind lead shields. Much of the work done today in medical research requires the use of radioisotopes and frequently such protective arrangements are necessary to prevent undue exposure to radiations.

One of the most fascinating fields of medical research is the measurement of minute amounts of electrical current which may be generated by tissues, especially tissues in the nervous system, in muscle, and in the heart. The detection and measurement of such very small currents requires electronic engineering knowledge. As a matter of fact there are now several companies which are engaged in the manufacture of electronic devices for medical practice and research.

In the sort of electronic devices used to record the currents from nervous tissue appropriately synchronized stimulating devices activate the nerve and the potential differences are picked up by electrodes which carry the current to amplifiers and eventually to an oscilloscope, where it may be photographed. A similar type of device, an electrocardiograph, is used to record the electrical activity of the heart and enables the physician to diagnose certain types of heart disease. Another useful device produces the records known as electroencephalographic waves. The electrocardiograph and the electroencephalograph pick up rather large potentials of the order of a millivolt and thus it is only necessary to attach the pickup electrodes to the skin directly over the heart or over the brain. These electroencephalographic waves, or brain waves as they are called show variations in different types of brain disease. There are many types of electronic instruments manufactured today—a whole new industry has sprung up as a matter of fact—industries concerned with electronic devices for medical diagnosis and treatment alone.

A cross section of a monkey brain which has been marked off in millimeters is used with an instrument known as the stereotaxic instrument. This was developed many years ago by a famous British neurologist and an engineer who was working with him. Its purpose is to place stimulating or electrocautery needles in any part of the brain. It is marked off in millimeters and thus one can locate a point in any one of three dimensions of space in the brain of the experimental animal and by means of this instrument direct the needle to the exact predetermined position. This instrument is now being used in humans for certain types of brain operations and is used quite extensively in animals for experimental investigations concerning the function of the brain.

I want now to take just a moment to mention a new engineering-medical science of cybernetics which has been recently developed. The basis of the new science is that the nervous system functions as a feedback mechanism—any activity routed through the brain regulates itself. Of course feed-back mechanisms are well known to electronic engineers—that is much of the principle of vacuum tube amplification. An article recently appeared in Electrical Engineering by W. S. McCulloch which developed remarkably the idea of the brain as a computing machine.

Thus we have seen through these multiple examples a very few of the ways in which medical science and engineering science can combine forces for good health and comfortable living. I have not had time to discuss many other examples—the agricultural engineer and his work in insuring maximum vitamin and mineral content of our foodstuffs by developing proper methods of processing and storing, the mechanical engineers who design prosthetic devices for amputees, and so forth. Many examples can be found showing that engineering and medicine as sciences and as areas of social responsibility can and should combine forces.

As was so ably pointed by Mr. S. C. Williams in his talk before this society last year on the social responsibilities of the engineer, in the last analysis it is *people* who must operate engineering devices and it is *people* upon whom these devices must operate. Thus although we call this an age of specialization, we find that the more specialized we become, the more heavily dependent we become upon other specializations. In this manner the engineer must more often call upon the psysician and medical researcher to find the answers to his problems. The engineer should never forget that a human being is going to be the ultimate target of his design. If he doesn't forget it in his promotional work, you may be pretty sure that people will appreciate the importance of the engineer to an enormously greater degree than they do now. People aren't interested, for example, so much in the fact that your new fluorscent light is burning for 40 hours longer as they are in being shown that it reduces eyestrain. It is equally important to point out that the medical researcher depends more and more on engineering design to carry out his work. Mr. Louis DeFlorez pointed out recently in an engineering journal that engineering is like medicine because engineering is concerned with measurement and utilization of chemical and physical reactions whereas medicine was concerned with measuring and utilizing biological reactions. The relationship is actually much closer than Mr. DeFlorez realized. Today medical research is almost entirely concerned with measuring the chemical and physical reactions which occur in biological processes. Tulane, as is the case with many other schools, has a laboratory of biophysics which is concerned with the determination of what biological reactions should be measured, how they should be measured, and what they should be measured with. Medical researchers are constantly refining methods of measurement of processes in the human body and as these methods are developed the clinical practitioner takes over their use on patients. Thus we have the use of radioctive substances in both medicine and industry as measures of rates and directions of physical and chemical reactions as one outstanding example of the identity of the aims and practices of engineering and of medical research.

I only wish to add one more point and that is the fact that these advances can only come through education. The best place for such education is in the professional schools where engineers and physicians are trained. If there we can inculcate into each type of student the fact that medicine needs engineering skill and experience to insure adequate instrumentation and production of those things it must use and that engineering must be alerted to the fact that engineering processes and designs are aimed ultimately toward people, combined effort in the solution of mutual problems would occur much more readily. In looking through a recent issue of the Illuminating Engineering journal I noted the curriculum of the illuminating engineer at one large university—and that physiology of vision and psychology of vision were two important parts of that curriculum. There is need and there should be room in orientation courses in general engineering for some elementary explanations of how the human body works and how it reacts to its environment. By such efforts we can continue at an accelerated pace, as engineering and medical researchers, to arrive at solutions of mutual problems which are still with us and which are related TO YOUR HEALTH.

MINUTES OF THE MEETINGS AND BUSINESS OF THE SOCIETY

Minutes of Meeting of the Board of Direction held on Monday, December 5, 1949

The meeting was called to order by President Lehmann in a private dining room at Arnaud's Restaurant. Those present were Messrs. Abrahm, Cucullu, Leake, Mire, Newton and Fernandez. Minutes of the preceding meeting were accepted as read.

Mr. Cucullu reported that the Chairman of the Library Committee hoped to have the Society's quarters habitable for the annual meeting. General Newton moved that the Society's text books be given to the Howard-Tilton Memorial Library to be added to their collection where needed, and those that could not be used be offered to the New Orleans Public Library before making any other disposition of them. The motion also provided that the Library Chairman dispose of the present furnishings as he saw fit. The motion was seconded by Mr. Leake and carried.

A letter from the Society of Plastics Engineers, requesting permission to display an exhibit of plastics at the annual meeting, was read. Mr. Leake moved that the request be granted, seconded by General Newton and carried.

A letter from the Iowa Engineering Society, requesting information on the "Committee on Cooperation with Other Professions" was read.

Recommendations from the Temporary Committee on Civic Awards was read. Mr. Cucullu moved that the recommendations for the mechanics of making the award be accepted, but that the naming of the award be deferred. The motion was seconded by Mr. Abrahm and carried.

Mr. Cucullu moved that the Reverend John W. Melton, Pastor of the First Presbyterian Church, Baton Rouge, be invited to give the invocation at the annual meeting. Motion seconded by General Newton and carried.

Mr. Cucullu moved that the secretary-treasurer's salary be increased to $175.00 per month, beginning January 1, 1950. The motion was seconded by Mr. Mire and carried.

Mr. Leake, Chairman of the Nominating Committee, made the following report of nominees for elective offices for 1950:

For President	Lionel J. Cucullu
For First Vice-President	Harry P. Newton
For Second Vice-President	John A. McNivan
For Secretary-Treasurer	John P. Fernandez
For Director for Two Years	R. Mallard Seago
For Director for Two Years	Charles P. Knost

It was moved and passed that the report be accepted.

There being no further business, the meeting adjourned.

JOHN P. FERNANDEZ, Secretary-Treasurer

Minutes of Meeting of the Louisiana Engineering Society held on Monday, December 5, 1949

The meeting was called to order by President Lehmann with approximately 100 members and guests present. The President thanked the U. S. Engineer Corps, and particularly the New Orleans District, for its courtesy in supplying the projector and operator to be used by the speaker of the evening.

Minutes of the preceding meeting were accepted as read. Mr. W. Stone Leake, Chairman of the Nominating Committee, reported that the following had been nominated for elective offices for 1950:

For President	Lionel J. Cucullu
For 1st Vice-President	Harry P. Newton
For 2nd Vice-President	John A. McNiven
For Secretary-Treasurer	John P. Fernandez
For Director for 2 years	R. Mallard Seago
For Director for 2 years	Charles P. Knost

President Lehmann then called for nominations from the floor, but none were made. Mr. M. C. Abrahm moved that the nominations be closed, seconded by Mr. Wm. H. Rhodes and carried.

Mr. M. C. Abrahm read an obituary of the late Rudolph Herpich, following which the audience rose and ooserved a moment of silence in memory of the deceased member.

President Lehmann announced that the December meeting had been designated as "Presidents' Night", and introduced all former presidents of the Society who were in the audience. General Newton then expressed the Society's appreciation to its former leaders for their contribution to its growth and progress.

The Secretary announced that members of the Society were invited to attend a lecture on "Prestressed Concrete" by a prominent British engineer, to be held at Tulane University on December 12. Dean Lassalle of Louisiana State University announced that the same lecture would be given in Baton Rouge on December 9.

President Lehmann then introduced the principal speaker of the evening, Mr. Eugene Palmer Fortson, Jr., Chief, Hydraulics Division, Waterways Experminent Station, Vicksburg, Miss., who gave a most interesting lecture on "Recent Developments of the Waterways Experiment Station".

Following the lecture, the meeting adjourned with a rising vote of thanks to the speaker.

JOHN P. FERNANDEZ, Secretary-Treasurer

Minutes of the 52nd Annual Meeting of the Louisiana Engineering Society, Held in the Beauregard Room, St. Charles Hotel, on Thursday, January 12, 1950.

The meeting was called to order by President Lehmann, who requested Dr. John W. Melton, Pastor, First Presbyterian Church of Baton Rouge, to give the invocation. Following this, Mr. Charles P. Knost moved that the reading of minutes of the preceding meeting be dispensed with, seconded by Mr. K. P. Kammer and carried.

President Lehmann introduced the presidents of local chapters of participating societies, and then called on Mr. John V. Dugan, Jr., General Chairman of the Annual Meeting, to introduce the main speaker, Mr. William H. Fitzpatrick, Editor, New Orleans States, whose keynote address was entitled, "Where Do We Go?"

The Secretary-Treasurer presented his annual reports on finance and membership, copies of which are attached to these minutes.

The retiring president then gave his annual report, and presented Certificates of Merit to the following speakers at the Student Conference:

Hudson G. Boue, Tulane University
Gerald R. Dyson, Louisiana Polytechnic Institute
Oscar G. Lewis, Louisiana State University
Fred S. Paul, Southwestern Louisiana Institute

It was announced that during 1949 Junior Membership awards were presented to the following students who graduated in engineering from their respective schools with highest scholastic honors:

Alva Lee Cooper, Southwestern Louisiana Institute
Bobby J. Hollingsworth, Louisiana Polytechnic Institute
Milton K. Morrison, Tulane University
Richard B. Nerf, Louisiana State University.

President Lehmann then presented Life Membership Certificates to the following who have been active members of the Society for thirty years: Ben H. Bell, Allen J. Negrotto, S. A. Theard, David W. Stewart.

General Newton then read several resolutions, copies of which are attached to these minutes, and moved that same be adopted. The motion was seconded by Mr. J. H. Collins, Sr. and carried.

Mr. R. A. Steinmayer moved that the keynote speaker receive a rising vote of thanks, seconded by Mr. Knost and promptly executed.

Mr. W. Stone Leake, Chairman of the Nominating Committee, gave the Teller's Report, requesting the following named gentlemen to escort the respective newly elected officers to the rostrum:

Officers: Michael C. Abrahm, Director with 1 remaining year to serve. Escort: Former Pres. K. P. Kammer; Arthur M. Hill, Director with 1 remaining year to serve, Escort: Former Pres. C. L. Nairne.

Newly elected Board Members by virtue of office as presidents of state sections: Austin J. Mary, President, Baton Rouge Section, Escort: Past Pres. Baton Rouge, Wayne P. Wallace; Ray E. Burgess, President, Lake Charles Section, Escort: Past Pres. Lake Charles, E. H. Goodloe; Roy T. Sessums, President, Monroe Section, Escort: Former Pres. James M. Robert; Ernest M. Freeman, President, Shreveport Section, Escort: Former Pres. F. N. Billingsley.

Newly elected officers and board members: Charles P. Knost, Director for 2 years, Escort: Former Pres. Chas. M. Kerr; R. Mallard Seago, Director for 2 years, Escort: Former Pres. A. L. Dunlap; John P. Fernandez, Secretary-Treasurer, Escort: Former Pres. R. A. Steinmayer; John A. McNiven, 2nd Vice-President, Escort: Former Pres. C. Glenn Cappel; Harry P. Newton, 1st Vice-President, Escort: Former Pres. Wm. H. Rhodes; Lionel J. Cucullu, President, Escort: Former Pres. David W. Stewart.

Retiring President Lehmann then handed the gavel to President-elect Cucullu, who accepted the office. Mr. John V. Dugan then proposed the following resolution:

"WHEREAS, it is believed to be the consensus of the members present at the Louisiana Engineering Society's Annual Meeting that there are serious dangers to the United States Constitution in the Genocide Convention now before the United States Senate for enactment as a treaty;

"THEREFORE, BE IT RESOLVED, that the Louisiana Engineering Society express its opposition to the adoption of the proposed treaty; and

"BE IT FURTHER RESOLVED, that the Louisiana Senators, Honorable Allen J. Ellender and Honorable Russell P. Long, be sent copies of this Resolution."

A motion for adoption was made by Mr. Nairne, seconded by Mr. Cappel, whereupon the secretary called attention to Article 12 of the constitution which does not permit such a motion to be voted upon until certain requirements have been met.

Following this, announcement was made of several events on the program, and the meeting adjourned.

JOHN P. FERNANDEZ, Secretary-Treasurer

Minutes of Regular Meeting of the Society held on Monday, February 13, 1950

The meeting was called to order by President Cucullu, with 56 members and guests present. The President extended a welcome to all those in attendance. Mr. Charles P. Knost moved that the reading of minutes of the preceding meeting be dispensed with, seconded by Mr. Harold A. Levey and carried.

The secretary read a report on the attendance at the annual meeting.

Mr. L. H. Hiers read an obituary of the late A. H. Guillot, following which a moment of silence was observed in memory of the deceased member.

The Secretary read letters from Professor R. A. Steinmayer and the Society of American Military Engineers.

President Cucullu then announced that a resolution opposing the adoption of the Genocide Convention as a treaty had been presented at the annual meeting and that the Board of Direction, in accordance with Article 12 of the Constitution, had approved same. Discussion followed as to whether or not the resolution should be put to vote at this meeting because of the small attendance. Mr. C. Glennon Melville moved that the resolution be passed unanimously, seconded by Mr. V. J. Bedell and carried with no dissenting vote.

Mr. Waldemar Nelson then introduced the speaker of the evening, Mr. H. J. Townsend, who gave a most instructive talk on "Recent Advancement in Airways Navigational Aids and Blind Landing Facilities." Following the lecture, President Cucullu thanked the speaker and the meeting adjourned with a standing round of applause.

JOHN P. FERNANDEZ, Secretary-Treasurer

Minutes of Meeting of the Board of Direction Held on Monday, February 13, 1950

The meeting was called to order by President Cucullu in a private dining room at Arnaud's Restaurant. Those present were Messrs. Abrahm, Knost, McNiven, Newton and Fernandez. Minutes of the preceding meetings were accepted with a deletion. The Secretary made the following report on attendance at the annual meeting:

	Local	Non-Res.	Total
Students	97	68	165
Members and Guests	259	69	328
Ladies	14	4	18
	370	141	511

The Finance Committee's budget for 1950 was presented, and General Newton moved that same be accepted, seconded by Mr. Knost and carried.

Mr. Knost moved that the Secretary be authorized to purchase a new typewriter and a projector, seconded by General Newton and carried.

Mr. Knost moved that the Treasurer be authorized to reduce the bank balance by $1200 to $1500 through a suitable investment. The motion was seconded by Mr. McNiven. Discussion took place concerning a suitable investment, but none was decided upon.

Resignations of the following were accepted with regret: Messrs. George Bertram, David Brown, Russell C. Fye, Jack E. LeMay, Norwood Pellerin.

General Newton moved that Messrs. J. T. Knight, Jr., and John I. McCain be reinstated to membership, seconded by Mr. Abrahm and carried.

A copy of letter addressed by Mrs. Nat L. Marks to the Editor, New Orleans States(, was read.

A letter from Dean R. T. Sessums pertaining to a new form of publication was read. Mr. McNiven moved that the matter be referred to the Publications Committee, seconded by Mr. Abrahm and carried.

A communication from Professor R. A. Steinmayer, asking for names of engineers educated in French institutions, was read. Mr. Knost moved that same be read before the Society's general meeting to follow, and that notice be placed in the Proceedings. The motion was seconded by Mr. Abrahm and carried.

President Cucullu appointed Messrs. S. E. Huey and S. W. Elberson to prepare an obituary for the late James P. Kemper.

A resolution protesting the adoption of the Genocide Convention as a treaty, presented at the Society's annual meeting, was read. Mr. McNiven moved that the resolution be presented to the membership for vote with the Board's recommendation for its passage. The motion was seconded by Mr. Knost and carried.

With the approval of the Board, the President appointed the following chairmen and vice-chairmen of standing and special committees for 1950:

Employment: Eugene L. Fithian, chairman; Raymond P. Bassich, vice-chairman. Entertainment and Outings: J. Robert Rombach, chairman; Claiborne Perrilliat, vice-chairman. Finance: Harry P. Newton, chairman, H. L. Lehmann, vice-chairman. Membership: Mario R. Guell, chairman; Clifton A. Frey, vice-chairman. Membership Qualifications: (Anonymous). Legislative: W. Stone Leake, chairman Hubert A. Flanakin, vice-chairman. Professional, Civic and Industrial Affairs: Reinhard A. Steinmayer, chairman; Arthur J. Naquin, vice-chairman. Publications: William J. Drawe, Jr., chairman; Henri J. Molaison, vice-chairman. Publicity: L. Villere Cressy, chairman; John S. Burke, vice-chairman; T. Edward Ernst, vice-chairman. Technical Papers: Waldemar S. Nelson, chairman; Aaron Abramson, vice-chairman. Student and Junior Activities: Orlando W. Stephenson, Jr., Chairman; William E. Owen, vice-chairman.

Mr. Knost moved that the Secretary be authorized to place on the ballot all names of applicants approved by the Membership Qualifications Committee. The motion was seconded by General Newton and carried.

The president was authorized to appoint a committee to investigate the matter of making an award for engineering ingenuity as proposed by Mr. James M. Todd.

Mr. Abrahm moved that the subscription to the Proceedings ordered by a Moscow library not be accepted, seconded by Mr. McNiven and carried.

The meeting then adjourned in order that the Society's regular meeting could open on schedule.

JOHN P. FERNANDEZ, Secretary-Treasurer

Minutes of Regular Meeting held in the Jackson Room, St. Charles Hotel on Monday, March 13, 1950

The meeting was called to order by President Cucullu, with approximately 120 members and guests present. Mr. Cucullu welcomed those in attendance and reported on a meeting of the Monroe Section recently held in which students of Louisiana Polytechnic Institute participated.

Reading of minutes of the preceding meeting was dispensed with.

The secretary read an obituary of the late Cecil Camp, following which a moment of silence was observed in his memory.

Mr. Gus Blancard addressed the meeting in behalf of the American Cancer Society.

The secretary made an announcement concerning the Norwegian Consul's invitation to visit hydro-electric plants in Norway.

Mr. L. V. Cressy then introduced the main speaker of the evening, Mr. Fred C. Brandt, Regional Sales Manager, Minneapolis Honeywell Regulator Company, who gave a most interesting talk on "Industrial Air Conditioning". The lecture was followed by a lively discussion period, after which President Cucullu thanked the speaker and the meeting adjourned with a standing round of applause.

JOHN P. FERNANDEZ, Secretary-Treasurer

Minutes of Meeting of the Board of Direction held on March 13, 1950

The meeting was called to order by President Cucullu in a private dining room at Arnaud's Restaurant. Those present were Messrs. Abrahm, Hill, Knost, Lehmann, McNiven, Seago and Fernandez. Mr. H. L. Landry also was present by invitation. Minutes of the proceding meeting were accepted as read.

A report on standing committee acceptances was made by the secretary.

A letter from Mr. G. M. Wallace, Executive Secretary to Governor Long, addressed to Mr. Hubert A. Flanakin was read. Mr. Lehmann reported that there was no change in the favorable prospects for passing a general engineering license law and that a meeting of the Louisiana Council of Engineers should be called in the near future.

Mr. Abrahm read an outline of plans for an Engineers' Club, which was followed by discussion.

Mr. Seago moved that the Society's old typewriter be sold to the Secretary for $5.00, seconded by Mr. Knost and carried.

Mr. Landry announced that the Baton Rouge Section would be glad to sponsor the June meeting, to be held probably on June 17, if the parent organization would furnish printing and postage for meeting notices. Mr. Knost moved that same be done, seconded by Mr. Seago and carried.

Mr. McNiven moved that the April meeting of the Board be held in Room 422 of the St. Charles Hotel at 6:30 p. m. The motion was seconded by Mr. Abrahm and carried.

It was reported that the House Committee had sold all of the Society's bookcases. Mr. Lehmann moved that the committee submit a plan for refurnishing the room at a cost of not more than $800.

It was decided that members of the board would sponsor the various standing committees, and the following were appointed:

Entertainment and Outings, Mr. Seago
Membership, Mr. Lehmann
Professional, Civic and Industrial Affairs, Mr. McNiven
Publicity, Mr. Knost
Technical Papers, Mr. Fernandez
Publications, Mr. Hill
Legislative, Mr. Cucullu
Student and Junior Activities, Mr. Abrahm

Mr. D. W. Stewart's offer to furnish a base for the Society's Golf Tournament Trophy was accepted. There being no further business, the meeting adjourned.

JOHN P. FERNANDEZ, Secretary-Treasurer

Regular Meeting, March 8, 1950, Baton Rouge Section

The second meeting of the Baton Rouge section of the Louisiana Engineering Society for 1950 was called to order at 7:30 p. m. by Mr. Mary, in the Geology Auditorium at L.S.U.

The following officers and approximately 103 members and guests were present: Mr. A. Mary, president; Mr. Fred H. Hannaman, Jr., 1st vice-president; Mr. Louis Duclos, 2nd vice-president, and Mr. Henry L. Landry, secretary-treasurer.

Mr. Mary turned the meeting over to Mr. J. O. Pilcher, president of the student chapter of the American Society of Civil Engineers for the purpose of conducting their necessary business. However, Mr. Pilcher received the necessary motions and dispensed with any regular business, and extended an invitation to the assembly to visit the University and exhibits of the different engineering groups on Engineers Day at L. S. U. on March 18th. Mr. Pilcher then turned the chair over to Mr. Mary.

Mr. O'brien advanced a motion that the reading of the minutes of the previous meeting be dispensed with, which was seconded and approved.

Mr. Mary then turned the chair over to Dean LaSalle for the purpose of introducing the main speaker of the evening, Colonel Holle.

Colonel Holle presented an informal talk on the work of the Corps of Engineers as it pertains to flood control, with particular emphasis on the Atchafalaya Floodway.

The talk was concluded in an interesting discussion period.

Refreshments were enjoyed by the group following the meeting.

HENRY L. LANDRY, Secretary-Treasurer
Baton Rouge Section

DEAN JAMES M. ROBERT

PROCEEDINGS

OF THE

LOUISIANA ENGINEERING SOCIETY

VOL. XXXVI JUNE, 1950 NO. 3

CONTENTS

EDITORIAL NOTES AND COMMENTS

Dean Robert Retires. After forty-four years of service with Tulane University, College of Engineering, Dean Robert will retire on July 1.

In the past years he has been active in Louisiana Engineering Society work, serving as Secretary, President and as Editor of the Proceedings.

During his years in the engineering profession in this community, he has not only aided in raising the standards of engineering, but through his cheerful personality has enriched the lives of those with whom he has come in contact—and these are many.

His host of friends in L.E.S. wish him carefree days devoted to the pursuit of his hobbies, interrupted now and then with a good fishing trip.

L.E.S.—Your Society. Probably most members of L.E.S. take their membership in the organization rather casually. Here are some facts about your Society which you may or may not know:

Members number about twelve hundred; the Society was founded in 1898; at present we have four active sections or branches.

The sections are: Baton Rouge, Lake Charles, Monroe and Shreveport. Professor Mason has been elected president of the Lafayette Engineering Society, which plans to become an LES section later. Soule Butler, Tom C. David and Charles A. Myers and other engineers have been active in promoting a section in Alexandria.

The "Proceedings" prints many papers presented at the meetings, gives you a record of the business of the Society through the minutes of the meetings, is perhaps the only local source of information on officers of various engineering societies, lists the complete roster of LES officers in all sections, lists standing committees of the Society.

The get-together before and after the various meetings is an important link in establishing more cordial relations throughout the engineering profession. Most branches of engineering are represented in L.E.S. Our annual meeting is an important engineering event, lasting two or three days; each year a golf tournament and outing is held.

Perhaps some engineer of your acquaintance should be, but is not now, a member of L.E.S. Why not drop a line, or call one of the secretaries, asking that an application blank be sent to your prospect? Now's the time!

Baton Rouge Section:
Henry Landry, Sec.-Treas.,
2222 Cedardale Ave.

Monroe Section:
Calvin A. Watts, Act. Sec.-Treas.
Tech Station, Ruston, La.

Lake Charles Section:
Vivien E. Sicks, Sec.-Treas.,
Route 2, Box 225.

Shreveport Section:
John H. Ellis, Sec.-Treas.,
1141 Janther Place.

John P. Fernandez, Sec.-Treas.,
9011 Apple St.,
New Orleans, La.

Our Annual Outing. The date set for our golf tournament is July 27, Thursday. Colonial Country Club will be the "play ground," and Robert Rombach is chairman of the event. The members may look forward to a day of good fellowship.

PAPERS AND DISCUSSIONS

INDUSTRIAL AIR CONDITIONING*

The subject of Industrial Air Conditioning covers a field which is usually considered to be the application of air-conditioning for the establishment of proper atmospheres for product requirements or production purposes. While the title of this talk is "Industrial Air Conditioning," since the material we hope to present actually has little to do with product, possibly a better title would be "Air Conditioning of Industrial Spaces for Comfort." This evening I expect to describe two jobs which involve unusual or new applications of air-conditioning to spaces which are for industrial purposes, but the air-conditioning is for the maintenance of conditions comfortable to the occupants.

It is our opinion that these two jobs are significant in that they point a trend in the air conditioning industry into a new and probably the largest market ever opened.

The first plant which I must call Plant X for secrecy reasons is an existing plant in which regular mass production processes are carried out on a 24 hour basis. Consideration of the investment and cost of air-conditioning this plant was extremely detailed as this investment could in no way be compromised with other cost factors. The building was already there, the heating plant was already there, some ventilation had already been installed and the plant was not specifically designed with air-conditioning in mind. Also, the utilities required for air conditioning with the possible exception of electric power were not available throughout the plant. Chilled water piping and new steam lines run to all air conditioning units. Every item of cost in this project was chargeable to the air-conditioning installation.

The second plant is a shop building for maintenance and repair work in the Shell Oil Refinery, and work is more on a job basis rather than on a production basis. This plant was built from the ground up and part of the air-conditioning cost was viewed as necessary since a heating system and a ventilating system were required. The air-conditioning consequently was considered as an addition to the cost of these two rather than as a total cost by itself.

Another factor in the two jobs was that in the first plant the cost of operating utilities such as steam was a direct cost to the air-conditioning system, whereas in the second one steam which had already been used in the processes was available at 10 to 15 lbs. pressure. Thus in the second shop the operating cost represented a negligible increase in the total cost of the plant.

Plant X is located on the Gulf Coast and is a production manu-

* By F. C. Brandt, Minneapolis-Honeywell Regulator Co. Presented at a regular meeting of the Society, March 13, 1950.

facturing plant in which a large quantity of machine work and considerable welding and heat treating is done. This particular plant is air-conditioning and modernizing over a period of several years and at the present time only a small part of the plant has been done. This part contains a large number of arc welding booths where welding is done on a production basis. Since the parts are relatively small and can be moved by hand, the booths are very close together. Before air-conditioning, it was practically impossible to maintain reasonable temperatures around these booths even with a tremendous amount of air being provided for ventilation. In addition to the large quantities of fresh air being supplied, each operator had one or two small propeller fans blowing directly on him. In the heat of summer occasionally welders would faint from the very high termperatures in the space and frequent rest periods were required in order for anyone to work the normal hours through the day.

The load calculations to arrive at the refrigeration required and the amount of air to be circulated through the space had to be done on an empirical basis since no data were available on the amount of heat given off by the arc welding processes. The method used to secure these data was to build a special room in which two arc welding booths were located. This room was air-conditioned with a standard air conditioning unit which was equipped with complete temperature recording equipment. A variable amount of fresh air was also provided to determine the effect of different rates of ventilation.

This welding booth was operated through an entire summer and sufficient data were secured on which to base the design for the entire welding shop.

At the present time this shop has been completely re-designed and has been actually moved to another part of the plant. In the new layout scientifically selected colors have been used throughout. An extensive exhaust ventilation system has been provided which removes the fumes from the welding booth before they ever get into the atmosphere of the shop, and the shop is completely air-conditioned by six large units provided with automatic summer-winter changeover and automatic dehumidification and reheat control.

No definite information has been released by this company but from all indications improved atmospheric conditions have reduced operator fatigue and have permitted the men and women to work more steadily.

If it is any evidence of the management of this company's experience with air-conditioning in that limited application, it is worthy to note that they are proceeding with the extensive air-conditioning of other areas of their shop spaces.

The Plant X job has a statistical background which I think would be interesting to you. These are some of the factors influencing the management of Plant X to embark on this program.

A New York State Commission ventilation survey reports a 28% increase on overall efficiency of workers in air-conditioned plants.

The American Management Association survey makes this comment on absenteeism, "Absenteeism which is one of the most costly forms of personnel loss to management when due to colds, minor illnesses, and other types of physical maladjustment of the worker has been significantly decreased through the use of air-conditioning. Air-conditioning accomplishes a 28% reduction of those illnesses which cause an employee to stay home from work. For example, a prominent soap manufacturing company reported a decrease in absenteeism of 27%. A public service electric company in the east has a 6-year average reduction of 29%. A mid-west newspaper publisher has a 5-year average reduction of 30%.

Industrial Hygiene Foundation reports "In two mid-western plants a careful record of causes for absenteeism discloses the fact that respiratory ailments accounted for 50% of lost time in one plant and 61% in the other."

It has also been established that transmission of bacteria by saliva droplets in the air is at a minimum when the temperature is approximately 72 degrees and the relative humidity between 45 and 50%.

The S.K.F. Company manufacturing ball-bearings report that air conditioning results in 1) less etching on finished material due to perspiration; 2) less out of telerance rejects due to temperature changes; 3) less damaged material due to dirt and dust.

The American Management Association survey reports a saving of 40% in cleaning of air-conditioning plants.

Further advantages accruing to air-conditioning in plants such as we are discussing are: 1) less down time on machine tools for repair due to dust and dirt; 2) less down time on tools due to electrical troubles caused by high humidity; 3) less set up time on tools due to temperature changes.

Among the anticipated improvements in employee relations is that air-conditioning eliminates only one of the many distracting variables that frequently take an employee's mind off his work. Stopping to wipe the sweat from his brow and similar annoyances are eliminated. Also, air-conditioning will reduce the now frequent trips to the water cooler or to the coke machine. It is further anticipated that air-conditioning of a plant will create for the plant better jobs, permitting the plant management to select the best workers available and thus reduce the costly labor turnover.

The Plant X is a large plant consisting of several large buildings which for the purposes of air-conditioning planning were treated as individual units. The proposed plan of air-conditioning was to use a central refrigerating plant supplying chilled water to units in the various buildings. For purposes of original cost and operat-

ing cost analysis, a survey was made based on an initial installation of 750 tons of refrigeration.

Capital expenditure is considered a long term investment and for the purpose of the original cost analysis, a depreciation period of 20 years was assumed with interest at 4% on the undepreciated investment. Insurance was taken at 60c per $1,000.00 per year.

For operating cost purposes an operating season of 5½ months from May 1st to October 15th was assumed. The refrigeration machine operating cost was based on estimated equivalent full-load operating hours. The operating cost for the air-conditioning unit fans and the water circulating equipment was based on year-round operation. Power cost used in the estimate was 1c per kilowatt hour and the maintenance cost on an annual basis was estimated to be $6.32 per ton per year.

To present the data to the management in reference figures, the owning and operating cost were given for each building for which air conditioning was contemplated in dollars per year, in dollars per man per year, in dollars per man per working day and in dollars per man per working hour. The number of employees was, of course, secured from personnel records with each employee working an 8 hour shift. The working days in the year were taken as 255 which excluded holidays and week-ends.

The estimated first cost per ton for installed air-conditioning for shop areas for this plant was estimated at slightly under $600.00 per ton which included all necessary air-conditioning installation plus any necessary cutting and patching, the relocating of interferring pipe, electrical wiring, and etc., and the necessary power wiring. These last three times can in some cases be considered as maintenance of the plant and may not be considered a part of the long term investment.

The annual fixed charges based on factors mentioned above, is $40.82 per ton per year, which covers amorization, depreciation, interest on the undepreciated investment and insurance.

Shop No. 1 of Plant X operates on a 24 hour basis, that is, three 8 hour shifts, with 120 operating days during the season from May 1st to October 15th. On shift No. 1 a full load operating factor of .85 is assumed. On shift No. 2 a full load operating factor .50, and on shift No. 3 a full load operating factor of .30 is assumed. Extended into operating hours this totals 1584 hours which is an equivalent, from an operating cost of standpoint, of operating the machine for 1584 hours at full load.

Assuming a horsepower requirement of .96 brake horsepower per ton and an energy cost of 1c per killowatt hour and 90% efficiency of the motor we arrive at .8 of 1c per ton per hour of operation for the refrigeration machine.

The auxiliary power cost is based on 1c per kilowatt hour, the operating hours are based on 24 hour operation, 360 days per year for the fans and circulating water pumps, and 24 hour per day for

168 days for the condenser pump and cooling tower fans.

Fans and the main water circulating pump work out to a operating cost of $18.93 per ton per year and the condenser pump and cooling tower fans work out to an operating cost of $4.90 per ton per year, for a total of $23.90 per ton per year.

The annual maintenance cost which is estimated at $6.32 per ton per year is made up of the following items:

1) Operating personnel, salaries, etc.; 2) Repairs for refrigeration machinery; 3) Refrigerant; 4) Oil and grease; 5) Painting; 6) Filters; 7) Control service; 8) Cleaning air-conditioners.

An owning and operating cost analysis of Shop No. 1 shows that 741 tons of refrigeration are required and there is an estimated full load equivalent of operating hours at 1584 and there are a total of 540 people on three shifts working in this shop.

The owning cost and fixed charges are:

741 tons × $40.82 = $30,248.00/yr. fixed charges.

The operating cost for the refrigeration machine is:

741 tons × 1584 hours × .008 dollars/ton/yr. = $9,390.00/yr.
Refrigeration machine cost.

For auxiliaries the operating cost is 741 tons × $23.90 per ton per year or a total of $17,710.00 per year.

The maintenance cost would be:

741 tons × $6.32 = $4,683.00 per year.

The total operating cost is the sum of:

Operating cost of Refrigeration machine —	$9,390.00
Operating Cost of Auxiliaries —	$17,710.00
Maintenance —	$4,683.00
	$31,783.00/yr.

The total owning and operating cost is the sum of:

Annual operating cost —	$31,783.00
Annual owning cost —	$30,248.00
	$62,031.00/yr.

Now assuming 540 men are in this shop, this works out to $114.87 per man per year. Based on 255 working days and 8 hours per day works out to 45c per man per working day or 5.6 cents per man per working hour.

In the several shop areas the final cost figures on a per man per hour basis varied somewhat, other typical figures being 3.6 cents per hour, 4.6 cents per man per hour, and 2.9 cents per man per work hour. The estimated cost of owning and operating the air-conditioning for the entire plant was approximately 4c per man per hour. All these figures are based on three shifts per day.

These figures represent an opportunity to plant managements to make what appears to be an investment with wonderful returns. Assuming an average labor rate of $1.30 per hour, the cost of air-

conditioning would increase this to $1.34. If only a 10% increase in efficiency were realized, the average rate would actually be reduced to $1.21 per hour. The cost of air conditioning may not be low, but the returns certainly are not low either.

The second job on which similar work was done—that is air conditioning of industrial spaces for human comfort—was a Shell Refinery Shop Building. This building is 250 ft. wide x 450 ft. long, and the clearance underneath a traveling crane in the center bay of the building is 34 feet. This building is completely air-conditioned, and is a building where normal shop processes carried on in a refinery are done. Tower sections and other parts of the refinery are brought in there and cleaned out, rebuilt, changed, etc. This building is so large that a railroad track runs into it and railroad cars are brought into the building. In addition to shop spaces there are also offices, storerooms, etc., in the building and among the shop processes carried on are ordinary shop machining, shop welding, assembly and dis-assembly of meters, instruments, gauges, etc., considerable heat treating nad other general shop practices. One of the problems considered by the designers at great extent in the design of jobs is the possibility that an entire tower might be brought into the shop and opening it found it contained material which gave off large quantities of hydrocarbon vapors, which could possibly create an explosive hazard. For this reason, the air-conditioning system was so arranged that all the units could be operated taking only fresh air and no recirculated air on very short notice so as to, in effect, flush out the building or dilute the concentration of vapors sufficiently to dissipate the hazard.

Before it was definitely decided to air-condition this shop building a complete survey of the additional cost of a complete air-conditioning system over merely a ventilation system was made and the increase in cost was relatively small. For a straight ventilating system it would have been necessary to circulate considerably more air for the same size space than it would be for an air-conditioning system, and while for an air-conditioning system it was necessary to add the refrigeration system and chilled water piping, condenser water piping, and the cost of the coils plus the additional controls. It was found in the overall this was not a serious item of cost and there were other advantages of air-conditioning which were not directly measurable in terms of dollars. Hence, the decision was made to go ahead with the air-conditioning system.

Air-conditioning of this building permitted a much more efficient arrangement of the working areas. It is even possible that because of the fumes etc., of the considerable amount of welding that goes on it might not have been practical to have the welding areas included in the same building with the instrument repair shops, for example, and some of the other activities. However, by

providing the proper atmospheric conditions it was possible to group these related activities for most efficient flow of work through the shop without regard for the special considerations which otherwise might have been necessary. Picture, for example, the time saved in moving a piece of pipe or heat exchanger from one building to another as compared with a single building operation. Here, the material is picked up on a crane and moved maybe 15 or 20 feet to another department. This has permitted a far more efficient flow or work through the shop plus far easier follow-up to see that the work is processed on time. Also, better planning has resulted from this more efficient grouping.

Refrigeration for this shop is supplied by a 500 ton centrifugal machine driven by a steam turbine powered with 10 to 15 lbs. exhaust steam. This steam has already been once used in the refinery, hence the operating cost of the machine is relatively low. Condensing water is secured from a central cooling tower which supplies cooling water for other purposes throughout the Shell Refinery. The condenser water is first circulated through the refrigeration condenser, and then through the steam turbine condenser and back into the circulating water system. Automatic control of the machine is accomplished by means of an air controller of the recording type with a thermal bulb in the water leaving the water chiller and controlling an oil bleed valve on the hydraulic turbine governor. A second pen is provided on this recording instrument to record the temperature of the water entering the chiller.

In the main shop area, 9 large air-conditioning units each delivering 16,0000 cfm are used to supply conditioned air. They are located in the top of the shop in the roof spaces, and no part of them project below the bottom of the trusses, as clearance is necessary for travelling cranes. Special discharge grilles have been used to deliver the air from this height down to the working space on the floor. These air-conditioning units have preheat coils in the outdoor intake to warm the outdoor air sufficiently to prevent freezing of the water coil. The water coil is a separate coil supplied with chilled water and equipped with three-way valve control. There is also provided a reheat coil which is used for winter heating and for summer reheating under adverse humidity conditions. Each of these 9 units has these 3 coils. Distribution throughout the area served by the air-conditioning unit is accomplished by normal or conventional duct system which supplies the ceiling type outlets. No provision has been made in the building design or equipment for exhausting the excess or used air from the space and this has proved to be one of the problems since this air contains fumes from welding machines. It was hoped that enough air would be exhausted by opening of doors in the side of the building, but that this practice has a tendency to exhaust the freshest air rather than the used air, and another system has been

experimented with in which the used air is exhausted at the top of the building through the penthouse doors which have been provided for access to the fan rooms. Access to the fan rooms is from the roof of the building through doors in penthouses. The fumes and smoke from the processes carried on in the shops always seem to rise making the top exhaust system appear most practical. Balanced type louvres, or louvres which open when the pressure inside the building increases slightly, have been provided in some of the doors and this means has been found to be reasonably satisfactory for the provision of discharging the waste air. Around the periphery of the building are some special shops and offices for the administration work and clerical work which goes on in connection with the shop activity. These spaces are supplied by six smaller air-conditioning units similar in design to the main shop units.

Of interest to the illuminating engineers is the lighting used in the building. Two overhead light fixtures are located side by side, one being a standard incandescent type lamp and the other being a mercury vapor type of lamp. The lighting intensity works out to about two watts per square foot.

The outside finish on the building is a corrugated asbestos type of board. On the inside is installed a one inch thick insulation having an insulating valve of .25 b.t.u. per square foot per hour per inch of thickness. The roof is a metal deck with built up roofing under which is two inches of insulation having an overall transfer cooefficient of .14 b.t.u. per square foot per hour. The importance of roof insulation becomes greater when it is realized the roof load represents almost 70% of the transmission and sun effect heat gain load on this building.

Because the change from one shop to another was a complete change from an old shop building to a new shop building with air-conditioning, it has not been possible for the Shell Company to isolate the advantages of air-conditioning as compared with others, but there has been a marked and noticeable improvement in the general attitude of employees in the new shop building. They do their work better and they take a greater pride in their work and there seems to be a far greater community of effort. Also, particularly during the summertime, jobs in the shop are the choice jobs in the whole refinery. Overall benefits from better employees attitudes toward their job in the company while intangible, certainly have been considerable.

In jobs of this type it appears that one essential to be incorporated in the design is the means of automatically changing the system from heating operation to cooling operation. This applies not only to the air circulating and air treating equipment, but it applies to the refrigeration plant equipment and auxiliaries as well. In coastal climates experience has proven many days when heating and cooling are needed on the same day. Inspection of

the load figures of the Shell job will reveal the large proportion of internal heat gain. The internal sources of heat account for approximately 53% of the total sensible heat gain and this alone would indicate that cooling would normally be required in this building under full internal load conditions even though the weather outside might be what would normally be considered as being a little touch of winter.

The Gulf Coast climate presents another problem which must be considered in the design of industrial air conditioning jobs, particularly those operating on a 24 hour basis and that is the extreme humidity problem. It is absolutely essential on this type of job to provide for dehumidification and reheat to provide satisfactory internal conditions. As a matter of fact these same comments apply to any type of air conditioning job operating on a 24 hour basis anywhere near the Gulf.

Our responsibilities as engineers and professional men, generally, and particularly consulting engineers require us to investigate possibilities of air-conditioning for our clients not only in main plants but possibly only specific areas and to inform our clients of the value of this production tool and the returns possible from investment in air-conditioning systems.

ENGINEERING BRIEFS

A new book "Rebellious River" by the late J. P. Kemper, C. E., has recently been published by Bruce Humphries, Inc.

This is an authoritative analysis of the problem of flood control, with particular reference to the Mississippi and its tributaries. Written by a recognized authority on floods and the problems of flood control, it can be understood and appreciated by any layman, and yet it is so authoritative in its technical aspects that it is a *must* volume for the expert. To students of river hydraulics, to officials of Levee Boards and Flood Control Districts, and to the citizens of the Tensas and Atchafalaya Basins, who have suffered so cruelly from the ravages of flood waters, it has a peculiar emphasis and significance. The book contains maps and charts.

J. P. Kemper was an honorary and life member of the Louisiana Engineering Society.

New Natural Rubber Roads Increase Driving Safety. Key highway and safety officials throughout the country are watching with keen interest a series of tests that may save countless American lives in the years to come.

In Virginia, Minnesota, Ohio and Texas, roads have been laid down composed of a combination of natural rubber powder and the asphaltic materials usually used. These roads are being subjected to normal traffic under the close observation of a variety of experts.

According to the adherents of this new roadbuilding technique, the addition of the natural rubber provides safety and economy advantages that would make rubber roads one of the great new advances of the post-war world.

It is said that on a natural rubber asphalt road the time it takes to stop a car is substantially less than that required on the conventional type of thoroughfare. It is also claimed that the rubber road has a tendency to resist the formation of ice film.

If these claims are borne out by the tests now being run, such roads would offer tremendous potential for saving lives and property.

From the economy point of view, rubber roads give indications of lasting longer and demanding far less maintenance than the normal highway. Authorities on the subject point out that when rubber is added to asphaltic material, roads are less susceptible to temperature variations.

For one thing, there is a reduction in brittleness. Rubber treated roads are harder in the summer and softer in the winter. They tend not to crack. Foundations of such roads are better protected. The rubber helps keep surface water from seeping into, and undermining the road base.

As far as they have gone, they hold great promise of greater safety and more economy. If they continue so, it probably will not be too long before you will be rolling along, rubber tires on rubber roads.—*From Natural Rubber Bureau.*

GLOSSARY OF FEDERALESE

(Reprinted from the column, "Federal Diary," by Jerry Kluttz, in the Washington Post).

A Program—Any assignment that can't be completed by one phone call.

Channels—The trail left by an inter-office memo.

Status Quo—This mess we're in.

To Expedite—To confound confusion with commotion.

Expediter—One who does same while riding fast trains and staying at good hotels.

Efficiency Expert—A guy who trains expediters.

Coordinator—A guy who has a desk between two expediters.

Liaison Officer—A person who talks well and listens better, but has no authority to make a definite statement.

Criteria—Measures which the other guy uses to underestimate what you have already overestimated the deal to be worth.

Incentive program—A scheme to titillate a submerged urge.

To Activate—To make carbons and add names to the memorandum.

Under Consideration—Never heard of it.

Under Active Consideration—We're looking in the files for it.

In Transmittal—We're sending it to you because we're tired of holding the bag.

A Conference—A place where conversation is substituted for the dreariness of labor and the loneliness of thought.

A Clarification—To fill in the background so detailed that the foreground must go underground.

A Modification of Policy—A complete reversal which nobody admits.

To Spell Out—To break big hunks of gobbledygook down into little hunks of gobbledygook.

Synthesis—A compounding of detailed bewilderment into a vast and comfortable confusion which offends no one.

Procedure—Everyday routine rigmarole.

Letter of Transmittal—A way to pass the buck.

A Survey is Being Made on This—We need more time to think of an answer.

Further Substantiating Data Necessary—We've lost your stuff. Send it again.

To Explore the Ramifications—And brother, just wait till you see what we think of.

Confidential Memorandum—There wasn't time to mimeograph this.

Note and Initial—Let's spread the responsibility for this.

See Me. or "Let's Discuss'—Come down to my office, I'm lonesome.

Let's Get Together On This—I'm assuming you're as confused as I am.

Give Us the Benefit of Your Present Thinking—We'll listen to what you have to say so long as it doesn't interfere with what we've already decided to do.

Referred for Appropriate Action—Maybe your office knows what to do with this.

Referred To A Higher Authority—Pigeonholed in a more sumptuous office.

To Give Someone the Picture—A long confused and inaccurate statement to a newcomer.

To Mastermind—To avoid blame for not doing while getting credit for the doing of others.

Research Work—Hunting for the guy who moved the files.

Point Up the Issue—Expand one page to 15 pages.

Functional Control—You tell him what to do and he'll tell you where to go.

Committee—A group that keeps minutes and wastes hours.

Research—Dragging data out of an inaccessible place, tabulating them, and then filing them in equally inaccessible place.

Research—Copying from one book is plagiarism; copying from two books is research.

An Economist—An economist is a man who tells you what to do with the money that you would have not have if you had followed his proposals.

A Statistician—A statistician is a man who draws a mathematically precise line from an unwarranted assumption to a foregone conclusion.

A Professor—A professor is a man who tells you how to solve the problems of life which he has avoided by becoming a professor.

A Conference—A conference is a group of people who individually can do nothing but who can meet collectively and agree that nothing can be done.

A Consultant—A consultant is a man who tells you how to run your business and charges you more for his services than you could possibly make out of your business if you ran it right instead of the way he told you to run it.

An Expert—An expert is a person who avoids all the small errors as he sweeps forward to the grand fallacy.

An Administrative Analyst—An administrative analyst is a man who if asked to perform an appendectomy would approach it through the mouth.

Corrosion of Idle Ships Prevented by New Method — A new method of preventing the hulls of the nation's numerous idle merchant ships from corroding was recently announced by the U. S. Maritime Commission. It was found that corrosion of the outside metal plates below the water line can be halted merely by hanging small magnesium metal plates all around each ship.

The magnesium plates halt corrosion by acting as anodes, while the steel in the ship's bottom acts as the cathode and the water acts as the electrolyte. Thus a primary cell is formed and an electric current flows from the magnesium to the ship. The current causes slight decomposition of the film of water in contact with the ship's hull, thus arresting corrosion.—*Aminco Laboratory News.*

Churnless Butter. Continuous buttermaking processes, now past the experimental stage, promise significant changes to the industry, which now relies on the centuries-old batch churning process. Successful continuous pilot plants, where cream goes in at one end to come out as wrapped packages of butter, may yield a more uniform and sanitary product with greater efficiency and more economical operation. Economy is important to the butter industry, which has been declining steadily for several years, while margarine consumption has been growing rapidly, with current legislation likely to accelerate this trend. The average per capita consumption of margarine for the 1935-39 period was only 2.9 pounds, compared to 16.7 for butter, but by 1948 the figures had shifted to 6.1 versus 10.0. The advantages of the new continuous processes in reduced operation, maintenance, storage, inventory, and labor costs will scarcely revolutionize the situation, but they will help.

Buttermaking requires breaking the almost perfect cream emulsion of fat in water, separating the fat, and producing the stable butter emulsion of water in fat. Since 1940 the Sugar Creek Creamery Company of Danville, Illinois, in conjunction with the Cherry-Burrell Corporation, soon followed by the Creamery Package Manufacturing Company, has worked toward continuous methods of manipulating these emulsions. Germany had over 50 continuous buttermaking plants in operation at the wartime peak, and developments are underway elsewhere, but the two new processes developed by Cherry-Burrell and Creamery Package are better suited to the American economy and market. In Europe, dairy production is scattered in small units—as it is in New England, for example—and there are no large centers where huge quanities of cream are available for large-scale processing as in our Mid-West. Then, too, European standards for butter are quite different from the U. S. concept; German butter, for example, is more like margarine, with a higher water content, often between 20 and 25 per cent, no coloring, and a different texture.

The Cherry-Burrell method begins with unpasteurized cream, which is heated to about 120°F. and separated to yield a milk-fat concentrate testing at least 86 per cent fat. The concentrate is paseurized under vacuum in a matter of seconds and is then discharged into standardizing vats. In these vats water, color, and salt, if necessary, are added and samples are taken out for composition control. The standardized concentrate is next chilled, worked into butter of the proper texture, and delivered for "printing" and packaging.

The Creamery Package method starts with pasteurized cream, which is heated, separated into a concentrate of 75 to 80 per cent fat, and delivered to a device which reverses the emulsion. Then it is again concentrated and the concentrate mixed with other ingredients, kneaded, and delivered to the packaging equipment.

Pilot-plant output has been highly encouraging. Both methods have estimated capacities of 2000 pounds of butter an hour. When enough cream is available, one Cherry-Burrell pilot plant has produced approximately a quarter of a million pounds of butter in a week. Three other plants have turned out about 125,000 pounds weekly. The Cherry-Burrell process requires only an hour and a half from the time the cream is delivered to the plant until the wrapped butter is ready for shipment. In the Creamery Package method, which has not yet been put into commercial operation, the finished product is ready ten minutes after the cream has been pumped into the separator.

Both methods have many obvious advantages. Quality control is good because samples can be removed and checked all along the line, instead of churning a batch until it is "done." Keeping qualities of the butter are enhanced by the improved sanitation, the high-temperature vacuum pasteurization, and the more even

distribution of salt. There is less moisture loss in printing or leakage after packaging, since the fine dispersion of moisture is more lightly held in the butter. While the product resembles any other piece of fine butter to the layman, to the experienced butter judge it has a different type of body and texture.—*From Industrial Bulletin of Arthur D. Little, Inc.*

MINUTES OF THE MEETING AND BUSINESS OF THE SOCIETY

Baton Rouge Section Louisiana Engineering Society

Date: April 12, 1950; Time: 7:30 p. m.; Place: Agriculture Auditorium L.S.U.,; Officers present: A. J. Mary, president; Henry L. Landry, sec'y. and treasurer.

Mr. A. J. Mary opened the meeting at 7:30 p. m.; the above listed officers and approximately 115 members and guests present.

Mr. Mary addressed a few words of welcome to the guests, and members of the three participating student engineering societies, namely the student chapters of the AIEE, and ASME, and the ASCE.

It was moved and seconded that the reading of the minutes of the last meeting be dispensed with.

There being no further business Mr. Mary introduced Mr. Evans, Acting Chairman of the Students Activity Committee. Mr. Evans introduced the speakers of the evening and their topics as follows:

Robby J. Bernard, Jr. (Senior in Mechanical Engineering at L.S.U.) of Brooklyn, New York, presented a paper on "Production Distribution and Storage of Dry Ice".

F. T. Wrotten, (Graduate Student at L.S.U., E.E.) of Marshall, Texas, presented a paper on "Application of Dielectric Heating to Corp Processing".

Eugene P. Simcic (Senior in Civil Engineering at L.S.U.) of Tampa, Florida, presented a paper on the "Comparison of European and American Structural Practices".

An interesting discussion period followed each talk.

Mr. Mary thanked the students for the fine presentations. There being no further business the meeting adjourned at 9:30 p. m.

HENRY L. LANDRY, Secretary-Treasurer

Minutes of Meeting of the Louisiana Engineering Society Held Jointly With the Lousiana Post, Society of American Military Engineers, on Monday, April 10, 1950

President Cucullu called the meeting to order, and welcomed the members and guests present, approximately 185 in number. Professor Steinmayer moved that the reading of minutes be dispensed with, seconded by Mr. Muller and carried.

President Cucullu reported that the Louisiana Council of Engineers had decided to submit a bill for licensing engineers at the next session of the Louisiana Legislature.

Mr. Waldemar Nelson, Chairman of the Technical Papers Committee, gave an outline of the remaining program for 1950.

The secretary announced that a lecture on Atomic Energy by Dr. William G. Pollard would be held at Tulane University on Wednesday, April 12, to which all members were invited.

President Cucullu then relinquished the chair to Captain Gilbert, President of S.A.M.E., who introduced the speaker of the evening, Commander, P. P. Pasqualino, Assistant to the District Radiological Officer, New Orleans Naval Station, who delivered a most interesting, illustrated lecture on "Radiological Warfare Defense".

Following the address, Mr. Cucullu thanked the speaker and the S.A.M.E. for providing such an excellent program, and closed the meeting with a

JOHN P. FERNANDEZ, Secretary-Treasurer

Minutes of Meeting of the Board of Direction Held in the St. Charles Hotel April 10, 1950

The meeting was called to order by President Cucullu, with Messrs. Abrahm, Hill, Knost, Lehmann, McNiven, Newton, Seago and Fernandez present. Minutes of the preceding meeting were accepted as read.

President Cucullu gave a report of the Legislative Committee concerning the submission of a bill for licensing engineers by the Louisiana Council of Engineers. The secretary read a report of the Technical Papers Committee on the program for the remainder of 1950. Mr. Abrahm submitted a report on the proposed Engineers' Club. Mr. Lehmann moved that a meeting of representatives of all local engineering societies be called and that M Abrahm's plan be presented to them so that they in turn may submit same to their respective memberships. The motion was seconded by Mr. Hill and carried.

General Newton submitted a report covering finances of the 1950 Annual Meeting, which was approved.

The secretary reported that all applicants named in the March ballot had been elected.

President Cucullu read a report of the House Committee. Mr. Abrahm moved that the refurnishing of the Society's headquarters be left to the discretion of the president and the committee, and that they consider Mr. Seago's suggestion that folding chairs be provided for use at board meetings. The motion was seconded by Mr. Knost and carried.

A communication from Mr. Leander H. Perez was read.

General Newton moved that the Society's Annual Outing be held in July. The motion was seconded by Mr. Hill and carried.

Upon the recommendation of the board, President Cucullu appointed Mr. James S. Janssen General Chairman of the 1951 Annual Meeting.

An invitation to attend Louisiana State University's Mid-Century program was read by President Cucullu, after which he appointed Mr. H. L. Lehmann to serve as the Society's representative on this occasion.

Mr. Lehmann reported that he would attend a meeting of the Lafayette group to be held on the following Tuesday, and that the Society may be asked to change the boundaries of state sections.

Mr. Seago reported that the Engineers' Council for Professional Development had inquired whether local societies are contacting high school students to encourage them to study engineering. There being no further business, the meeting adjourned.

JOHN P. FERNANDEZ, Secretary-Treasurer

PROCEEDINGS

OF THE

LOUISIANA ENGINEERING SOCIETY

VOL. XXXVI AUGUST, 1950 NO. 4

CONTENTS

EDITORIAL NOTES AND COMMENTS

A Message from Our President About the Engineers' Licensing Law. You are probably aware that the recent session of the State Legislature enacted Senate Bill No. 18, providing for the registration of qualified persons as professional engineers and land surveyors. This measure, which supersedes the previous registration act for civil engineers and surveyors (Act No. 308 of 1908 as amended), was signed by the Governor as Act No. 73 of 1950. It is reproduced in these *Proceedings* for your information.

While Act No. 73 is not ideal in all respects, it does represent a real step forward in the profession-wide licensing of engineers. To that extent, therefore, it is the culmination of approximately 20 years of effort by the Louisiana Engineering Society to expand the scope of the original act. In recent years, the Society has been

joined in cooperative action toward that goal by local sections of national societies and by other engineering groups in the State, all working together as the Louisiana Council of Engineers.

The Society and the Council are indebted to hundreds of engineers who have labored toward the objective of a registration act through the years. There is little doubt that their cumulative efforts are to a large extent responsible for the present success, and I therefore count it a privilege to extend to them the thanks to which they are entitled.

I am particularly proud to speak for the Society and the Council in conveying well-earned thanks to the men who have carried on the work during 1950. These, too, are numerous, but some have been outstanding. Such men as Dean Roy Sessums, Louis Duclos, Mike Flanakin, Herman Lehmann, Stone Leake and several others merit special commendation for their efforts. I offer it to them in your name.

It is recommended that all qualified engineers register as soon as practicable, regardless of whether their licensing under the Act is compulsory or not. Section 17 of the Act is designed to facilitate the registration of practitioners at the time the Act becomes effective, and its provisions will not longer be applicable after July 26, 1951.

Definite information regarding the date on which actual registrations can begin is not presently available. The law provides that the Governor shall appoint the members of the new Board of Registration within 90 days after July 26 and the Board must hold its first meeting not less than 30 days after the appointments are made. We shall endeavor to keep you informed regarding pertinent developments.

L. J. CUCULLU,
President L. E. S.

AN ACT—To regulate the practices of engineering and land surveying; providing for the registration of qualified persons as professional engineers and land surveyors; defining the terms "Engineer", "Professional Engineer", "Practice of Engineering", "Land Surveyor", and "Practice of Land Surveying"; creating a State Board of Registration for Professional Engineers and Land Surveyors, and providing for the appointment of its members; fixing the term of the Board and defining its powers and duties; setting forth the minimum qualifications and other requirements for registration; establishing fees with expiration and renewal requirements; imposing certain duties upon the State and political subdivisions thereof in connection with public work, providing for the enforcement of this Act and penalties for its violation; and to repeal all laws or parts of laws in conflict herewith and particular-

ly Title 37, Chapter 8, Sections 681-697 both inclusive of the Revised Statutes of Louisiana of 1950".

Section I. General Provisions. Be it enacted by the Legislature of the State of Louisiana that, in order to safeguard life, health and property, and to promote the public welfare, any person in either public or private capacity practicing or offering to practice professional engineering or land surveying, shall hereafter be required to submit evidence that he is qualified so to practice and shall be registered as hereinafter provided; and it shall be unlawful:

(1) For any person to practice or to offer to practice in this State, engineering or land surveying, as defined in the provisions of this Act, or to use in connection with his name or otherwise assume, use or advertise any title or description tending to convey the impression that he is a professional engineer or a land surveyor, unless such person has been duly registered under the provisions of this Act.

Section 2. Definitions. The following words and phrases when used in this Act shall have the following meaning, unless the context clearly requires otherwise:

A. Engineer. The term "Engineer" as used in this Act shall mean a "Professional Engineer" as hereinafter defined.

B. Professional Engineer. The term "Professional Engineer" within the meaning and intent of this Act shall mean a person who, by reason of his special knowledge of the mathematical and physical sciences and the principles and methods of engineering analysis and design, acquired by professional education and practical experience, is qualified to practice engineering as hereinafter defined, as attested by his legal registration as a Professional Engineer.

C. Practice of Engineering. The term "Practice of Engineering" within the meaning and intent of this Act shall mean responsible professional service which may include consultation, investigation, evaluation, planning, designing, or supervision of construction in connection with any public or prviate utilities, structures, machines, equipment, processes, works or projects wherein the public welfare, or the safeguarding of life, health and property is concerned or involved, when such professional service requires the application of engineering principles and the interpretation of engineering data.

A person shall be construed to practice or offer to practice engineering, within the meaning and intent of this Act, who practices any branch of the profession of engineering; or who, by verbal claim, sign, advertisement, letterhead, card, or in any other way represents himself to be a professional engineer; or who represents himself as able to perform, or who does perform any engineering

service or work or any other professional service designated by the practitioner or recognized by educational authorities as engineering. The practice of engineering shall not include the work ordinarily performed by a person who himself operates or maintains machinery or equipment.

D. Responsible Professional Service. The term "Responsible Professional Service" shall mean the technical control and direction of the investigation, design, or construction of engineering works requiring initiative, engineering ability, and the use of independent judgment.

E. Land Surveyor. The term "Land Surveyor" as used in this Act shall mean a person who engages in the "Practice of Land Surveying" as hereinafter defined.

F. Land Surveying. The "Practice of Land Surveying" within the meaning and intent of this Act includes measuring of areas, land surfaces, streams, bodies of water and swamps for their correct determination and description, for the establishment, reestablishment, ascertainment or description of land boundaries, corners, divisions, distances and directions, the plotting and monumenting of lands and subdivisions thereof, and mapping and topographical work.

G. Board. The term "Board" as used in this Act shall mean the State Board of Registration for Professional Engineers and Land Surveyors, provided for by this Act.

Section 3. Board-Appointments-Terms. A State Board of Registration for Professional Engineers and Land Surveyors is hereby created whose duty it shall be to administer the provisions of this Act. The Board shall consist of seven professional engineers, who shall be appointed by the governor from among nominees recommended by the Louisiana Engineering Society, or its duly recognized successor, and shall have the qualifications required by Section 4. At least five nominations shall be made for each appointment required. The members of the first Board, not less than three of which shall be selected from the membership of the present "State Board of Engineering Examiners" created by Act No. 308 of 1908, as amended, shall be appointed within ninety days after the effective date of this Act, to serve the following terms: One member for one year ,one member for two years, one member for three years, one member for four years, one member for five years, one member for six years, and one member for seven years from the date of appointment. Every member of the Board shall receive a certificate of his appointment from the governor and before beginning his term of office shall file with the Secretary of State his written oath or affirmation for the faithful discharge of his official duty. Each member of the Board first appointed hereunder shall be required to obtain a certificate of registration under

this Act from said Board. At the expiration of the respective terms of office of each of the original appointees, or in case of their prior death or resignation, their successors shall be appointed by the governor, for a term of seven (7) years, within thirty days after nominations have been submitted to him, in the same manner as the predecessor appointee was selected. Each member shall serve until his successor has been appointed and qualified. It shall be the duty of the President of the Louisiana Engineering Society, duly authorized and acting on behalf of said Society, to make the nominations described above, in the first instance within thirty (30) days after the effective date of this Act, and, thereafter, within (30) days from the receipt of notice from any person of the occurrence of any vacancy on the board (whether such vacancy results from the expiration of the term of a member or in any other manner.

Section 4. Qualification of Board Members. Each member of the Board shall be a citizen of the United States and a resident of this State, and shall have been engaged in the practice of engineering or teaching of engineering for at least twelve years, and shall have been in responsible charge of important engineering work for at least five years. Responsible charge of engineering teaching may be construed as responsible charge of important engineering work.

Section 5. Compensation and Expenses. Each member of the Board shall receive the sum of twenty-five ($25.00) dollars per diem when actually attending to the work of the Board or any of its committees and for the time spent in necessary travel; and, in addition thereto, shall be reimbused for all actual traveling, incidental, and clerical expenses necessarily incurred in carrying out the provisions of this Act.

Section 6. Removal of Members for Cause. The governor may remove any member of the Board for misconduct, incompetency or neglect of duty. Vacancies in the membership of the Board shall be filled for the unexpired term by appointment by the governor as provided in Section 3. Before the governor can remove a member for cause, he must serve the member with a written statement of charges against him and afford him an opportunity to be heard publicly on such charges. If the member thus served does not request a public hearing within ten (10) days after service, the governor may proceed with his removal. If the member does request such a public hearing, it shall be heard by a special committee composed of three persons, namely: The Chief Justice of the Supreme Court of Louisiana, Chairman; the Dean of the College of Engineering of the Tulane University of Louisiana and the Dean of the College of Engineering of Louisiana State University. The recommendation of this Committee shall be binding upon the

governor. A copy of the charges, a transcript of the record of the hearing, and a copy of recommendation shall be filed with the Secretary of State.

Section 7. Organization and Meetings. The Board shall hold a meeting within thirty (30) days after its members are first appointed, and thereafter, shall hold at least four (4) regular meetings each year. Special meetings shall be held at such time and place as shall be specified by call of the Chairman or Secretary. Notice of all meetings shall be given in writing to each member by the Secretary. The Board shall elect annually from the membership the following officers: A chairman, a vice-chairman, and a secretary. A quorum of the Board shall consist of not less than four members. The board may appoint or employ an assistant secretary, executive secretary, treasurer, or other officers or employees not members of the Board, to whom clerical and administrative duties may be assigned. The Board shall fix the compensation of such persons. The Board shall be domiciled and maintain its principal office in the City of New Orleans and shall maintain its records at said principal office and shall hold its regular meetings there, unless in the discretion of the Chairman, it is necessary or convenient to meet elsewhere.

The present "State Board of Engineering Examiners" created by Act. No. 308 of 1908, as amended, shall continue in office and administer said Act No. 308 of 1908, as amended, and continued as Title 37, Sections 681-697 of the Revised Statutes of Louisiana of 1950 until such time as the State Board of Registration for Professional Engineers and Land Surveyors created under Section 3 of this Act shall have been appointed, met and organized. The Chairman of the State Board of Registration for Professional Engineers and Land Surveyors shall then notify each of the members of the State Board of Engineering Examiners of the time, hour and place of a joint meeting of both the old and new Boards. At this meeting the State Board of Registration for Professional Engineers and Land Surveyors shall formally receive and take over the custody and control of the records, funds and property of the State Board of Engineering Examiners, and, thenceforth the State Board of Engineering Examiners shall cease to exist or function and Title 37, Chapter 8, Sections 681-697 of the Revised Statutes of Louisiana of 1950 shall be repealed, effective as of that time as provided in Section 27 hereinafter.

Section 8. Powers of Board. The Board shall have the power to make, adopt, alter, amend and promulgate all by-laws and rules not inconsistent with the constitution and laws of this state, which may be reasonably necessary for the proper performance of its duties, and the regulation of the proceedings before it. The Board shall adopt and have an official seal.

Each member of the Board shall have power to administer oaths, and the Board have power to subpoena witnesses and compel the production of books and papers pertinent to any investigation or hearing authorized by this Act, and any employee of the Board engaged in making any investigation shall have the power to administer oaths to, and take the depositions of persons, pertaining to any investigation. The Board may require any law enforcement officer or any state agency, the sheriffs of the various parishes, or constables, marshals, or other law enforcement officers of any parish or municipality to serve such subpoenas and other process of said Board; provided, whenever parish, municipal or other local officers are required to serve such subpoenas or other process of the Board they shall be paid the same fees by the Board as are provided by laws for similar services under processes issued by district courts. Any person who shall fail to appear in response to a subpoena or to answer any question or produce any books or papers pertinent to any such investigation or hearing, or who shall knowingly give false testimony therein shall be guilty of a misdemeanor and subject to the penalties provided by Section 23 of this Act. In case of contumacy or refusal to obey a subpoena issued to any person, any district court of the State of Louisiana within the jurisdiction of which the inquiry is carried on, or within the jurisdiction of which said person guilty of contumacy or refusal to obey is found, or resides, or transacts business upon application by the Board, shall have jurisdiction to issue to such person an order requiring such person to appear before the Board, its member or agent, and to produce evidence, if so ordered, or there to give testimony touching on the matter under consideration or in question; and any failure to obey such order of court may be punished by said court as a contempt thereof.

Section 9. Receipts and Disbursements.

A. The secretary of the Board shall receive, disburse and account for all monies paid to or received by the Board. He shall institute a system of books and financial records satisfactory to the Supervisor of Public Accounts, who shall audit them annually. He shall open an account in a bank in the City of New Orleans designated by the Board as its official depository and he and one other officer of the Board shall both sign all checks disbursing funds of the Board. All disbursements of funds shall be approved by the Board. The secretary shall deposit all funds of the Board which he received in the bank designated as official depository within forty-eight hours after he receives such funds.

B. The Board may employ such investigators, clerical or other assistants as are necessary for the proper performance of its work, and may make expenditures from this fund for any purpose which in the opinion of the Board is reasonably necessary for the proper

performance of its duties under this Act, including the expenses of the Board's delegates to annual conventions of, and membership dues to, the National Council of State Boards of Engineering Examiners. The Board may, if it deems necessary or upon advice of the attorney general, hire counsel and investigators and pay traveling expenses thereof for the investigation and prosecution of any violator of this Act.

C. The Board may, at its discretion, pay any witness subpoenaed to appear before the Board fifteen dollars ($15.00) per diem when actually in attendance, including time spent in traveling not to exceed one day to and one day from the location of the Board meeting, and in addition,the Board may reimburse any witness for actual traveling expenses when furnished with proof of such expenses, including hotel, when witness resides in a parish other than the one in which the Board is meeting.

D. Under no circumstances shall the total amount of warrants issued by the Board in payment of the expenses and compensation provided for in this Act exceed the amount of the examination and registration fees collected as herein provided.

Section 10. Records and Reports. The Board shall keep a record of its proceedings and a register of all applications, which register shall show (a) the name, age, and residence of each applicant; (b) the date of the application; (c) the place of business of such applicant; (d) his educational and other qualifications; (e) whether or not an examination was required; (f) whether the applicant was rejected; (g) whether a certificate or registration was granted; (h) the date of the action of the Board; and (i) such other information as may be deemed necessary by the Board.

The records of the Board shall be prima facie evidence of the proceedings of the Board set forth therein, and a transcript thereof duly certified by the secretary of the Board under seal, shall be admissible in evidence with the same force and effects as if the original were produced.

The Board shall submit to the governor an annual report of its transactions of the preceding year by April 1st, and shall also transmit to him a duly certified audit and financial statement prepared by a Certified Public Accountant showing receipts and expenditures of the Board.

Section 11. Roster. A roster showing the names and places of business of all registered professional engineers, the branch of engineering in which professional engineers are registered, and all registered land surveyors shall be published by the Secretary of the Board during the month of April of each year. Copies of this roster shall be mailed to each person so registered and furnished to the public upon request, and placed on file with the Secretary of

State, and the libraries of all engineering colleges and universities in this State.

Section 12. Requirements for Registration.

A. General. The Board shall register each applicant in the branch or branches of engineering as specified herein, which may be requested by the applicant, when, in the opinion of the Board, and after the applicant has met the requirements of this Act, that applicant is proficient or qualified to practice.

Professional engineers will be issued certificates of registration in one or more of the following branches: Agricultural, Chemical, Civil, Electrical, Mechanical, Metallurgical, Mining, Petroleum.

The following shall be considered as minimum evidence satisfactory to the Board that the applicant is qualified for registration as a Professional Engineer or Land Surveyor, respectively.

(1) As a Professional Engineer:

a. Engineers—Graduation Plus Experience. Graduation in an approved engineering curriculum of four (4) years or more from a school or college approved by the Board as of satisfactory standing; together with the applicant's specific record of character, education and ability of a character satisfactory to the Board, and indicating that the applicant is competent to practice engineering, provided that in a case where the evidence presented in the application does not appear to the Board conclusive nor warranting the issuing of a certificate of registration, the applicant may be required to present further evidence for the consideration of the Board, and may also be required to pass an oral or written examination, or both, as the Board may determine; or,

b. Engineers—Experience Plus Examination. A specific record of eight years or more of experience in engineering work of a character satisfactory to the Board and indicating that the applicant is competent to practice engineering; and successfully passing a written, or written and oral, examination designed to show knowledge and skill approximating that attained through graduation in an approved four-year engineering curriculum;

c. Engineers of Long Established Practice. The Board shall register an applicant without written examination, who presents the written recommendations of five (5) or more Professional Engineers registered under this Act, and, who submits proof that he has had at least twenty (20) years of successful practice, satisfactory to the Board, not less than twelve years of which shall have been in the responsible charge of important engineering work.

(2) As a Land Surveyor:

a. Land Surveyors—Graduation Plus Experience. Graduation from a school or college approved by the Board as of satisfactory

standing, including the completion of an approved course in surveying; together with the applicant's specific record of character, education and ability of a character satisfactory to the Board, and indicating that the applicant is competent to practice surveying, provided that in a case where the evidence presented in the application does not appear to the Board conclusive nor warranting the issuing of a certificate of registration, the applicant may be required to present further evidence for the consideration of the Board, and may also be required to pass an oral or written examination, or both, as the Board may determine; or

b. Land Surveyors—Experience Plus Examination. A specific record of six years or more of experience in surveying work of a character satisfactory to the Board and indicating that the applicant is competent to practice land surveying and successfully passing a written, or written and oral, examination in surveying prescribed by the Board.

B. Character. No person shall be eligible for registration as a Professional Engineer, or Land Surveyor, who is not of good character and reputation.

C. Teaching Credits. In considering the qualifications of applicants, enginering teaching may be construed as engineering experience.

D. Education Credits. The satisfactory completion of each year of an approved curriculum in engineering in a school or college approved by the Board as of satisfactory standing, without graduation, shall be considered as equivalent to a year of experience in Section 12A (1) b or c. Graduation in a curriculum other than engineering from a college or university of recognized standing may be considered as equivalent to two years of experience in Section 12A (1) b or c, provided, however, that no applicant shall receive credit for more than four years of experience because of undergraduate educational qualifications.

E. Work as Contractor. The execution, as a contractor, of work designed by a professional engineer or the supervision of the construction of such work as a foreman or superintendent shall not be deemed to be a violation of Section 18. However, such work may be considered toward qualification required for registration under Section 12.

F. Nonpracticing Applicants. Any person having the necessary qualifications prescribed in this Act to entitle him to registration shall be eligible for such registration although he may not be practicing his profession at the time of making his application.

Section 13. Application and Registration Fees. Application for registration shall be on forms prescribed and furnished by the Board, shall contain statements made under oath, showing the applicant's education and detailed summary of his technical work,

and shall contain not less than five references, of whom three or more shall be registered professional engineers having personal knowledge of his engineering experience.

The registration fee for professional engineers shall be twenty-five dollars ($25.00), which shall accompany the application.

The registration fee for interstate registration, provided for in Section 19, shall be fifteen dollars ($15.00) and shall accompany the application.

The registration fee for Land Surveyors shall be fifteen dollars ($15.00) and shall accompany the application.

Should the Board deny the issuance of a certificate of registration to any applicant after written examination the fee deposited shall be retained by the Board. An unsuccessful applicant must pay the prescribed registration fee for each subsequent re-examination.

Section 14. Examination. When oral or written examinations are required, they shall be held at such time and place as the Board shall determine. When examinations are required on fundamental engineering subjects (such as are ordinarily given in college curricula) the applicant shall be permitted to take this part of the professional examination prior to his completion of the requisite years of experience in engineering work and satisfactory passage of this portion of the professional examination by the applicant shall constitute a credit for a period of ten years. The Board shall issue to each applicant upon successfully passing the examination in fundamental engineering subjects a letter stating that the has passed the examination and that the fact has been properly recorded. Any books, tables, calculating machines or other aids to which a practicing engineer would have access may be used by the applicant in the examination.

The scope of the examination and the methods of procedure shall be prescribed by the Board to determine the applicant's ability and educational qualifications to design and supervise engineering works in that branch of engineering in which he has studied and in which he has obtained his experience and for which he has applied for registration, so as to insure the safety of life, health and property. Examinations shall be given for the purpose of determining the qualifications of applicants for registration separately in engineering and in land surveying. A candidate failing on examination may apply for re-examination at the expiration of six months from the time he failed to pass the examination. Subsequent examination will be granted only upon payment of the prescribed fee.

Section 15. Certificates—Seals. The Board shall issue a certificate of registration in the branch or branches of engineering in which the applicant has qualified upon payment of the registration

fee as provided for in this Act, to any applicant who, in the opinion of the Board, has satisfactorily met all the requirements of this Act. In the case of Registered Land Surveyor, the certificate shall authorize the "practice of land surveying." Certificates of registration and certificates as Land Surveyor shall show the full name of the registrant, shall have a serial number, and shall be signed by the Chairman and the Secretary of the Board under the seal of the Board.

The issuance of a certificate of registration by this Board shall be prima facie evidence that the person named therein is entitled to all the rights and privileges of a Registered Professional Engineer, or of a Registered Land Surveyor, while the said certificate remains unrevoked or unexpired.

Each registrant hereunder may upon registration obtain a seal of a design authorized by the Board, bearing the registrant's name and the legend "Registered Professional Engineer in . . ." (insert the branch of engineering in whcih the registrant is registered), or "Registered Land Surveyor." All registrants engaged in the practice of engineering or land surveying either in a private professional practice or as an employee of a corporation, company, partnership, individual or other private employer shall impress with his official seal all plans, specifications, plats, maps, studies, reports or other drawings or documents which he shall prepare or which shall be prepared under his supervision.

All registrants who are employed by the State of Louisiana or some political subdivision thereof, or by a parish, city, municipality, or any department, branch or agency of the United States Government or any other public corporation, body or agency, may, if they wish, impress their seal upon all plans, specifications, plats, maps, studies, reports or other drawings or documents which they prepare in the practice of engineering or land surveying, but such use is not mandatory.

Section 16. Expirations and Renewals. Certificates of registration shall expire on the thirty-first (31st) day of the month of December each year following their issuance or renewal and shall become invalid on that date unless renewed. It shall be the duty of the Secretary of the Board to notify by letter to his last known address, every person registered under this Act of the date of the expiration of his certificate and the amount of the fee that shall be required for its renewal of one year; such notice shall be mailed at least one month in advance of the date of the expiration of such certificate. Renewal may be effected at any time during the month of December by the payment of a fee not to exceed ten dollars ($10.00) at the discretion of the Board for professional engineers, and not to exceed five dollars ($5.00) at the discretion of the Board for land surveyors engaged in private practice or employment.

The failure on the part of any registrant to renew his certificate annually in the month of December as required above shall not deprive such person of the right of renewal, but the fee to be paid for the renewal of a certificate after the month of December shall be increased ten per cent for each month or fraction of a month that payment of renewal is delayed; however, provided that the maximum fee for delayed renewal shall not exceed twice the normal renewal fee.

Section 17. Practitioners at time Act became effective.

a. Private practice. At any time within one (1) year after this Act becomes effective, upon due application therefor and the payment of the registration fee for Professional Engineers, the Board shall issue a certificate of registration in the branch or branches of engineering in which the applicant has been practicing, without oral or written examination, to any engineer who shall submit evidence under oath satisfactory to the Board that he is of good character, has been a resident of the State of Louisiana for at least one (1) year immediately preceding the date of his application, and was practicing or had the necessary qualifications to practice engineering at the time this Act became effective; provided, that the above provisions of this paragraph shall not apply to the practice of Civil Engineering or Land Surveying. All civil engineers and land surveyors who are at present registered under the civil engineers and surveyors licensing law, Title 37, Chapter 8, Sections 681-697 of the Revised Statutes of Louisiana of 1950, shall be registered by the Board as Professional Engineers to practice civil engineering or as Land Surveyor to practice land surveying in accordance with the registration they hold under the present law without examination or other investigation of any nature; and those so registered shall be issued certificates of registration immediately without charge and without the necessity of application therefor.

No other person shall be registered as a Professional Engineer to practice civil engineering or as a Land Surveyor to practice land surveying, without meeting all requirements of this Act and in particular Sections twelve (12) and thirteen (13 of this Act.

b. Public employees. Any person employed on a full time salary basis by the State of Louisiana or any of its political sub-divisions at the time that this Act becomes effective to perform duties requiring the practice of civil engineering may apply at any time within one year after this Act becomes effective for registration under the provisions of this Act, and the Board shall register such person, without examination, as Professional Engineer to practice in the branch of Civil Engineering upon the condition that such person restrict his practice of civil engineering to any work that he may do as an employee of the State of Louisiana, or one of its

political subdivisions, on a salary basis; provided that nothing in this Section shall be construed to permit any person registered as a public employee without examination on the basis herein provided to accept employment as a Professional Engineer on a fee or commission basis from any firm, person, or corporation or by the State of Louisiana, any of its political subdivisions, or by any parish, city, town, or other public body or agency. The initial registration as a public employee under this section shall be one dollar ($1.00). This registration shall be renewed yearly upon the payment of a fee of one dollar ($1.00).

c. After this Act shall have been in effect one (1) year, the Board shall issue certificates of registration only as provided for in Section 12 or Section 19 thereof.

Section 18. Public and Private Work.

a. Private Work. (1) Persons performing sub-professional work as defined in the rules or by-laws of the Board or construction or process superintendents or foreman need not be registered under this Act, but their work shall be supervised by a Registered Professional Engineer when their work involves the practice of engineering.

(2) It is not the intent of this Act that the planning, specifications, drawings or construction, in relation to the construction of a private home or dwelling, or by an individual of a domestic structure or work for his own use or any agricultural work done on farm lands shall come under the jurisdiction of this Act.

(3) This Act shall not apply to, affect, interfere with, or in anywise regulate employees of a person, firm, or corporation engaged in industrial operation, including, but not limited to, producing, processing, manufacturing, transmission, distribution, or transportation, when performing services in the course and scope of the business of said person, firm or corporation, or affiliates thereof; provided that this exemption does not apply to the practice of Civil Engineering or Land Surveying.

(4) All land surveying must be performed by a Registered Land Surveyor or Professional Civil Engineer.

(5) A person will not be construed as practicing land surveying who establishes lines and elevations for canals and levels for irrigation or errosion control on lands owned, rented or leased by him and when the person performing the work received no remuneration of any kind for professional services.

(6) Services performed by employees of persons, firms, or corporations in determining lines within established boundaries and between established corners of property owned by, leased to, or under the control of their employers in the course and scope of such employers business, and in locating drilling sites, lines of pipe, or

improvements on such property shall not be construed as falling under the definition of "Practice of Land Surveying" within the meaning of this act and are not covered by this act.

(7) Providing that nothing in this Act shall be construed as permitting any person other than a registered professional engineer to affix his signature as such to engineering plans, specifications or estimates.

Section 19. Interstate Registration. The Board may upon application therefor, and the payment of a fee of fifteen dollars ($15.00), issue a Certificate of Registration as a Professional Engineer to any person who holds a Certificate of Qualification or Registration issued to him by proper authority of the National Council of State Boards of Engineering Examiners, or of the National Bureau of Engineering Registration, or of any state or territory or possession of the United States or of any country, provided: (1) that the applicant's qualifications meet the requirements of this Act and the rules established by the Board; (2) that the applicant is in good standing with the licensing agency in said state or country, and (3) that said state or country will accept the certificates of registration issued by this Board on a reciprocal bases.

Section 2. Revocations.

a. The Board may receive and investigate complaints against Registered Professional Engineers and Land Surveyors, and make findings thereon.

b. By a majority vote, the Board may reprove (private or publicly), or may suspend for a period not to exceed two years, or may revoke the certificate of registration of any registrant hereunder:

(1) Who has been convicted of a felony.

(2) Who has been found guilty by the Board of any fraud, deceit, gross negligence, misrepresentation, violation of contract or gross incompetency in his practice.

(3) Who has been found guilty of any fraud or deceit in obtaining his certificate or violation of any provision of this Act.

c. The Board may act either upon its own motion or as the result of the filing or written charges, by any person or persons making a complaint against a registrant, with the Secretary of the Board.

d. All charges ,unless dismissed by the Board as unfounded or trivial, shall be heard by the Board within two (2) months after the date on which they shall have been preferred.

e. Before the Board shall suspend or revoke the registration of any Registered Professional Engineer or Land Surveyor as provided in Section 20b, it shall conduct a hearing as provided hereinbelow. Such hearing shall be public, unless the registrant requests in writing that it be private.

f. The time and place for said hearing shall be fixed by the Board, and a copy of the charges, together with a notice of the time and place of hearing, shall be personally served on or mailed by registered letter to the last known address of such registrant, at least thirty days before the date fixed for the hearing. At any hearing, the accused registrant shall have the right to appear personally and by counsel, to cross examine witnesses appearing against him, and to produce evidence and witnesses in his own defense. A written record, including the testimony of all witnesses, shall be made and filed by the Secretary.

Section 21. Reissuance of Certificates. The Board, for reasons it may deem sufficient, may reissue a certificate of registration to any person whose certificate has been revoked, provided four (4) or more members of the Board vote in favor such reissuance. A new certificate of registration, to replace any certificate revoked, lost, destroyed, or mutilated, may be issued ,subject to the rules of the Board, and a charge of five dollars ($5.00) shall be made for such issuance.

Section 22. Appeals. Any person who shall feel aggrieved by any action of the Board in denying, suspending or revoking his certificate of registration may appeal therefrom to the District Court of the Parish of Orleans, within sixty (60) days following the action of the Board. The aggrieved party in his petition to the District Court shall set out in what respect the adverse action of the Board was erroneous. After citation of the Board as provided by law, and full hearing, said court shall make such decree sustaining the action of the Board as may seem just and proper.

Section 23. Violations and Penalties.

a. Any person who shall practice, or offer to practice, engineering or land surveying in this state without being registered in accordance with the provisions of this Act, or any person presenting or attempting to use as his own the certificate of registration or the seal of another, or any person who shall give any false or forged evidence of any kind to the Board or to any member thereof in obtaining a certificate of registration, or any person who shall falsely impersonate any other registrant of like or different name, or any person who shall attempt to use an expired or revoked certificate of registration, or any person who shall violate any of the provisions of this Act, shall be guilty of misdemeanor, and shall, upon conviction, be sentenced to pay a fine of not less than one hundred dollars ($100.00) nor more than five hundred dollars ($500.00), or suffer imprisonment for a period not exceeding three months, or both. Any corporation, company, partnership, firm or business entity who violates any part of this Act shall be guilty of a misdemeanor and shall, upon conviction, be sentenced to pay a fine of not less than five hundred ($500.00), nor more than one thousand

dollars ($1000.00). Each day of violation shall be a separate offense.

b. It shall be the duty of the Attorney General, all District Attorneys, and all duly constituted officers of the law of this state, or any political subdivision thereof, to enforce the provisions of this Act and to prosecute any persons violating same. The Attorney General of this state or his assistant shall act as legal advisor of the Board and render such legal assistance as may be necessary in carrying out the provisions of this Act, provided, that this shall not relieve the local prosecuting officers of any of their duties under the law as such.

c. The Board is charged with the duty of seeing that the provisions of this Act are enforced and the Board shall investigate any complaint relating to the violation of any provision of this Act, and depending upon the result of such investigation, the Board shall present the facts of their findings to the District Attorney in whose district such violation has occurred and shall aid in the prosecution of the violator; or the Board may if it deems necessary, prosecute any violator directly and in its own name in any district court of this state. Such action may be instituted by any member, officer, attorney or agent of the Board.

Section 24. Saving Clause. This Act shall not be construed to prevent or to affect:

a. Other Professions or Trades. The practice of architecture as defined in Title 37, Chapter 3, Sections 141 through 160 of the Revised Statutes of Louisiana of 1950; or the practice of any legally recognized profession or trade; or the professional practice of the physical sciences, such as: Chemistry, Physics, Geology, Mathematics, so long as they do not involve the practice of engineering; or,

b. Nonresidents. The practice of a person not a resident of and having no established place of business in this state, practicing or offering to practice herein the profession of engineering or land surveying, when such practice does not exceed in the aggregate more than thirty days in any calendar year; provided, such person is legally qualified by registration to practice the said profession in his own state or country in which the requirements and the qualifications for obtaining a certificate of registration are not lower than those specified in this Act; and provided further, that before beginning such temporary practice in this state the person shall have applied to the Board and received a temporary permit, and upon the conclusion of such work he shall advise the Board as to the period of time that he has practiced in the state under such temporary permit.

c. Government Officers and Employees. The practice of officers and employees of the Government of the United States while en-

gaged within this state in the practice of engineering or land surveying, for said government.

d. Cooperatives Under the Rural Electrification Administration. Engineering performed by Cooperatives under the Rural Electrification Acts.

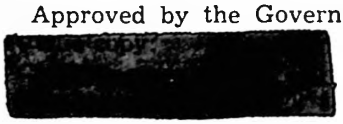
e. The practice of engineering exclusively as an officer or employee of a public utility corporation authorized to and doing business in this state, by rendering to such corporation such service in connection with its facilities and property which are subject to supervision with respect to safety and security thereof by the Public Service Commission of the State of Louisiana, or other duly authorized utility regulatory body and so long as such person is thus actually and exclusively employed, and no longer; provided this does not apply to the practice of Civil Engineering or land Surveying.

Section 25. Invalid Sections. If any Section or Sections of this Act or any clause, sentence, paragraph or other portion thereof shall be declared unconstitutional or invalid, this shall not invalidate any other section, clause, sentence, paragraph or portion of this Act.

Section 26. Effective Date. Sections 1 through 26 of this Act shall become effective at the time provided by law. Section 27 shall become effective at the time prescribed therein, which in no event shall be later than one hundred and fifty (150) days following the signature of the Act by the Governor.

Section 27. Repeal of Conflicting Legislation. All laws or parts of laws in conflict or inconsistent herewith, and the provisions of any municipal charter or city or parish ordinance contrary to the provisions of this Act, and especially and particularly Title 37, Chapter 8, Sections 681-697 both inclusive of the Revised Statutes of Louisiana of 1950 are hereby repealed and superseded effective as of the time that the records, funds and property of the Board of Engineering Examiners (provided by Act 308 of 1908, as amended) are transferred to the State Board of Registration for Professional Engineers and Land Surveyors, (created by this Act) as provided in Section 7 of this Act.

Approved by the Governor, June 30, 1950.



New Members:

FOR MEMBER

FELIX J. BOUDREAUX, Lafayette; age 33. Endorsed: H. R. Mason, R. E. Jenkins, G. G. Hughes. Southwestern La. Inst., B.S.E.E., 1941. Univ. of Ill., M.S.E.E., Jan. 1947. Field Engr., RCA, 1941-42. Field Engr., U.S. Army, 1942-43. Lt., U.S.N., 1943-46. Univ. of Ill., Graduate Asst. in Electronics, 1946-47. Southwestern La. Inst., Asst. Prof. E.E., 1947-date. Member Sigma Xi, IRE, ASEE.

A. M. BUJARD, New Iberia; age 45. Endorsed: A. J. Dubus, J. E. Jarman, H. R. Mason. Southwestern La. Inst., B.S.E.E., 1926. Gulf States Utilities, 1926-28. La. Public Utilities Co., Production Engr. Div. Supt., 1928-45. United Gas Corp., New Iberia, Division Supt., 1945-date. Member Southwestern Gas Ass'n., American Gas Ass'n.

DAVID J. CARVILLE, Baton Rouge; age 37. Endorsed: J. S. Burk, D. F. Latimer, R. A. Matherne. La. State University., B.S.M.E., 1938. Shell Oil Co., Draftsman, 1938. Gulf States Utilities Co., Layout Engr., 1938-39. Public Works Admin., Jr. Engr., 1939-40. E. I. Dupont Co., Project Engr., 1940-41. U.S. Army, Major, 1941-45. Barnard & Burk, 1945-date, Engineer.

LOUIS C. CHRISTIAN, JR., Baton Rouge; age 37. Endorsed: G. T. De La Matyr, H. L. Landry, A. J. Mary. La. State Univ., B.S.E.E., 1935. Gulf States Utilities Co., 1935-date, except 1941-47, U.S. Army, C.E. Present position, Asst. Personnel Director.

CLARENCE E. COPLAND, Shreveport; age 35. Endorsed: T. F. Cash, E. M. Freeman, J. P. McCullouh, Centenary College, courses in Trigonometry, Algebra and Surveying. Home studies in surveying and Engineering. U.S. Forest Service, land surveying, 3 years. United Gas Pipe Line Co., 14 yrs., now Sr. Inspector, Eng. Dept.

HERBERT E. DICKARD, Monroe; age 56. Endorsed: A. T. Givens, S. E. Huey, O. C. Roddey. La. Tech (L.I.I.) Mech. Eng.-no degree. Junior Engineer on various projects, 1912-22. Standard Carton Co., Chief Engr., 1923-26. Herbert E. Dickard & Co., Consulting & Construction Engrs., 1926-date.

HOMER FLYNN, JR., Maplewood; age 26. Endorsed: R. E. Burgess, G. L. Smith, G. B. Walther, Jr. La. Polytechnic Inst., B.S.C.E., 1944. U.S. Army 1944-46. Cities Service Refining Corp., Design Engr., 1947 to date.

JOHN R. GAUGLER, Lafayette; age 54. Endorsed: S. W. Elberson, F. C. Gault, H. R. Mason. Carnegie Inst. of Tech., BSEE, 1919. West Penn Power Co., 1919-20. Gannett, Seelye & Fleming, Consulting Engrs., 1920-26. Oklahoma Northern Utilities Co., Vice-Pres., Gen. Mgr., 1926-28. La. Public Utilities Co., Vice-Pres. chg. of Operations, 1928-46. Gulf Public Service Co., Inc., V. Pres. charge of New Business, 1946-date. Member IES.

JOHN W. HALE, Lake Charles; age 50. Endorsed: R. S. Clark, C. A. Jackson, E. M. Schwartz. Mich. State College, Graduate Mech. Engr., 1925. L. L. Massey Co., Estimating Engr., 1936-42. The Austin Co., Field Engr., Supt., 1946. H. K. Ferguson Co., Design Engr., 1946-47. Southern Alkali Corp., present employer.

WILLIAM C. HAMILTON, Baton Rouge; age 42. Endorsed: L. W. Harrell, E. A. Landry, H. L. Lehmann. Ark. State College, 2 yrs. Eng. completed 1932. I.C.S., completed courses in Design Reinforced Concrete and Steel, 1937 La. Dept. of Highways, Instrumentman, 1934-38. Miss. Dept. of Highways, Asst. Project Engr., 1938-40. U.S. Army, 1940-46. Ford, Bacon & Davis., Field Engr., 1948. Lr. Dept. of Highways, Asst. Dist. Maint. Engr., 1949-50.

SAMUEL J. HELFMAN, Baton Rouge; age 46. Endorsed: C. C. Barnard, A. J. Mary, R. A. Matherne. Mass. Inst. of Technology, B.S.E.E. 1924. Duquesne Lt. Co., Engr., 1926-41. Prack & Prack, Industrial Engrs., Asst. Chief Elec. Engr., 1941-43. J. A. Jones Const. Co. (Atomic Bomb Plant, Oakridge, Tenn.) Asst. Chief Elec. Engr., 1944-45. Barnard & Burk, Chief Elec. Engr., 1946-date. Member AIEE.

JOSEPH O. HERPIN, New Iberia; age 69. Endorsed: J. E. Jarman, J. H. O'Neill, R. A. Osborne. La. State Univ., BSME, 1902. City Mgr., Crowley, La., 1920-23. City Engr., Port Arthur, Tex., 1923-27. La. Dept. Highways, 1927-42. Supt. Water & Light Plant, Abbeville, La., 1942-49. La. Dept. Highways, Project Engr., 1949-date. Member La. Highway Engrs. Ass'n.

THOMAS F. HOLLENSHEAD, JR., Shreveport; age 33. Endorsed: J. S. Broyles, T. F. Cash, W. W. Wilson. La. Polytechnic Inst., C. E., 1936-38. United Gas Pipe Line Co., Eng. Dept., 1939-date, now Asst. Engr. charge construction of 12" pipe line near Austin and San Antonio, Tex.

JOHN H. HOUGH, Baton Rouge; age 47. Endorsed: H. T. Barr, W. H. Carter, R. L. Green. Manchester Tech., B.S. Eng., 1923. ICRR, Construction Engr. &Bldg. Inspector, 4 yrs. Baton Rouge Elec. Co., Rural Service Engr., 7 yrs. U.S.D.A., Photogrammetric Engr., 7 yrs. U.S. Army Air Force, 4 yrs. Southern Pine Ass'n., Field Engr, 2 yrs. LSU Instructor Agri. Eng., 2 yrs.

JOHN HENRY HUNTER, Lafayette; age 27. Endorsed: R. E. Jenkins, H. R. Mason, J. R. Troxler. Va. Polytechnic Inst., 1941-43. Univ. of Va., 1943-44, B.C.E. Harvard Univ., 1948-49, M.S.C.E. Civil Engr. Corps., U.S. Navy, 1944-46. Civil Engr. of OinCC Staff with Pacific Islands Engrs. (A&E Contractor) 1947-48. Southwestern La. Inst., Asst. Prof. of C.E., 1949 to date. Member Harvard Eng. Society, Lafayette Eng. Society.

HARDY M. JAMES, Monroe; age 62. Endorsed: A. T. Givens, S. E. Huey, K.C.P. Muller. U.S. Navy, Marine Steam Engineering, 9½ yrs. Ouachita

Iron Works, Machine Shop Supt., 6 yrs. Chief Engr. Ocean Going Steamship, 1½ yrs. Private practice (owner-manager machine shop doing industrial plant maintenance) 22 yrs. Member ASME.

ROY C. KETCHUM, New Orleans; age 45. Endorsed: E. M. Dunn, A. J. Negrotto, W. H. Scales. Univ. of Cincinnati, College of Eng.-Architecture, 2 yrs. USNR, CEC, Resident Officer in charge major war time construction in 11th N.D.; Officer in charge of C. B. Battalion, oversea stations; Public Works Officer at Dutch Harbor, Alaska, Midway Islands and Key West, Fla. Prior to 1943 for more than 15 yrs., Supt. of general construction, all types of projects in Ohio, Ind., Ill., Iowa and Canal Zone. Member SAME.

LOUIS C. LANDRY, JR., New Iberia; age 38. Endorsed: G. G. Hughes, M. E. Kirkpatrick, Jr., H. R. Mason. Southwestern La. Inst., BSEE, 1931. United Gas Corp., 1939 to date, now Div. Engr., New Iberia, La.

FRED E. LESHE, Maplewood; age 34. Endorsed: R. E. Burgess, W. M. Davis, V. E. Sicks. La. State Univ., Eng. 1934-1937. Great National Oil Corp., Pet. Engr., 1938-40. Talco Asplant & Ref. Co., Mt. Pleasant, Tex., Lab. Technician & C.E., 1940-42. U.S. Army Engrs., Denison, Tex., Jr. C.E., 1942-43. U.S. Army Air Force, Test Pilot & Maint. Engr. Officer, 1943-45. Cities Service Ref. Corp., Sr. General Engr., 1945-date. Former member SAME, Nat'l Aeronautics Ass'n.

CHARLES R. McBRIDE, JR., Lake Charles; age 34. Endorsed: C. A. Jackson, V. E. Sicks, G. B. Wooster. La. Polytechnic Inst., BSEE, 1940. United Gas Pipe Line Co., E.E., 1940-42 Consolidated Steel Corp., Orange, Tex., Asst. Engr., 1942-44. Firestone Tire & Rubber Co., Plant Engr., 1944-date.

E. A. MEAGHER, Shreveport; age 65. Endorsed: E. M. Freeman, F. W. Grant, H. L. Mitchell. Henry Kendall College, Muskogee, Okla., 1902-05. I.C.S., Eng. Course, 1907. Hold Cert. of Competency as Engr., issued by Okla. State Highway Comm., 1915. County Surveyor, Muskogee, Okla., 1906-10. Stone & Webster Eng. Co., Dallas, Resident Engr., 1910-12. Res. Engr., Sewer Construction, Polytechnic, Texas (now Ft. Worth) 1913. Sinclair-Cudahy Pipe Line Co., Prin. Asst. to Chief Engr., 1913-15. Chief Engr. for "Ringling Road", Ardmore, Okla., 1915-17. A.E.F. Enlistment, 1917-18. Wichita Falls Ranger & Ft. Worth Ry. Co., Res. Engr., Div. Engr., 1918-21. Atlas Oil & Ref. Corp., Chief Engr., 1921-49. City of Shreveport, Eng. Dept., 1949-date.

ALFRED G. MULLER, Sterlington; age 60. Endorsed: J. R. Horton, W. B. Jordan, R. T. Sessums. Ingenieurschule Ilmenau, Ingenieur, graduate 1909. National Box Co., Chief Engr., 1916-21. Commonwealth Edison, Mtce. Engr., 1921-28. La. Power & Light Co., Master Mechanic, 1928-date. Licensed Stationary Engr., City of Chicago.

JOHN V. MUTCHLER, Lafayette; age 30. Endorsed: R. E. Jenkins, H. R. Mason, J. R. Troxler. Cornell Univ., M.E., 1939-43. N.Y. Univ., (nights) Ac.E., 1944-45, 1946-48; B.S.Ac.E., May 1948. Univ. of Texas, 1948-49, toward M.S. in Ac.E. Consolidated-Vultee Aircraft Corp., 1943-44. Curtis Wright Corp., 1944-45, Research Engr., 1948-49. Univ. of Texas, Instructor Eng. Mechanics, 1948-49. Southwestern La. Inst., Asst. Prof. M.E., 1949-date. Member Tau Beta Pi, Inst. of Aeronautical Sciences.

WALTER I. NEEL, Monroe; age 57. Endorsed: S. E. Huey, R. T. Sessums, C. T. Watts. Purdue Univ., BSCE, 1915 Missouri-Pacific Rwy., Eng. Dept., 1915-17. AEF, Captain Artillery, 1917-18. Neel, Burroughs & McGee, Engineers, 1918-21. City Engr., Monroe, La., 1921-48. Private Practice General Engineering, 1948-date. Registered C.E., La. Member La. Inst. of Civil Engrs.

ELIHU H. NUTT, JR., Baton Rouge; age 38. Endorsed: C. C. Barnard, J. S. Burk, R. A. Matherne. Univ of Kentucky, 1929-34, BSME, BSCE. Barnard, Godat & Heft, Civil Engr., 1941-43. Godat & Heft, C.E., 1944-45. Barnard & Burk, Civil & Mech. Engr. in responsible charge, 1945-date. Registered C.E., La.

LOUIS R. OTTO, JR., New Orleans; age 34. Endorsed: L. J. Cucullu, G. E. May, J. S. Janssen. Tulane Univ., B.E., 1938. N.O. Public Service Inc., Power Engr.

KENNETH A. REES, Baton Rouge; age 35. Endorsed: F. A. Hannaman, Jr., F. J. Kring, J. T. O'Brien. Ill. Inst. of Technology, M.S.Ch.E., 1940. Esso Standard Oil Co., 1942-date Member A.I.Ch.E., Assoc. Sigma Xi.

FRANK E. REEVES, Baton Rouge; age 48. Endorsed: C. C. Barnard, J. S. Burk, R. A. Matherne. Mass. Inst. of Technology, SB, 1924; SM, 1925. Boston Edison Co., Elec. Engr., 1925-43. Electrical Apparatus Co., Sales Engr., 1944-48. Fay, Spofford & Thorndike, Boston, Power Plant Design Engr., 1948-49. Barnard & Burk, Senior Elect. Engr., charge of Power Plant Construction, 1949-date. Registered Prof. Engr., Mass. Member AIEE, IAEI, MSPE, NSPE.

FLOYD D. RICHARDS, Baton Rouge; age 32. Endsored: F. A. Hannaman, T. J. Innes, A. C. Matthies. Georgia Tech. Chem. Eng., 1938-43, 1946-47, B.S., M.S., U.S. Army, 1943-46. Esso Standard Oil Co., 1947-date.

JESSE D. ROBERTS, Baton Rouge; age 41. Endorsed: C. C. Barnard, J. S. Burk, R .A. Matherne. Miss. A & M College, 3 yrs. C.E. La. Dept. of Highways, Instrumentman, Squad Leader, Res. Engr., 1929-41. Chester Engrs., Pittsburgh, Pa., Senior Design Engr., 1941-43. Westinghouse Elec. & Mfg. Co., Construction Engr., 1943-44. Barnard & Burk, Consulting Engrs., Design Engr., 1945-date.

FRANK B. SONNIER, Lafayette; age 45. Endorsed: R. T. Brooks, J. E. Jarman, H. R. Mason. Southwestern La. Inst., BSEE, 1927. Gulf States Utilities Co., Meterman, Elec. Engr., Dist. Supervisor, 1929-date

WILLIAM B. SPALSBURY, Maplewood; age 35. Endorsed: V. M. Brown, C. A. Jackson, E. M. Schwartz. Univ. of Okla., BSEE, 1938. Okla. Gas & Elec. Co., Elec. Engr., 4 yrs. U.S. Civil Service, Chief Eng. Mtce. & Construction, 2 yrs. U.S.N., Radio Technician, 2 yrs. Southern Alkali Corp., Chief E.E., 3 yrs. Associate Member, AIEE. Registered Prof. Engr., Okla.

WILLIAM DORR WALTHALL, Lafayette; age 38. Endorsed: J. E. Jarman, F. R. Adams, F. F. Pillet. Tulane Univ., M & E. Eng., 1930-33. La. State Univ., C.E., 1933-35. Southern Bell Tel. & Tel. Co., 1937-date, now District Engr., Lafayette Dist.

AUBREY D. YOUNG, Lebanon, Pa.; age 49. Endorsed: G. G. Hughes, R. E. Jenkins, H. R. Mason. Vanderbilt Univ., B.E. in C.E., 1926. Washington College of Law, 1934-38. Kentucky State Hwy. Dept., Instrumentman, 1926. City Engr. Office, Memphis, Designer, 1926-27. Am. Bridge Co., Structural Details, 1927-28. Mt. Vernon Bridge Co., 1928-30. N.Y. State Dept. Public Works, 1930-33. Free lance engineering, 1933-34. Fed. Govt. Procurement Div., Asst. Engr., 1934-36. Private practice, 1937. Penna. Turnpike Comm., 1938-40. Gilbert Associates, 1940-45. Sanderson & Porter, N. Y., 1944-46. Private practice, Lebanon, Pa., 1946-date. Licensed N.Y., Pa., La. Member ASCE, A.C.I., Penn. Society of Prof. Engrs.

FOR TRANSFER FROM JUNIOR TO FULL MEMBER

PAUL A. McKIM, Baton Rouge; age 27. Louisiana State University, B.S. Ch.E., 1944; M.S.Ch.E., 1947; Ph.O. Ch.E., 1949. La State University, graduate assistant in Dept. of Chem. Eng., December 1943-March 1944; June-September 1946. U.S. Naval Reserve, active duty, 1944-46. Gaylord Container Corp., Research Fellow, Sept. 1946-May 1949. Ethyl Corp., Baton Rouge, Profess Design Engr., 1949 to date.

FOR AFFILIATE MEMBER

FRED N. BANKER, Gonzales, La.; age 48. Endorsed: J. A. Brown, J. E. McAdam, E. F. Oakley. La. College, Elec Eng., 1916-18. The Telephone Engineering College, 2 yrs. Southern Bell Tel. Co., Telephone Engineer, outside construction, 1919-31. La. Power & Light Co., outside construction, 1930-34. U.S. Coast Guard Signal Corps, 1942-45. Private practice of telephone engineering with Gonzales Telephone Exchange, 1945-date.

LYNN P. FOURNET, St. Martinville; age 29. Endorsed: R. E. Jenkins, H. R. Mason, J. R. Troxler. U.S.N.T.C., Basic engineering, Advanced Diesel. Small Craft Diesel Engineering, 1944. Southwestern La. Institute, Mech. Eng., 1946-48. U.S. Navy, Diesel Instructor, 1944-45. Southwestern La. Inst., Laboratory Instructor, 1946-date. Standard Oil Co. of La., Mach. App.-Machinist, 1942-44.

ROBERT GATES, Fairbanks; age 26. Endorsed: C. E. Dickey, W. B. Jordan, K. C. P. Muller. Northeast Jr. College, Radio Tech Course, 1942-43. U.S. Navy, Mtce. & Repair, 1943-46. La. Power & Light Co., Installation, Maintenance & Repair of Power House Controls & Instruments, over 3 yrs. Licensed pilot.

WALTER A. GEHRKE, New Orleans; age 38. Endorsed: E. M. Dunn, W. E. Douglas, Jr., A. J. Negrotto. Lane Technical High, Chicago, Architecture, 1928-32. U.S. Navy, Chief Eng. Draftsman, 1942-43; Res. Engr. charge construction, 1943-44. Neo Eng. Co., Consulting Engrs., Partner, 1944-48. U.S. Navy, C.E., Field Branch Mgr. of Inspection Div., 1948-date.

A. C. (BOB) LINDSAY, JR., Shreveport; age 39. Endorsed: C. B. Foster, Jr., F. W. Grant, H. L. Mitchell. Centenary College, night course in C.E., 1943-44. Also studied I.C.S. Engineering. City of Shreveport, Inspector, Instrumentman, Party Chief, Chief Inspector, 1940-date.

WILLIAM D. TABOR, Thibodaux, age 31. Endorsed: T. T. Chenet, E. E. Guillot, Jr., J. E. Jarman. La. State Univ., C.E., 1938-40. La. Dept. of Highways, Rodman, summers 1939-40; Jr. Instrumentman, 1941-43. La. Dept. Public Works, Party Chief, 1947-49. La. Dept. Highways, Party Chief, 1949 to date.

ROBERT E. TORREGROSSA, Bogalusa; age 31. Endorsed: M. R. Guell, C. J. Mayeux, J. E. Wallace. Southeastern La. College, B.A., 1940. I.C.S., Mech. Eng. course 90% completed. Gaylord Container Corp., Machinist, 7 years.

JAMES S. WARREN, Lafayette; age 35. Endorsed: F. R. Adams, T. J. Hogue, J. E. Jarman. N. E. Center of L.S.U., 2 yrs, 1932-34. La. Polytechnic Inst., Elec. Eng. 1½ yrs., 1934-36. Southern Bell Tel. & Tel. Co., 1938-42 and Jan. 1946 to date.

FOR JUNIOR MEMBER

LINDSEY J. AUCOIN, Shreveport; age 23. Endorsed: E. M. Gillen, E. S. Heim, R. H. Vaughan. La. Polytechnic Inst., BSCE, 1949. La. Dept. of Highways, Sr. Instrumentman, Party Chief, 1949-date. Licensed C.E., La.

ALEXANDER B. BELL, Broussard; age 27. Endorsed: T. J. Hogue, Jr., F. R. Adams, R. J. Meyer. U.S. Army Air Force, 1940-45. Southern Bell Tel. & Tel. Co., Trainee-Jr. Engr., 1945-date.

JAMES H. BOOKSH, JR., Lake Charles; age 28. Endorsed: R. E. Burgess, E. H. Goodloe, G. G. Hughes. La. State Univ., Petroleum Engineering, 1938-40. Southwestern La. Inst., 1940-43, 1946-47, BSCE. United Gas Corp., New Iberia, Engineer, 1947-49; Lake Charles, Dist. Engr., 1949-date.

RAGAN C. DEFREESE, Lafayette; age 27. Endorsed: B. T. Bogard, J. E. Jarman, R. T. Sessums. La. Polytechnic Institute, 1940-43 and 1946-48, E.E. Southern Bell Tel. & Tel. Co., Jr. Engr., 1949-date.

PIERRE L. DELCAMBRE, New Iberia; age 27. Endorsed: R. E. Jenkins, H. R. Troxler. Southwest La. Inst., BSEE, 1948. United Gas Corp., New Iberia, Engineer, 1948-date.

CHRISTOPHER H. HALL, Baton Rouge; age 30. Endorsed: F. A. Hannaman, Jr., T. J. Innes, Jr., C. S. Pugsley. Va. Polytechnic Inst., BSME, 1949. Esso Standard Oil Co., Project Design & Coordinating Engr., 1949-date. Member ASME.

ROBERT M. HARRISON, Lafayette; age 31. Endorsed: F. R. Adams, T. J. Hogue, C. U. Schexnailder. La. Polytechnic Inst., 1935-37. Southwestern La. Inst., 1938-40. Armed Forces Institute, 1941-44, BSEE. Southern Bell Tel. & Tel. Co., Engineer, 1947 to date.

EMILE J. LeBLANC, Lafayette; age 28. Endorsed: R. E. Jenkins, H. R. Mason, J. R. Troxler. Southwestern La. Inst., Mech. Eng., 6-2-46 to 5-28-48. Univ. of Houston (D.M.E.), 6-3-48 to 9-30-49. B.S. Gas Combustion Engineering, 1942-45. Diesel Maintenance Engineering, Oct. 1949 to date.

DAVID P. LEVY, New Orleans; age 27. Endorsed: Neville Levy, W. P. Oster, Frank Riess. Tulane University, Mech. Eng., 1940-41. U.S. Naval Academy, BSEE, 1941-44. U.S. Navy Officer, 1944-48. Equitable Equipment Co., Marine Engr. & Architect, Nov. 1948-date.

WILLIAM A. MASSIMINI, New Orleans; age 29. Endorsed: A. W. Betz, J. V. Dugan, R. L. Gilbert. Univ. of Arizona, BSME, 1949. Gulf Engineering Co., Inc., Asst. to President, Marine & Industrial Engineering, present position. U.S. Coast Guard duty, 4 yrs. Mechanical practice in machinery installation and repair, approx. 6 yrs. Student member ASME.

CLARENCE A. PECORARO, Maplewood; age 24. Endorsed: V. M. Brown, R. S. Clark, C. A. Jackson. La. State Univ., BSEE, 1947. Southern Alkali Corp., 1947 to date, present position, Elec. Design & Field Engr.

SAM A. PHILLIPS, Shreveport; age 26. Endorsed: E. M. Freeman, L. M. Odom, W. P. Wallace. La. State Univ., BSCE, 1949. United Gas Pipe Line Co., Aug. 1949-date. Member Sigma Tau Sigma, Tau Beta Pi, Phi Kappa Phi. Licensed C.E., La.

JAMES A. STELLY, Baton Rouge; age 24. Endorsed: H. L. Landry, D. F. Latimer, F. J. Warren, Jr. La. State Univ., BSEE, 1949. Gulf States Utilities Co., Jr. Lighting Engr., 1-1-50 to date. Member IES.

JAMES E. ST. GERMAIN, New Orleans; age 26. Endorsed: H. R. Davies, Jr., Felicien Perrin, J. E. Morehiser, Jr., Tulane University, Freshman Engineering, 1940-41. Mass. Inst. of Technology, Aero Engineering, 1941-44, B.S.Aero Eng. USN Aviation Officer, 1944-46. Glenn L. Martin Co., Jr. Aerodynamicist, 1946-47. Simplex Mfg. Co., Development Engr., 1947-date. Member Institute of Aero Sciences.

LEE ROY TILL, Shreveport, age 21. Endorsed: Chris Demopulos, E. M. Freeman, C. A. Frey. La. State Univ., BSCE, 1949. F. P. Joseph & Associates, Consultants, Alexandria, Sept.-Oct. 1949. Builders Supply Co., Inc., Shreveport, Civil Engr., Oct. 1949-date. Licensed C.E., La.

BOBBY R. VOTAW, Baton Rouge; age 23. Endorsed: J. A. Ellis, H. L. Landry, A. M. Melancon. A & M College of Texas, BSEE, 1949. Gulf States Utilities Co., Sept. 1949-date. Member AIEE.

JUNIOR MEMBERSHIP AWARD WINNERS

JOSEPH L. BALCH, graduate in Electrical Engineering at Southwestern Louisiana Institute.

CHARLES W. GORTON, graduate in Mechanical Engineering at Louisiana Polytechnic Institute.

FRANK R. GROVES, JR., graduate in Chemical Engineering at Tulane University.

HERBERT P. REINSCH, graduate in Mechanical Engineering at Louisiana State University.

FOR TRANSFER FROM STUDENT TO JUNIOR MEMBER

PAUL BERCEGAAY, ALBERT CREWS, JAMES FAYARD, graduates of Southwestern Louisiana Institute in Chemical Engineering.

GEORGE J. GLAUBRECHT, GERALD M. GOSSEN, WALLIS J. MORGAN, M. A. STEELE, graduates of Southwestern Louisiana Institute in Civil Engineering.

AUSTIN ARDOIN, JOSEPH L. BALCH, ELLIS L. BEGNAUD, CLEVELAND J. BERGERON, JR., CLAIBORNE J. DUHON, CHARLES GIBSON, WILLIAM M. HOWE, JAMES O. LYSOGHT, GEORGE P. MORESI, JOHN H. PERE, LEONARD J. ROMERO, ROBERT E. SEILEY, CECIL S. SONNIER, CHARLES SELLERS, JOHN C. UPTON, graduates of Southwestern Louisiana Institute in Electrical Engineering.

RAYMOND W. BABAZ, JOSEPH G. BENOIT, DEWEY D. BILLODEAU, LEE J. BLANCHARD, T. A. BRASSETTE, CESIR J. DECAREAUX, L. M. FALCONER, MELVIN S. FISHER, J. W. FLESHMAN, CHARLES R. HENRY, RICHARD L. JOHNSON, CALVIN B. KLOTZ, WALTER A. LANDRY, JOSEPH C. MEHRHOFF, EDWIN W. MEYERS, ALEXANDER McCOOL, CHARLES F. NEGLEY, RIDLEY A. NAQUIN, JOHN A. NEPUEUX, FRED J. PAUL, LARRY F. REYNAUD, FRANK ROBERT, JR., VERNON O. SIBILLE, JAMES A. TOCHO, JOHN R. TOCHO, JR., ROY J. WASKO, grdauates of Southwestern Louisiana Institute in Mechanical Engineering.

FOR STUDENT MEMBER

DONALD T. BOUMANS, Chemical Engineering Student at Southwestern La. Institute.

WALTER EDWARD TANNER, Chemical Engineering Student at Southwestern La. Institute.

RAYNAUD J. THIBODEAUX, Civil Engineering Student at Southwestern La. Institute.

Papers and Discussions

THE USE OF COLOR IN INDUSTRY*

Our topic for discussion is the use of color in industry. You will agree that management today is trying to increase production, improve quality, reduce absenteeism, improve employee-management relations, and also to reduce accidents. In general, you of management want to reduce costs and to increase profits. My colleague and I sincerely believe that this can be accomplished to a large extent by the proper use of color in a plant, regardless of the product being manufactured.

In the industrial application of color we will often speak of color conditioning, a word coined by DuPont. By color conditioning, we mean the scientific use of color to achieve a desired result. It is not the haphazard use of color to make a plant look like a circus, as many people believe, but rather the use of color to perform a definite job and act as an additional worker.

The selection of the right colors to do the right job at first appears to be rather abstract, but upon closed examination and study it becomes a scientific task usually requiring the assistance of a color conditioning engineer, who must be an engineer, in every sense of the word, as well as a psychologist, an illumination expert, and an opthalmologist.

Now, in the actual selection of colors to be used, we can break the job into two parts, namely, the colors to be used on the floors, walls, and ceilings, and secondly, the colors to be used for safety coding. The first of these jobs is definitely the largest, not only in volume, but also in the number of factors that must be considered. There is no set rule for determining the exact color to be used but each individual case must be weighed separately and after all factors have been taken into account, the proper color chosen. For example, in painting the ceiling, we must first ask ourselves what we want the ceiling to do. If indirect lighting is used, we want the maximum amount of light reflected, so this would suggest using a color with a high reflective value, say 90%; in other words, white. If we had direct lighting, we could use a paint with reflective value that was equal to or greater than the floor so that the light reflected from the floor would be reflected from the ceiling. However, you can easily see that the higher the reflective value of the ceiling, the more efficient is our lighting. Since most plants today use direct lighting, the general trend is to make the ceiling and all the beams, ducts, and equipment in the ceiling blend in to-

* By Jesse E. Hart and John S. Vernor, engineering students at Louisiana State University. Presented at the regular meeting of the Society May 8, 1950.

gether and be of a recessive nature. This can be accomplished by using the same color on all of these pieces of equipment and the ceiling. To further recede them it is advisable to use either the same shade of color as the walls or one lighter than that used on the walls. Next comes the task of deciding which is the more important, the recession of the ceiling and equipment or the most effective utilization of light. This is something that can only be determined by a close study of an actual plant. The same is true with the choosing of colors for walls and floors. The color is dependent on the results that one wants to obtain.

Next, we must choose a safety color code and standardize it throughout the plant so that one color will have the same meaning throughout the entire plant. There are many such codes on the market today, the most notable being a Safety Color Code for Industry that offers the following advantages to industry:

(1) It specifies certain colors as the basis for a uniform, effective safety program.
(2) It establishes the association of a particular color with certain specific devices or conditions.
(3) It indicates the location of hazards and protective devices and thus enables the worker to guide his actions accordingly.
(4) It assists in the maintance of proper working conditions, encourages good housekeeping, orderly arrangement, and keeps employee morale at a high level.

In general, it specifies the following colors for the following uses:

(a) Yellow and black stripping to indicate striking against, stumbling, falling, or tripping hazards.
(b) Orange to mark parts of machines or equipment that might cut or crush a worker.
(c) Red to identify fire fighting equipment.
(d) Blue to warn workers against electrical switches and outlets.
(e) Green to mark first aid equipment and other safety devices.
(f) White and grey or black to mark aisles, storage places and waste receivers.

The Industrial Engineering Laboratory at L.S.U. is an example of good color conditioning. It employs the use of white enamel, semi-gloss on the ceiling to take full advantage of its reflective value about 90%. This helps reflect the natural light that comes through the large windows downward to the working areas. It also re-reflects the light which is reflected upward by the floor which is painted a medium gray. The gray was chosen because of its ability to show up grease spots and other results of bad housekeeping, yet not look constantly dirty from normal walking. Another reason for the choice of gray is its reflective value of 35% which meets the requirement set up by illumination engineers. This may

be a little low as floors with up to 85% reflective value have been used without being obnoxious, but this has been most effective in clerical offices where cleanliness is a maximum. A light and medium green were selected for the upper and lower half of the walls respectively. The reflective value was about 40% to 60%. Medium green was used on the lower wainscoat because it was felt that a darker green along the lower part of the wall would be more practical than the lighter in resisting soiling. However, the lighter green had a higher reflective value, so a compromise was made and the resulting light and medium greens were used on the upper and lower halves of the wall.

The machines were given "three dimensional seeing," depth, height and width by spotlighting the working area with a light buff. The main body of the machines were painted gray. To complete the color conditioning, the machines were placed so that when the worker looks up he can rest his eyes on a medium and light green wall.

Ventilation engineers are also benefited particularly by the results of an engineered color scheme. If employees do not keep their work areas clean and neat, trash and dirt accumulate, causing abnormal density of dust particles in the air. This naturally will have a detrimental effect upon the ventilation system.

One of the most notable results of color conditioning is the reduction of accidents. In the average shop today, the machine, the material and the surroundings are all camouflaged into one mass. This is eliminated by color conditioning and therefore accidents are reduced. The use of safety colors in identifying dangerous and safety devices also plays an important part in reducing accidents.

An increase in production is usually recognized with the color conditioning of a plant. It is a result due to reduction in seconds or rejects, decreases in accidents and increase in employee morale.

Now that we have seen some of the benefits that can be derived from color conditioning, we will take a look at some of the applications used for achieving the best working results. The first is that when color discrimination is necessary, a simulation of daylight is desirable but this can be over done. There is evidence that ordinary incandescent light (yellowish) is the most satisfactory. If one is to choose between a bluish tint and a yellowish tint, the latter is psychologically superior. Secondly, color in decorated and painted surfaces may be just as distracting as it is pleasing. The colors of the walls, machines, and background should obviously never be too pure or saturated. Light tones, pale in hue, are almost always best. Where distraction is desirable, as on a guard, a danger signal, or marking, the attention value of saturated hues may be sought. Here yellow, orange and yellow green have higher visibility than the conventional red and therefore should be used.

When the general feeling of an interior is cold, a warm tone, such as red, orange, or yellow, may be preferable. When the interior seems "stuffy" and "hot", a cool tone, such as blue and green, is usually indicated.

The painting of merchandising establishments offers an interesting commentary on the use of color to take advantage of any given climatic conditions. In cool climates customers prefer "cool" building exteriors, "cool" merchandise and warm interiors. In southern locations the reverse is true.

Although red and blue are the most popular of all colors, it is also true that warmer hues are generally preferred in regions having much sunlight. Cool hues, on the other hand, are preferred where there is relatively higher proportion of cloudiness.

In product merchandising, bright colors and warm colors will almost always sell better where there is an abundance of sunlight. The element of sunlight, in fact, seems to have a more dominant influence than climate itself. In contrast, soft colors and cool colors are highly acceptable in regions where the hours of sunlight are relatively few. Commercial building exteriors may advisedly be designed in colors that hold unmistakable appeal in any given region; warm colors in the south, cool colors in the north. Here color may be effectively used for its merchandising value in prompting active local acceptance. However, in the application of color to interiors, a reverse policy may be followed, cool hues being used to compensate for relatively intense sunlight, and warm hues being used for cooler regions.

The visibility of colors is of greatest importance where advertising signs and accident and safety locations are to be made highly noticeable. Several factors enter into color "visibility". When it comes to single objects, a bright color is generally more readily visible than a dull one. Naturally, yellow is the color of highest visibility, although yellow green holds advantage when the eye is dark adapted.

As to signs and devices, tests show black on yellow to be far superior to all others. And since readability is primarily a function of large difference in brightness, color contrasts itself has little significance. Combinations of red and green, or red and blue, rank very low in legibility.

When words and designs are to be made conspicuous, the following combinations are best in the order listed:

Black on yellow; green on white; red on white; blue on white; black on white.

It will be noted that these combinations all show dark letters on light backgrounds. The advantage of this is that the light color being the one most readily seen and occupying the greatest area, will command the greatest notice. Reversing these combinations,

that is yellow on black, white on green, etc. tends to decrease the attention value of the sign for the reasons explained.

Generally speaking, however, almost any combination of hues will be readily seen provided extreme darkness is contrasted against extreme lightness. Bear in mind in this connection that the eye will nevertheless focus more sharply on red orange, and yellow than it will on blue or green.

An understanding of the principles of size, dimension and weight in color makes it possible to have small areas look larger or large areas seem smaller. Color can be applied so as to appear to raise or lower ceilings. It has been proven by psychology that even tote boxes for carrying an accumulation of heavy objects can be made apparently easier to lift if they are painted yellow or light green.

One of the prime considerations of management today is the labor supply. Pleasant surroundings help to lift employee morale. When people are happy with the working conditions they will not be going on strikes as often because they will feel that management has the employees' interests at heart and, if possible, they will receive all the benefits that they are entitled to. They will work harder and a spirit of cooperation will exist between the employee and employer. When this condition exists costs are reduced; employees submit time saving practices to the employer, and management and labor can then bargain in good faith. If a scientific plan of painting is used, then a smaller inventory of paint can be utilized safely by the company. The result of decreasing the inventory of paint will free capital that can be used for research or revert back to the workers for additional benefits. This money that is freed can also be used to help pay some of the old age security benefits that have been derived by workers through "Acts of Congress," by bargaining, or by strikes in this new age—the "age of security."

In any industrial plant, it is axiomatic that good housekeeping on the part of the employees is the most effective way in which maintenance costs can be kept at a minimum. Plant after plant has found that an engineered color scheme will induce employees to keep their work areas clean. Speaking of this type of benefit derived from the scientific use of color, in repainting the compressor stations of the Arkansas Louisiana Glass Company, W. E. Nestor, Superintendent, stated, "This assortment of colors definitely has a psychological effect upon a workman. Certain of these colors impart a cheerfulness. The walls provide eye rest surfaces and induce a sense of restfulness. Undoubtedly a desire and a sense of good housekeeping was also born with the color scheme, for workmen in the shop now keep it spic and spotless. Every man agrees that he can do more with less fatigue and that the shop is just as effective and safe at 4:00 p. m. as it is at 9:00 a. m."

CORROSION IN REFINERY HEAT EXCHANGER AND CONDENSER EQUIPMENT*

Corrosion is a subject of interest to all industry, and particularly to the petroleum industry because of the multiplicity of complicating factors which arise in the process streams of the refineries. A little known fact by the consumer of petroleum products is that 10% of the cost of gasoline or fuel oil at the refinery can easily be charged off to corrosion costs.

Although it is not my intention to go into detail on the cost angle it might be well to consider where these costs arise.

The cost of corrosion today in the petroleum industry goes far beyond the cost of equipment destruction, replacement, and maintenance.

1. Equipment replacement or repair needs no elaboration other than to say that the frequency depends on the type of exchanger equipment, crude oil, and cooling water being used.

2. Lost time through shut-downs owing to replacement or repairs means shifting of employees to other duties for the duration of repairs, which is costly to the refinery.

3. Inspection and maintenance offer one of the first barriers to corrosion damage but involves large labor costs.

4. Cost of corrosion prevention is a large cost in itself as it has to do with treatment of process streams with corrosive inhibitors, such as chromates, phosphates, silicates and various kinds of organic agents. Cooling waters are inhibited with such agents as phosphates and alkalies. The corrosive resistant coatings, such as stainless steel and monel claddings have come into their own. The use of alloy metals for specific excessive corrosives has long been known and used. Cathodic protection, sacrafically, by the use of magnesium, aluminium, and zinc or by superimposing a direct electrical current, is being used in many heat exchanger installations today.

5. Loss of conveyed or processed material occurs undectectably in many instances inside exchanger equipment and is a cause for lost efficiency and contamination of finished products.

6. Heat and power to maintain flow: One of the important factors that determines the rate of flow of fluid or heat through a pipe, condenser, or heat exchanger is that of surface conditions. A smooth clean surface decreases friction loss and possesses a more favorable film for flow of heat. If the surface of the metal has become rough, pitted, or covered with corrosion products, the fluid

* By George Lambousy, engineering graduate of Tulane University, presented at a regular meeting of the Society, May 8, 1950.

flow rate and heat flow rate will be greatly reduced, resulting in increased energy requirements and costs.

7. Lastly, considerable money has been spent on the research, testing, and development of means to counteract corrosion. Many of these costs have been compensated with tangible results, for example, by the use today of the Shell Probolog, an electronic device for the detection of defects in condenser and heat exchanger tubes. Prior to this if a number of tubes in a heat exchanger or condenser were found defective, many plants followed the safety first custom of scrapping the entire piece of equipment on the assumption that what had happened to a number of tubes must have happened to all of them operating under the same conditions.

All of these considerations go to make up what is meant by the cost of corrosion today in the industry.

One is tempted to derive general rules from the study of refinery corrosion and is continually thwarted by the next set of test rules.

One general rule that holds, however, is that the character of corrosion changes with the presence or absence of liquid water which is equivalent to saying that above some temperature level one type of corrosion will take place while below this level another type will occur. Beyond this, few general rules seem to apply.

One should be cognizant of the fact that petroleum or the refined products are not corrosive in themselves. However, many crudes contain some impurities such as water, salt, oxygen, carbon dioxide, and sulfur, which are detrimental to the metals of construction. These components, when subjected to high temperatures in the distillation plant, react forming compounds which are even more detrimental to the pipes of the still, fractionating column, and tubes of the condensers and heat exchangers.

During the later stages of refining, use of sulfuric acid and HF contributes to further costly corrosion.

I will discuss water side corrosion in exchanger equipment only briefly because this difficulty is not peculiar to the petroleum industry. However it can be said that all factors favoring a cell type of attack are present. This type of attack may be directed and controlled to some extent by the variables of aeration, temperature, and velocity. The most vigorous waterside corrosion is found in plants utilizing coastal brackish waters, and takes the form of dezincification, pitting, and impingement attack, particularly when admiralty metal tubes are being used.

On the oil side conditions are rarely favorable to galvanic effects due to dissimiliar materials. Elemental oxygen is absent and rarely does a suitable deposition of electrolyte exist. Except under unusual conditions of acid concentration, absence of oxygen is very important in suppressing galvanic affects.

Some of the more corrosive agents to be found in process streams are sulfur compounds, Hydrochloric acid, sulfuric acid, hydrofluoric acid, naphthenic acids, phenol compounds, and water.

Hydrogen sulfide and mercaptan sulfur, determined by dry distillation of the crude, are of about the same order of corrosiveness, and for convenience can be considered together as "Corrosive Sulfur" or "Distillation Sulfur." At high temperatures and a crude with greater than 0.38% Sulfur, this type of corrosion is controlling, attacking steels above 500 degrees F. Resistance above this temperature is found in chromium containing alloys. The 4-6% chromium containing steels are the most widely used; however, sulfur corrosion resistance progressively increases with addition of chromium up to 20%. Molybdenum is added to alloys containing up to 10% chromium to prevent temper brittleness at high temperatures. Nickel, associated with chromium in alloys of the austenitic non-magnetic group, enhances corrosion resistance of the high chromium alloys and improves load carrying properties at elevated temperatures. For lower temperatures where liquid water is found, chromium-containing alloys lose some of their importance and non-ferrous alloys, such as nickel, monel, brass, and the special alloys, Hastelloys, LaBour, Worthite, and Pioneer metal take over.

Sulfur dioxide forms a very corrosive solution in water and type 316 stainless steel (18% Cr.—8% Ni—3% Mo) is used to combat the corrosive attack.

A combination of sulfide and hydrochloric acid corrosion is much more severe than sulfide corrosion alone. As partial alleviators of this, refiners have found that careful settling of brime from crude oil is helpful and that ammonia in the condenser system may also be helpful if the concentration is carefully controlled.

In Thermofor catalytic cracking the main corrosives have been hydrogen sulfide and ammonia formed during the cracking process. This has led to crack failures of admiralty metal tubing in condensers, principally in depropanizer and debutanizer systems. 70-30 cupro-nickel tubes are now on trial as an alternate for admiralty.

In spite of the many sulfide resistant alloys it is not yet economical to utilize them to the fullest extent and a typical setup for a low sulfur crude at temperatures below 500 degrees is a cast iron shell with admiralty tubes and naval bronze tube sheets. Steel shells with admiralty metal tubes and naval bronze tube-sheets or steel tube-sheets with admiralty tubes have shown severe corrosion under the same conditions.

Hydrochloric acid evolution is a measure of the acid that will be formed during steam distillation under prescribed conditions. Hydrochloric acid is one of the most corrosive agents to be found

in a refinery when crudes containing high salt contents are used (125 lbs. per 1000 bbls.). The hydrochloric acid is generated during cracking and topping operations from salts in the feed stocks. Also, hyrochloric acid is used purposely as atmosphere for certain refinery reactions.

In general, ammonia neutralization is of most value in preventing corrosion under conditions where hydrochloric acid exists with liquid water. Ammonium chloride is stable up to 660 degrees F., whereas ammonium sulfide breaks down at 110 degrees F.

Solid alkalies are considerably cheaper than ammonia. However, they are not suitable for neutralization of overhead vapors, due to the difficulty of obtaining thorough contacting, and also, to the fact that continued contact with alkaline water is damaging to the usual admiralty metal condenser tubes.

The order of choice of metal for combating hydrochloric acid corrosion runs thus: Hastelloy "B", Inconel, and nickel or monel. Shells of condensers are often lined with monel and if the condensers are of light weight, monel plate may be used. Condenser and cooler tubes are often used made of admiralty metal inhibited with not more than 10% arsenic, antimony, or phosphorus.

Sulfuric acid always has played an important role in the petroleum industry but as of late it has been introduced as a catalyst and as such has given new corrosion problems.

Many factors may influence corrosion of materials by sulfuric acid, but there are certain principal factors having direct bearing on corrosion rates such as: concentration, temperature, oxygen content of fluid, velocities and turbulance, and electrolytic action. These factors must be considered both individually and collectively, none of which should be neglected in any study of a sulfuric acid corrosion problem.

Ordinary carbon steel does not corrode in highly concentrated sulfuric acid, the limiting concentration for corrosion being 65-75% by weight. Generally sulfuric acid becomes more corrosive with a rise in temperature unless the stream contains oxygen. If it contains oxygen then the rise in temperature would serve to drive out the oxygen thus lessening corrosion until all the oxygen was out and then any further increase in temperature would tend to increase corrosion.

Care must be exercised in the design of any system for handling sulfuric acid to assure that if dissimilar metals are used, they will not be in close proximity to one another, or, if possible ,there should not be a wide spread in the electromotive series between dissimilar metals.

For weaker concentrations of sulfuric acid which are highly corrosive to steels, lead linings may be used at the lower temperatures. At high temperatures and high concentrations Hastelloy

"A" and "D" alloys are used; the "D" form being the better for use in concentrating and handling the hot sulfuric in various concentrations. The lack of ductility limits its use however. Hastelloy "B" can be used in both wrought and cast form and is preferred by some users over other types.

The most resistant of metallic materials to sulfuric acid is the high silicon (13% Si) cast iron, such as "duriron" but the extreme brittleness of this material necessitates special design features for successful use.

With the advent of hyrofluoric acid more headaches came to the refinery. This corrison involves typical oxidation and reduction phenomena-hydrogen evolution, oxygen, and sometimes galvanic currents. In most cases the process seems to be reduction of hydrogen to molecular hydrogen, while fluorine combines with the metal to form metallic fluorides.

As temperature increases, corrosion rate increases. Steel and copper are particularly affected, and above 200 degrees F. neither material is satisfactory. Corrosion rates of monel and cupro-nickel also increase with temperature, but not nearly so rapidly.

Increase of velocity of the acid-containing stream will increase rate of corrosion for most materials except plain carbon steel.

There is but a small number of desirable materials of construction for hydrofluoric acid service. Carbon steel in the basic material is adequate for condenser shells and baffles under pressure and up to temperatures of approximately 150 degrees F. Monel metal or monel-clad steel is used for higher temperatures. Cupro-nickel is particularly suitable in heat exchanger tubes.

Materials to be avoided are: 1. straight chrome stainless steel and copper alloys except cupro-nickel alloys, 2. materials attacked by intergranular corrosion such as Hastelloy "A" and "B", cast iron, and high zinc uninhibited brasses, and 3. materials that are brittle such as free-machined steel and high phosphorus steel.

Naphthenic acid corrosion: This acid is found in many crudes and becomes quite corrosive at elevated temperatures. It has been shown that monel has good resistance to naphthenic acid corrosion but care must be taken not to subject the metal to temperatures above 500 degrees F.

Inconel and 18% Cr—8% Ni—3% Mo alloys may both be used with high degrees of success.

The 18-8 stainless steel is rapidly corroded by this acid at temperatures of 500 and more degrees F.

Phenolic compounds, especially when contaminated with sulfur, rapidly attack carbon steels. 18-8 stainless steel is used as liners in contact with phenolic compounds and hydrocarbons above 500

degrees F. Monel is resistant to the phenol group of solvents and to furfural. The vessels may either be clad or sprayed with the monel metal.

Condenser shells of cast iron with a small percentage of nickel, admiralty metal tubes, and naval bronze tube-sheels will be satisfactory for use, with either fresh or salt water, on crudes containing up to 0.38% sulfur and chlorides up to 0.06% without the use of neutralizers. The preferred unit for installation, in view of the possible change in crude, would be a shell of nickel-chrom alloy of about 8% and 18% respectively, with 2.5% silicon, naval bronze tube-sheets, and admiralty metal tubes. For high sulfur crudes, the same unit is preferred with the use of a neutralizer.

This takes care of the most common and corrosive compounds which arise in refinery work. There are others to be sure such as phosphoric acid, solvents, and caustic, but are of major importance in only a few isolated cases.

Complete elimination or neutralization of corrosives is seldom economical or feasible. The selection of suitable corrosion-resistant alloys as well as their economical usage, is usually a desirable adjunct to neutralization efforts, and in many cases alloys are the only practical method of corrosion control. The application of alloys is expensive; therefore good judgment must be exercised in their selection as well as in determining the extent of application. The economy of application depends on a number of factors, among them:

1. Importance to operations: In corrosive services, where the continuity of operation of a process unit depends upon a particular exchanger, the use of corrosion-resistant alloys is almost mandatory.

In services where an exchanger is not a vital link in the process but, nevertheless, is important from a heat-conservation viewpoint, economics may favor alloys which will assure continuity of service.

2. Maintenance costs: Excessive maintenance charges will result from frequent retubing or replacement of parts. Higher priced alloys which will render longer service life can frequently be justified on the basis of reduced maintenance costs.

In summing up then, the question of proper materials to use in combating condenser and heat exchanger corrosion involves the consideration of type of corrosive agent or agents, quality of cooling water, and an economic balance between the combination of low price materials and chemical treatment of the process streams, as opposed to special materials and no chemical treatment of the process streams.

ENGINEERING BRIEFS

Dr. Johnson's Brew. When coffee first became popular in Europe, it was a leisurely drink which came to play an important part in social and political life. In fact, Charles II of England tried to suppress the coffee houses because they had become centers of political agitation. Today, the pace of living does not leave the coffee drinker time to wait to have his coffee brewed. Soluble coffees have been supplying coffee in a hurry for several years, and only recently several newer products have been introduced.

The newest is frozen coffee concentrate, similar to frozen orange juice concentrate and just now reaching the retail market. About a teaspoon of the twenty-to-one concentrate of coffee brew is recommended for each cup of hot water. At this rate the frozen coffee costs about as much per cup as vacuum-packed ground coffee. Its bouquet approaches that of fresh coffee and is superior to that of most soluble coffees. It is soluble in cold water for quick iced coffee. The concentrate can be kept in any part of the refrigerator for some weeks after opening; before sale and first use it is kept at frozen-food temperatures.

Another innovation is the coffee bag, similar to the familiar tea bags, which provides an easily stored source of measured coffee. One type, now on the retail market in New England, contains pure ground coffee, which provides the aroma, body, and flavor of brewed coffee. To reduce the size of the bag, other types replace most of the ground coffee with the soluble product, retaining only enough ground coffee to give a fresh coffee aroma.

The powdered soluble coffees have been available for several years and now account for about seven per cent of total dollar sales of coffee. They cost roughly the same per cut as fresh coffee and their ease of preparation and reduced dishwashing have made them popular, although their flavor and aroma are somewhat different from those of regular coffee brew. Many people have quickly become accustomed to the different, but pleasant, flavor of the beverage, and may prefer it to that of brewed coffee. Coin-operated machines which sell a cup of hot or cold coffee, with or without sugar and cream, use soluble coffee or liquid coffee extract to provide a fresh cup at the push of a button. It is expected that this will be a substantial market for coffee concentrates as soon as technical problems have been overcome.

In general, soluble coffees are made by spray-drying a concentrated and filtered water extract of coffee. Some types contain added dextrins or other non-sweetening carbohydrates which do not change the flabor, but aid in drying the product. This discourages

lumping and makes it easier to measure and dissolve the powder. The newest type of dry soluble coffee is a crystalline flake, produced by drying quickly under a high vacuum at low temperatures, as is done with blood plasma and penicillin. This promotes retention of an aroma and flavor closer to that of fresh coffee than earlier products. One of the products of this type, which have been developed to the market-testing stage, will soon be sold nationally.

Coffee consumption

The growing popularity of coffee concentrates has paralleled the the increase in the national consumption of coffee. The United States is the world's largest coffee consumer, taking from 65 to 75 per cent of the world's exportable production, or about 19 pounds per capita, up from 14.4 pounds prewar. When the young children, who account for the postwar increase in population (and are averaged into the "per capita" statistics) grow to be coffee consumers, another jump in imports may be expected. Brazil supplies about half of the world's coffee. For the 1949-50 season, this is expected to be nearly 20 million bags, and for the first time in 20 years will be the current crop, with no backlog from previous production. The rising price of coffee has been blamed on many factors, including drought, lack of transportation during the war, and scare-buying by the housewife. Actually, the trend of production in Brazil has been steadily downward since the depression days when the huge crops could not be sold even at a loss. At that time, there was no incentive for the grower to improve his methods and keep older trees in production, so many trees died off. Because it takes from five to seven years for a coffee tree to reach commercial production, it will be some time before the coffee crop can be much increased, even if current prices stimulate expansion. Supplies to the United States will probably be adequate, however, since high prices have caused the European market to decline somewhat, and a 65 per cent increase in African production will supply the United Kingdom. Colombian coffee production is also above prewar figures.

—*Industrial Bulletin of Arthur D. Little, Inc.*

New Concrete Gives Better Protection from Radiation. Many types of concrete were tested by Dr. Edward Creutz and K. Downs at Carnegie Institute of Technology. Pittsburgh, Pa., to find the best possible shield for the 400,000,000-electron-volt proton synchrocyclotron located at that institution.

They found that a high-water-content concrete containing magnetite ore gave better protection than ordinary concrete, and that the new concrete is easy to make and handle, is quite strong, and, since it gives more shielding ability per cubic foot, less space is required to give the same protection from radiation.—*Aminco Laboratory News.*

Rubber Made from Turpentine. A new type of high-quality rubber, made with a chemical (isoprene) derived from turpentine, has been developed at the U. S. Department of Agriculture.

Under present conditions, rubber made from turpentine is somewhat more costly than GR-S, the most common synthetic rubber now produced commercially.

The new synthetic rubber, compounded for use in tires, has a tensile strength of about 3800 psi, will stretch to seven times its length, and in standard tests develops 7° to 18° F. less heat under stress than similarly produced and compounded GR-S rubber. —*Aminco Laboratory News.*

Match-head-size Radio Tube Developed. A radio tube the size of a match head is in experimental development at the Wright-Patterson Air Force Base, Dayton, Ohio. Ninety of these midget tubes equal in volume one standard radio tube.

About 250 of them have been made and are under test.

The name of the new sub-miniature tube is the "fieldistor," which offers important advantages from a weight and space standpoint. Possible adaptation of the small tube to civilian usage is seen in such items as radio, television, hearing aids, fire and burglar alarms, and thermostats.

Since aircraft uses hundreds of radio tubes, the space and weight saved by the use of these tiny tubes means longer aircraft range at reducing operating expenses, officials stated.

Another advantage of these tubes is that they withstand engine vibration, gunfire and landing shock which literally destroys many conventional tubes. Also, the new tube uses so little current that many of the batteries now necessary can be eliminated.

—*Aminco Laboratory News*

OBITUARY OF ROBERT E. GLENK

Robert E. Glenk, past curator and founder of the Louisiana State Museum, died on Sunday, April 2, 1950 at the Touro Infirmary after a lengthy illness, at the age of 79. He was a native of Esslinger, Germany, and was brought to this country as an infant, receiving his early education in the public schools of Philadelphia and was graduated with a Ph. B. in Pharmacy from the Philadelphia College of Pharmacy and Sciences in 1891. He received an honorary degree from this institution in 1936. In 1899 he received a B. S. with his major in Chemistry from Louisiana State University. He became a member of the Louisiana State Sugar Experiment Station at which time he contributed much valuable original work in connection with the processing of cane juice into refined sugar.

During the first few years of this century he conceived of and contributed actively toward the formation of the Louisiana State Museum. This act was undoubtedly his most significant contribution to our community and to the natural sciences of this section He acted as Curator and Director for the major portion of the first half of this century to this institution.

He was a founder and charter member of the Louisiana Section of the American Chemical Society and was elected to Life Member and Section Historian for the past 14 years. He has also held other important offices in this section during the last three decades, when he gave liberally of his time, effort and constructive thought toward the benefit and advancement of this section.

He was honored by many scientific societies of which he was a member and officer including American Chemical Society, National Academy of Sciences, Fellow American Institute of Chemists, American Association for the Advancement of Science, American Museum Association and many others. He contributed liberally with scientific articles to these and other publications and enjoyed a national reputation as an authority in the broad field of the natural sciences and is listed in American Men of Science since 1926.

He was a member of the Round Table Club. His religious affiliation was with the Unitarian Church of this city of which he was a member of the board. Museum work was both his vocation as well as his avocation. Another hobby of his was his interest in perfumes, natural and synthetic, on which subject he was a deep

student and constructive worker. His interests covered all the natural sciences and his status as a scholar is evidenced by his complete and carefully selected library covering these branches of learning.

He enjoyed a large host of friends. They admired him for his superior character, his scholarly attainments and his civic pride in this community. Our Society has lost one of its most treasured members who endeared himself to all who knew him and will long be remembered by all who met him.

As historian of the Louisiana Section of the American Chemical Society, as well as the Ladies Auxiliary of same, he devoted many of his last years to the gathering of all relevent data and the compilation of complete and detailed histories of these societies.

Submitted by:

HAROLD A. LEVEY

OBITUARY OF JOHN KLORER

John Klorer was born in the City of New Orleans in the year 1875.

Upon completion of his preliminary education in private and public schools, Mr. Klorer entered Tulane University, from which he was graduated in 1895—with the degree of B. E. in Civil Engineering.

Following his graduation Mr. Klorer entered the service of the Corps of Engineers, United States Army, and his early professional life was devoted to harbor and jetty work along the Gulf Coast, and with the problems of flood control in the lower Mississippi Valley.

Between the years 1920 and 1924 Mr. Klorer served as City Engineer, and in 1925 became the Commissioner of Public Property of the City of New Orleans. During these years he was instrumental in inaugurating a movement to revise the Building Code of the City of New Orleans; and advocated the removal of the lower Bohemia Levee in the interest of flood protection for the Lower Mississippi Valley. In 1925 Mr. Klorer also introduced an ordinance which resulted in a $2,500,000.00 street paving project; likewise initiated a move to rebuild the City Markets.

In 1933 Mr. Klorer was an unsuccessful candidate for the Mayor's office; and in that year was appointed to the position of Chief Engineer of the Orleans Levee Board. He served in this capacity until 1935, at which time he was appointed Chief Engineer of the Board of State Engineers. He served as Chief Engineer until 1936. He then became associated with the Engineering Division of the Sewerage and Water Board of New Orleans. In 1941 he became Supervising Engineer of the Engineering Division of the Reconstruction Finance Corporation.

During the years of World War II Mr. Klorer was located in Washington, D. C. as Engineer Consultant to the United States Navy. He remained in this position until 1946, at which time he entered private practice.

Mr. Klorer was distinguished as an Engineer in these various capacities. His paramount interest during the years of his professional life was in Flood Control. He was considered an authority in this field, and his efforts in behalf of all this important work

were vigorous and helpful. He was an indefatigable worker in all his undertakings. He entered whole-heartedly into all matters of public interest and improvement.

Mr. Klorer was at one time President of the American Society for Municipal Improvement; of the Louisiana Engineering Society; and of the Louisiana Section of the American Society of Civil Engineers.

Mr. Klorer married Miss Jessie Dujay of Galveston, Texas, and is survived by two sons, John D. Klorer of Los Angeles, California, and Richard D. Klorer of New Orleans, Louisiana.

CHARLES M. KERR, *Chairman*

OLE K. OLSEN, *Member*

AUDITOR'S REPORT

Board of Direction,
Louisiana Engineering Society,
New Orleans, Louisiana

Dear Sirs:

I have audited the accounts of the Louisiana Engineering Society for the year ended December 31, 1949 and submit the following:

Balance Sheet, December 31, 1949 (Cash receipts and disbursements basis) (Exhibit A)

Statement of Income and Surplus for the Year Ended December 31, 1949 (Cash receipts and disbursements basis) (Exhibit B)

The cash on deposit at December 31, 1949 in the regular checking account was verified by certification obtained from the depositary.

The U. S. Savings bonds were inspected by me on May 29, 1950 in the Society's bank box and the amounts to the credit of the Society in the various homesteads were verified by certifications obtained from those institutions.

In my opinion, the accompanying balance sheet and statement of income and surplus fairly present, respectively, your financial condition at December 31, 1949, and the results of your operations for the year ended that date.

Yours truly,
CARLOS J. GRIMADER,
Certified Public Accountant

LOUISIANA ENGINEERING SOCIETY

Balance Sheet, December 31, 1949
(Cash Receipts and Disbursements Basis)

Assets

Exhibit A

CASH IN BANK	
Checking account	$ 5,964.21
UNITED STATES SAVINGS BONDS, SERIES F	
(Maturity value — $4,000.00) — redemption value	$ 3,236.00
INVESTMENTS — HOMESTEADS: (at cost)	
Columbia Homestead Association	$ 366.21
Commonwealth Homestead Association	305.97
Greater New Orleans Homestead Association	1,652.28
Security Building and Loan Association	500.00
Sixth District Building and Loan Association	500.00
Union Savings and Loan Association	500.00
Total investments — homesteads	$ 3,824.46
PROPERTY	
Furniture, Fixtures, Equipment and Books — nominal value	$ 1.00
FUNDS ON DEPOSIT WITH BANK IN LIQUIDATION:	
Interstate Trust & Banking Co. in Liquidation (less reserve for loss $190.82)	$ 1.00
Total Assets	$13,026.67

Liabilities

SURPLUS (Per Exhibit B)	$13,026.67

Exhibit B

Statement of Income and Surplus (on Cash Receipts and Disbursements Basis)
For the Year Ended December 31, 1949

INCOME:	
Dues collected	$ 6,480.25
Advertising revenue	698.00
Income from investments and savings accounts	195.09
Net profit — sale of certificates, buttons, etc.	31.11
Contributions toward cost of passage of Engineers' License Act	150.00
Total Income	$ 7,554.45

Murray-Baker-Frederic, Inc.

620-630 SOUTH PETERS STREET
NEW ORLEANS, LA.
RAYMOND 2185

REPRESENTING

Allegheny Ludlum Steel Corp.
E. C. Atkins & Co.
E. B. Badger & Sons Co.
J. T. Baker Chemical Co.
Bethlehem Steel Corp. (Wire Rope)
Black Cat Paint Corporation
Bristol Co.
Buda Company
Carboloy Company, Inc.
Clark Manufacturing Co.
Climax Engineering Co.
Cooper Alloy Foundry Co.
Corning Glass Works
Crane Co.
Crescent Truck Company
Crosby Steam Guage & Valve Company
The Dayton Rubber Co.
Durant Manufacturing Co.
Eagle Iron Works
Ford Meter Box Co.
Foster Engineering Co.
General Controls Co.
Globe Steel Tubes Co.
Heppenstall Steel Corporation
Hills McCanna Company
Jenkins Brothers
Kerotest Manufacturing Co.
Kieley & Mueller, Inc.
E. J. Lavino & Co.
Lyon-Raymond Corp.
Mercoid Corp.
Merrill Brothers
Moeller Instrument Co.
Moorehead Manufacturing Co.
New York Belting & Packing Co.
Nordstrom Valve Co.
Okonite Company
Ottumwa Iron Works
Pittsburgh Equitable Meter Co.
Robbins & Myers, Inc.
Standard Steel Spring Co.
Taylor-Wharton Iron & Steel Company
Trane Company
Tube Turns, Inc.
Weston Electrical Instrument Co.
Whiting Corp.
Worthington Pump & Mfg. Co.
Wright Manufacturing Division
John Zink Co.

COMPLETE WAREHOUSE STOCKS

Pipe, Valves, Fittings, Steel Plates, Structurals, Bars, Band and Strip, Stainless and Tool Steel, Machine Shop Equipment, Rubber Belting and Hose, Saws and Knives, Boiler Tubes, Thermometers, Laboratory Glassware, and Chemicals.

EXPENSES:	
Salary — secretary-treasurer	$ 1,500.00
Cost of publishing proceedings	1,859.30
Cost of anual meeting (expended $2,261.69 less receipts of $2,046.37)	215.32
Cost of annual outing ($554.13 less receipts of $514.40)	39.73
Refreshments at meetings ($578.71 less pro rata receipts from joint meetings held, $29.46)	549.25
Printing, stationery, and postage	930.47
Payments to Baton Rouge, Lake Charles, Shreveport, and Monroe Sections	699.00
Presents to retiring presidents	111.05
Library expense — porter	16.00
Social security tax	35.00
Auditing	100.00
Telephone	91.36
General expenses	477.86
Total Expenses	$ 6,624.34
NET INCOME FOR THE YEAR	$ 930.11
SURPLUS AT BEGINNING OF YEAR	12,096.56
SURPLUS AT END OF YEAR	$13,026.67

MINUTES OF MEETINGS AND BUSINESS OF THE SOCIETY

Minutes of Meeting of the Society held on May 8, 1950

The meeting was called to order by President Cucullu in the Jackson Room of the St. Charles Hotel, with approximately 125 members and guests present. The president welcomed members and guests, particularly those from out-of-town. Reading of minutes of the preceding meeting was dispensed with.

Mr. W. Stone Leake, Chairman of the Legislative Committee, outlined the progress of the Engineers' License Act in the Louisiana Legislature. Mr. Cucullu reported the activities of the Engineers' Club Committee.

Mr. Charles M. Kerr read an obituary of the late John Klorer, following which a moment of silence was observed in memory of the deceased member.

Mr. Levey stated that in the near future a large portion of the Society's membership would be licensed, and that he wished to call to the attention of the Board of Direction and the members at large that considerable thought should be given to elevating the prestige of the engineer in his professional stature.

Announcement was made of the dedication of the new engineering building at Tulane University on May 10 .

Mr. Clayton L. Nairne announced that a testimonial dinner for retiring Dean James M. Robert of Tulane would be given on May 11, and urged the membership to attend.

Professors F. J. Germano and O. W. Stephenson, Jr., of L.S.U. and Tulane respectively, then introduced the following speakers who gave interesting talks on their respective subjects:

"Color Conditioning in Industry", by Jesse E. Hart and John S. Vernor.

"Comparison of European and American Structural Practice", by Eugene Simic.

"The Reaction Mechanism of the Fischer Tropsch Process for Synthesis of Petroleum Products", by George Lambousy.

"Rate of Heat Transfer to and from the Water Table", by Anthony C. Occhipinti.

President Cucullu then thanked the speakers and their professors for providing such an interesting program, and the meeting closed with a standing round of applause.

JOHN P. FERNANDEZ, Secretary-Treasurer

Minutes of Meeting of the Board of Direction held on Monday, May 8, 1950

The meeting was called to order by President Cucullu, with Messrs. Abrahm, Hill, Lehmann, McNiven, Newton, Seago and Fernandez present. Mr. W. Stone Leake also was present by invitation. Minutes of the preceding meeting were accepted as read.

Messrs. Leake, Newton and Abrahm reported on the activities of the Legislative, Finance and Engineers' Club Committees, respectively.

A letter from Mr. Harold A. Levey, containing an obituary of the late Doctor Robert E. Glenk was read. Mr. Hill moved that the obituary be published in the Society's Proceedings, seconded by Mr. Seago and carried.

Applications for reinstatement from Messrs. Rodney M. Vincent and Andre J. Dubus were presented. General Newton moved that they be reinstated, seconded by Mr. Lehmann and carried.

Mr. Lehmann moved that the dates for the 1951 Annual Meeting be set for January 11-12-13, seconded by Mr. Abrahm and carried. Mr. Lehmann moved that Mr. Allen Betz be appointed General Vice-Chairman of the meeting. The motion carried.

A discussion of the constitution and by-laws of the proposed Lafayette Section took place, and it was decided to postpone acceptance until the next board meeting.

The date of the annual outing was discussed, and it was recommended that same be held on the 20th or 27th of July, preferably on the latter date. A communication from the Engineers' Council for Professional Development concerning student selection and guidance was read. President Cucullu stated that he would attend to the matter.

It was reported that the American Institute of Mining & Metallurgical Engineers, with whom the Society expects to hold a joint meeting in November, had requested that the meeting include a dinner, to cost approximately $2.50 a place. It was the opinion of the board that a dinner meeting would cut down the attendance, and was therefore moved by Mr. Lehmann, seconded by Mr. Seago and carried, that the invitation be declined.

In accordance with Article 9 of the constitution, the following delinquent members were dropped from the rolls for non-payment of dues:

Thomas H. Bean, Clyde E. Bolton, Andrew L. Cameron, Robert D. Cosgrove, David D. Davis, Osborn J. Dykes, Sr., John J. Finegan, Jr., *John H. Frederickson, Jr., Earl B. Gaines, John J. Gutweiler, James E. Hufford, James M. Kidd, Jr., William J. Mattox, Robert L. Morris III, Gayle Schneidau, Jr., Robert I. Senn, Spencer G. Smith, A. Dale Stancliff, Jr., Curtis D. Stubbs, *Leonard R. Swinney, Robert K. Wells.

* Address unknown.

Following this, the meeting adjourned in order that the Society's general meeting could be opened on schedule.

JOHN P. FERNANDEZ, Secretary-Treasurer

Minutes of Meeting of the Board of Direction, June 12, 1950

The meeting was called to order by President Cucullu in the St. Charles Hotel, with the following members present: Messrs. Lehmann, Knost, Mary, McNiven, Seago and Fernandez. Minutes of the preceding meeting were approved as corrected.

President Cucullu outlined the progress of the Legislative Committee concerning the engineering license bill, particularly the amendment introduced in the House Committee by representatives of the Southern Bell Telephone Company. Mr. Seago announced that plans for the outing were well under way, and that "Mercedes" of Pat O'Brien's would be the entertainer. Mr. Lehmann moved that the prices for golf, horseshoe pitching and dinner be the same as last year, seconded by General Newton and carried.

PROCEEDINGS

OF THE

LOUISIANA ENGINEERING SOCIETY

August, 1950

"PATRONIZE OUR ADVERTISERS"

INDEX TO ADVERTISERS

General Newton reported for the finance committee and moved that the local sections receive the gross proceeds from all sales of advertising space in the Proceedings which they might secure. The motion was seconded by Mr. Lehmann and carried unanimously. General Newton moved that the secretary be authorized to purchase two Series F United States Savings Bonds in order to reduce the Society's cash bank balance. The motion was seconded by Mr. Seago and carried.

Mr. Knost reported on the activities of the Publicity Committee.

The auditor's report for 1949 was presented by the Treasurer, following which Mr. Lehmann moved that it be accepted, seconded by Mr. Knost and carried.

The resignation of Mr. Robert L. Green was accepted with regret, and Mr. Marshall B. Ewing was reinstated to membership.

Correspondence between Mr. L. L. Moody, President, S.L.I. Student Chapter, and the Society was read. An invitation to join the American Association of Small Business was read. Mr. Knost moved that the invitation be declined; seconded by Mr. Seago and carried.

The constitution of the proposed Lafayette Section was read and the following changes were recommended:

Article II, Section 2, addition of the following sentence: "Individual membership from other areas may also be granted upon written application by such individuals."

Article III, Section 3, to read as follows: " Any member of the Louisiana Engineering Society residing in the above area shall become a member of this section unless he requests in writing to be a member of another section or to be excluded from membership in the Lafayette Section."

The third amendment, in Article III, Section 2, is to read, for clarification, "The term of office **of the officers** of this section, etc."

Mr. Mary moved that the constitution and by-laws of the Lafayette Section be accepted with the foregoing amendments, seconded by Mr. Lehmann and carried. It was announced that the charter presentation for the Lafayette Section would be made on October 10 and that General Newton would be the speaker.

President Cucullu reported on the meeting held to study plans for an Engineers' Club.

Announcements concerning the membership drive at Alexandria and meetings at Monroe and Baton Rouge were made, also that of the U.S. Engineers 175th Anniversary Dinner.

Mr. Seago announced that several items should be purchased for the public address system which would make meetings more enjoyable to the membership, particularly a wide angle microphone, neck bracket halter and pulpit stand. Decision to acquire these articles was postponed until the finance committee could study the matter.

There being no further business, the meeting adjourned.

JOHN P. FERNANDEZ, Secretary-Treasurer

Regular Meeting of the Baton Rouge Section, May 10, 1950

A regular meeting of the Baton Rouge Section of the Louisiana Engineering Society was held on May 10, 1950 at the Gulf States Utilities Company's Power Plant in North Baton Rouge.

The meeting was called to order by Mr. A. J. Mary at 7:30 p. m. Approximately 98 members and guests were present.

It was motioned and seconded that the reading of the minutes be dispensed with. Unanimously passed.

There being no pressing business Mr. Mary introduced the principle speaker of the evening, Mr. R. J. Robertson, Superintendent of Production of the Gulf States Utilities Company in Louisiana.

Mr. Robertson's talk entitled "The Operation of the Gulf States Utilities Company's Steam and Electric Generating Station at Baton Rouge" was very interesting. A very easily followed one line schematic diagram distributed in advance was very helpful in following the talk.

A guided tour of the plant followed and after a "few" flights of stairs, everyone enjoyed the refreshments.

The meeting adjoined at approximately 9:45 p. m.

HENRY L. LANDRY, Secretary-Treasurer

Baton Rouge Section

Minutes of Joint Meeting of the Baton Rouge Section of the Louisiana Engineering Society and the Louisiana Engineering Society, Saturday, June 17, Baton Rouge, Louisiana

On Saturday, June 17, 1950 at 2 p. m. activities started at Harry Cloud's Camp on Florida Street in Baton Rouge, Louisiana.

Mr. J. T. Obrien registered and bracketed members and guests for the horseshoe pitching contests. There was much interest displayed and very close matches were played. The winner of the singles was Mr. W. D. Halloway with Mr. A. E. Hutchinson the runner-up. The winners of the doubles were Mr. M. A. Hudson and Mr. T. J. Innes. The runner-ups were Messrs. P. M. Floyd and A. H. Demers. Prizes were given to the winners and runner-ups

Dinner was served at 7:30 p. m. to 51 members and guests.

Short business sessions were held by both groups. Mr. Fred A. Hannaman, 1st Vice-President of the Baton Rouge Section, presided over the Baton Rouge Section in the absence of Mr. Mary and Mr. L. Cucullu presided over the L.E.S. group. Mr. Cucullu outlined the progress of the engineer licensing law which was of interest to all present.

At 8:30 p. m. Mr. Hannaman and Mr. Louis Duclos made presentations of attendance prizes enjoyed by 29 winners.

Meeting adjourned at approximately 9:30 p. m.

HENRY L. LANDRY, Secretary-Treasurer

Baton Rouge Section

PROCEEDINGS

OF THE

LOUISIANA ENGINEERING SOCIETY

VOL. XXXVI OCTOBER, 1950 No. 5

CONTENTS

EDITORIAL NOTES AND COMMENTS

Our Annual Meeting. Committee meetings have been started in connection with our annual meeting, January 18-20, 1951. James S. Janssen is general chairman; Allen W. Betz, vice-general chairman. Other chairmen and vice-chairmen are as follows:

J. Robert Rombach, chairman, Technical Papers Committee; J. Howell Peebles, vice-chairman, Technical Papers Committee; A.

R. Wingate, chairman, Banquet Committee; Clifford A. King, vice-chairman, Banquet Committee; Sargent F. Jones, chairman, Contact with Woman's Auxiliary Committee; Frank C. Fromherz, vice-chairman, contact with Woman's Auxiliary Committee; B. P. Babin, chairman, Industrial Plant Inspection Committee; Albert R. Boelte, vice-chairman, Industrial Plant Inspection Committee; A. W. Durning, chairman, Program Committee; Aaron Abramson, vice-chairman, Program Committee; G. Elmer May, chairman, Publicity Committee; Arthur M. Hill, vice-chairman, Publicity Committee; Chas. E. Cassagne, chairman, Registration Committee; Claude J. Kelly, vice-chairman, Registration Committee; Calvin T. Watts, Chairman, Student Conference; J. D. Haverkamp, chairman, Technical Exhibits Committee; Albert A. Glodt, vice-chairman, Technical Exhibits Committee; L. J. Lassalle, chairman, Reception Committee; W. Stone Leake, vice- chairman, Reception Committee. L. J. Cucullu, president; Harry P. Newton, vice-president; and John P. Fernandez, secretary-treasurer.

Our Front Cover. This is a modern low cost steam-electric generating station with name plate capacity of 25,000 kilowatts but can and has effectively produced over 30,000 kilowatts. This station is unique in that the three generating units and boilers are of the out-door type. It also has the distinction of having the first completely weather-proofed generating units installed without euxilliary covers for central station operation. The plant is fully automatic and is specifically designed to reduce the required operation complement or personnel in comparison with other steam-electric generating stations. It is located at St. Landry, La.

Donors at Our Annual Outing. Through the generosity of our friends, numerous valuable prizes were awarded at the outing on July 27.

		Amount	Prize	Won By
	President's Flight			
1	L. J. Cucullu	15.00	Floor Lamp	K. P. Kammer
	Guests—Low Net			
1	United Gas Pipe Line Co.	10.00	Silver Vegetable Dish	A. L. Weddle
2	Murray-Baker-Frederic Corp.	10.00	Table Lamp	A. Pilney
3	Mr. A. B. Paterson	5.00	Silver Dish	Wm. Stroud
4	Pittsburgh Testing Laboratories	5.00	½ Dozen Golf Balls	G. Gabler
	Members—Low Net			
1	W. Horace Williams Company	25.00	Silver Water Pitcher	K. P. Kammer
2	Asbestone Corporation	15.00	Silver Bread Tray	Geo. Hammett
3	Allan J. Harris Company	10.00	Grill & Waffle Platter	C. S. Williamson
4	A. M. Lockett & Comany	10.00	Silver Meat Platter	L. L. Smith
5	Southern States Equipment Co.	10.00	Silver Gravy Boat	H. Blain
6	Allis-Chalmers Manufacturing Co.	10.00	Golf Cart	Ivan Purinton
7	Chase Brass Co.	10.00	Dozen Golf Balls	G. B. Davis
8	Gulf Engineering Co.	10.00	Pendleton Shirt	R. Grehan
9	James M .Todd & Associates	10.00	Switch Clock	W. M. Larkin
110	Boland Machine & Mfg. Co. Inc.	10.00	Pendleton Shirt	A. Farmer
111	Mr. John Riess	5.00	Table Lamp	R. P. Lockett, Sr.
112	Mr. C. G. Cappel	5.00	Silver Bon Bon Dish	Stone Leake
113	Dixie Mill Supply Co.	5.00	Golf Club Covers	Verne Clawson
114	Patrick H. Dillon	5.00	½ Dozen Golf Balls	R. Dreuding
115	General Electric Co.	5.00	Telechron Kitchen Clock	F. L. Alcus
	Members—Low Gross			
1	W. D. Taulman & Associates	25.00	Silver Bowl	W. A. Massimini
2	Shilstone Testing Laboratories	10.00	Dozen Golf Balls	W. M. Larkin
3	Boh Bros. Construction Co.	10.00	Pendleton Shirt	R. Dreuding
4	Fletcher Equipment & Supplies Co.	5.00	Golf Club Covers	J. R. Rombach
	Closest To Hole—No. 7			
1	Service Foundry	10.00	Silver Tray	A. L. Farmer
2	Mr. C. Knost	10.00	Time Clock	Wm. Stroud
	Closest To Hole—No. 14			
1.	American Creosote Works	10.00	Grill & Waffle Iron	T. B. Lockett
2	Anchor Packing Co.	10.00	Dozen Golf Balls	R. A. Rusca
	Member—High Gross			
1	Louisiana Power & Light Co.	10.00	Putter	R. G. Cappel
	Horse Shoe Pitching—Singles			
1	Eagle Asbestos Company	15.00	Silver Vegetable Dish	F. M. Taylor
2	Lone Star Cement Co.	10.00	Pendleton Shirt	J. F. Vogt, Jr.
3	Dixie Machine Welding Co.	10.00	Cory Knife Sharpener	J. J. Brown
4	N. O. Cement Products Co. Inc.	5.00	Silver Dish	S. A. Nasca
	Horse Shoe Pitching—Doubles			
1	R. P. Farnsworth	10.00	Silver Platter	F. M. Taylor
1	John H. Carter Co.	10.00	Sunkist Juicer	L. H. Johnson
2	Ole K. Olsen Co.	5.00	Silver Vegetable Dish	C. Kerr
2	Frerichs Lumber Comany	5.00	Table Lamp	C. Kelly
	Attendance—Guests			
1	New Orleans Public Service	15.00	Waffle Iron	C. Seeman
2	Flintkote Company	10.00	Sunkist Juicer	J. Hutton
3	Maritime Electric Company	5.00	All Purpose Seat	J. Tedford
4	Mr. R. E. Gosa	5.00	Table Lamp	P. Dimberg
	Attendance—Members			
1	Reed Unit Fans Inc.	75.00	Reed Window Fan	C. Bostrom
2	N. O. Blue Print & Eugene Dietzgen	25.00	Silver Tray	J. W. Brown
3	Westinghouse Electric Co.	10.00	Pendleton Shirt	S. Leake
4	Jahncke Services	5.00	Telechron Clock	M. L. Hurstell
5	Orleans Material & Equipment Co.	10.00	Badminton Set	D. W. Stewart
6	Crane Company	10.00	Bathroom Scale	F. L. Alcus
7	Freeport Sulphur Co.	10.00	Automatic Coffee Percolator	G. E. May
8	Standard Supply & Hardware Co.	10.00	Table Lamp	A. M. Fromherz
9	Frank P. Fischer Engineering Co.	10.00	Hair Dryer	H. L. Landry
10	Jones & Laughlin	10.00	Cory Knife Sharpener	M. R. Guell
11	Mexico Refractories	10.00	Automatic Toaster	R. H. Earl
12	Anaconda Wire & Cable	5.00	Telechron Clock	E. A. McLellan
13	Mr. J. K. Wolf	5.00	All Purpose Seat	J. St. Raymond

Letter to the Editor:

The following has been received as "Letter to the Editor," regarding the new licensing law. Such communications are always welcome.

1003 Hidalgo St.,
New Orleans 19, La.,
October 5, 1950

Dear Sir:

The new Act providing for registration of professional engineers of all branches in Louisiana—finally seen in print in the August issue of the Proceedings—is indeed welcome to those engineers of the State who worked for so many years toward enactment of such a law. Only one state (Montana) of the forty-eight is now without a general professional engineers' registration law. Enactment of our new law is an important milestone in the progress of professional engineering in Louisiana, but Louisiana's engineers must recognize their responsibility in supporting the Act and in making it work in the interest of greater public service.

As to the detailed provisions of the law itself, discussion thereon could continue almost endlessly, and so it seemed in the course of its drafting by the Louisiana Council of Engineers. The law as now written is a good start, however, and deviations from ideality will gradually be corrected in future years.

I would like to comment on the matter of fees as specified in the Act, as many prospective registrants are necessarily interested in this feature.

The application fee of twenty-five dollars, called for in Section 13, is in line with that of our neighboring states (Texas and Mississippi). The annual renewal fee, however, specified in Section 16, is "not to exceed ten dollars." During preparation of the Bill, many constructive critics stated that ten dollars was too high; but the counter-argument was that the figure cited was only a maximum permissible and that the actual renewal fee would probably be less. Both Texas and Mississippi renew registrations at five dollars, and I think that licenses under our old Civil Engineering law were renewed at three dollars.

It is hoped that the new Board of Registration will give serious consideration to keeping the renewal fee as low as possible, and by doing so, not lend aid to the argument advanced by those opponents of registration laws who maintain that these laws mean only an additional tax on the Professional Engineer. A reasonably low renewal fee might well mean the difference of being registered or not in the case of many a young engineer.

To those of us who are registered in other states, our attention is directed early to Section 19, which "provides" for Interstate regis-

tration. There are many Louisiana engineers who are presently registered outside of Louisiana. Possibility of registration on a reciprocal basis, and admittedly for a lower registration fee (fifteen dollars), seems unlikely, however, in view of the clause "provided - - - - that said state or country will accept the certificates of registration issued by this Board on a reciprocal basis." No experience is required by our new Act in the case of engineering graduates, whereas Texas requires four years, and Mississippi, one. It is improbable therefore that either of these states would recognize Louisiana registration on a reciprocal basis, at least for recent engineering graduates. Perhaps some reciprocal relations might be arranged eventually in the cases of registration by examination and of those engineering graduates with four years or more of experience. Reciprocity with other states is certainly desirable, and this should be considered as early as possible by the new Board.

The writer made a count of registered engineers in the Louisiana Engineering Society from the 1950 directory, and was interested to find that, prior to enactment of the new law, 19.7% of the membership were registered. This figure is thought to be on the low side, as some members who are registered did not so indicate in the directory. This figure covers all grades of Society membership (except Student Members) and registration in any state.

Sincerely,
/s/ HENRI J. MOLAISON

Personals. Mr. F. D. Cardwell writes us that he recently presented a paper entitled "Optimum Tube Size in Heat Exchangers" before the A.S.M.E. in Washington. He states also that he has just received his license for practicing in New York ,and is in the supplement of Who's Who.

New Members. Under the stimulus of new sections, and members actively engaged in interesting new prospects, our membership continues to grow.

For Member

MILLER H. ALEXANDER, Lake Charles; age 50. Endorsed: H. G. Chalkley, F. C. Gault, E. E. Shutts. Graduate of Tech High (Atlanta). Rice Institute, B. A. Old Catalouchee Ranch, N. C., Construction Supt., 1933-35. Alexander Estates, Atlanta, Ga., Asst. Engr., 1935-36. Prarie Can. Co. Lake Charles, Mech. & Hydraulic Engr. 1936-48. Lac. Co., La. Can. Co., Am. Rice Growers, Mech. & Hydraulic Engr., 1949-date.

MYRON GEORGE ARNETT, Lafayette; age 52. Endorsed: S. W. Elberson, F. C. Gault, H. R. Mason. Leland Stanford University, Calif., M. E., 1915-16. Caterpillar Tractor Co., Electrical Engr. Leonard Construction Co., Const. Foreman. Gannett, Seelye & Fleming Eng. Co., Constr. Eng. La. Public Utilities Co., Const. Engr. Gulf Public Service Co., Inc., Construction Engineer.

THOMAS ALLEN BONNET, Lafayette; age 45. Endorsed: B. P. Babin, F. C. Gault, S. W. Elberson. Southwestern La. Institute, B. S. Engineering, 1927. La. Public Utilities, Draftsman, 1927-1946. Gulf Public Service Co., 1946-date, now District Engr. for all GPS properties.

CLIFTON CLINTON BOYD, Monroe; age 29. Endorsed: R. T. Sessums, C. T. Watts, S. E. Huey. Alabama Polytechnic Institute, B. S. Agri. Eng., 1947. Portland Cement Ass'n, Structural Field Engr., 1947-date.

C. D. BROWN, Opelousas; age 50. Endorsed: W. J. Johnson, B. H. Wade, H. L. Lehmann. La. Dept. of Highways, materials Inspector, 1922-24. Evangeline Parish, Instrumentman, 1925-26. La. Dept. of Highways, Instrumentman, 1927-29. U. S. Engineer Dept., Surveyman, 1930-31. La. Dept. of Highways, Instrumentman, Jr. and Sr. Project Engr., 1932-date.

EDWARD ALLAN BURKE, Baton Rouge; age 30. Endorsed: C. C. Barnard, J. S. Burk, R. A. Matherne. Louisiana Polytechnic Institute, Civil Eng., 1939-41. Louisiana State University, Civil Eng., 1945. Post Engineers, Camp Polk, La., Draftsman, 1941. Benham Eng. Co., Leesville, La., Road Design, 1942. U. S. Army Air Force, Architectural, Structural & Site Planning, 1942-44. Eighth Naval Hq., P-2 Architect, June-Dec. 1944. Fraser-Brace Eng. Co. & Graham, Anderson, Probst & White, Naval Ordnance Plant, Camden, Ark., June-Sept. 1945, Engineer. Bernard & Burk, Structural Engineer, Oct. 1945-date.

PEARL PIERCE BURKE (MRS.), New Orleans; age 33. Endorsed: M. Carbonell, G. H. Dudley, R. Hertzberg. University of New Hampshire, B. S. Geology, 1939. Lowell Institute of M.I.T., M.S. Phys. Metallurgy, 1944. Watertown Arsenal, Mass., Research work in metallurgy, 1942-45. Corps of Engrs., N. O., Civil Eng. Aide, 1948-49; Geologist, 1949-50. Member Gamma Kappa, geological fraternity.

HENRY WILLIAM BUSCH, Lafayette; age 38. Endorsed: T. F. Ruffin, H. R. Mason, J. R. Troxler. Texas A & M College, B.S.E.E., 1933. Bowdin College, Maine, Navy Pre-radar, 1943. M.I.T., Navy Radar Course, 1944. McCollum Exploration, Seismograph Operator, Party Chief, Geophysicist, 1933-41. War Production Board, Priorities Dist. Mgr., Houston, 1½ yrs. Radar Officer in Pacific Theatre, U. S. Navy. Managing Partner, Mike Baker Brick Co., 1946-date.

HOWARD CHANEY, Baton Rouge; age 43. Endorsed: E. E. Ford, J. R. Murphy, C. P. Walters. I.C.S. Steam-Electric Course. Marine Engineer, 1927-29. Gulf States Utilities Co., 1930 to date, various positions; since June 1947 in responsible charge of operating 148,500 KW Power Station. Licensed 1st Asst. Marine Engineer.

ROBERT E. CHAPPUIS, Bunkie; age 35. Endorsed: E. Hogge, H. R. Mason, P. E. Randol. Southwestern La. Institute, B.S.M.E., 1940. Central La. Electric Co., Project Engineer, Asst. Supt., 1936-date.

FRED A. CONSTERDINE, Abbeville; age 48. Endorsed: J. B. Carter, J. E. Jarman, H. L. Lehmann. La. Dept. of Highways, 21 yrs., Instrumentman-Project Engineer. J. Ray McDermott Co., Construction Engineer, 8 yrs. Member La. Hwy. Engrs. Ass'n.

CHARLES WILLIAM COOK, Pollock; age 39. Endorsed: Soule Butler, T. C. David, C. A. Myers. Rice Institute, Houston, B.S.C.E. Texas Highway Dept., Inspector, 1934. Petroleum Iron Works, Detailer Structural Steel, 1935-36. Sun Oil Co., Geophysical Operator, 1936-42. John Dollinger, Jr., Inc., Structural Detailing & Checking, 1942-46. Consulting Engineer, 1946-50. Member Professional Engineers, Texas, American Concrete Institute. Registered C. E., La.

GENE V. DIETZ, Lake Charles; age 26. Endorsed: C. A. Jackson, V. E. Sicks, C. W. Stokes. John McNeese Jr. College, Pre-engineering, 1941-43. University of Texas, Aeronautical Engineer, 1943-44, 1946-47, B.S.Ae.E. Catapult & Arresting Gear School, Philadelphia Navy Yard, 6 weeks course, 1945. USNR, Ensign, Catapult Officer, 1945. McDonnell Aircraft Corp., Jr. Stress Analyst, 1947-48. Cities Service Refining Corp., Jr. Engr., 1948-date. Member Pi Tau Sigma, Tau Beta Pi.

PETER M. FERGUSON, Lafayette; age 27. Endorsed: A. J. Dubus, G. G. Hughes, H. R. Mason. Tulane University, B.E.M.E., 1944. Esso Standard Oil Co., Lubrication Engineer, 1946-date.

WILLIAM E. FLOWERS, Alexandria; age 43. Endorsed: T. C. David, C. A. Myers, G. O. Coignet. Merrill Eng. Co., Asst. Supt., 1928-30. Miss. State Hwy. Dept., Asst. Office Engr, 1930-35. Marquette Cement Mfg. Co., Memphis, Salesman, 1935-41. Dunn Construction Co., Birmingham, Construction Engr., 1941-43. U. S. Army Corps of Engineers, 1943-45. Geo. M. McDearmon, Engineer, 1945-48. Pan American Engineers, Resident Engr., 1948-date.

R. M. HETHERWICK, Lafayette; age 31. Endorsed: G. G. Hughes, R. E. Jenkins, H. R. Mason. Southwestern Louisiana Institute, B.S.E.E., 1940. Electric Utility, Cadet Engineer, 1940-41. Air Corps Experimental Radio Laboratory, Associate Engineer, 1941-45. Well Logging Engineer, charge operation of unit, 1946-47. Engineer, Electric Cooperative, 1947-date.

JOHN CAMERON HOGE, Lafayette; age 63. Endorsed: C. C. Barnard, J. S. Burk, R. A. Matherne. Nebraska State University, B.S.E.E., 1910; E.E., 1912. Continental Gas & Electric Co., Chief Engineer, 1916-18. Central Power Co., General Supt., 1920-40. Consumers P.P. District, General Supt., 1940-47.

Grays Harbor P.P. Dist., Aberdeen, Wash., Manager, 1947-49. Manager of Utilities, Lafayette, La., 1949 to date. Member Nebraska Engineering Society. Licensed, Nebraska & Washington.

RICHARD HALL HUDSON, JR., Baton Rouge; age 29. Endorsed: F. A. Hannaman, T. J. Innes, Jr., O. R. Menton. Georgia Tech, B.S.M.E., 1947. Louisiana State University, February, 1948 to date, 21 hrs. Completed toward M.S.M.E. Cooperative Engineering Student Trainee, 21 mos. Boston Ordnance Dist., Chief Military Components & Supply Section, August, 1944 to July, 1946. Esso Standard Oil Co., Mech. Eng. Dept., April, 1947 to date. Member A.S.M.E.

LEE HARNIE JOHNSON, JR., New Orleans; age 41. Endorsed: L. J. Lassalle, A. M. Hill, L. J. Cucullu. Rice Institute, Math & Engineering, 1927-31; B.A., 1930, M.A., 1931. Harvard University, Civil Engineering, M.S., 1932, S.D., 1935. U. S. Waterways Experiment Station, Vicksburg, Miss., 1935-36. U. S. Engineer Office, Mobile, Asst. to Engineer in charge of Design & Specifications, 1936-37. U. S. Engineer Office, Vicksburg and Mobile offices, special design and research projects, summers of 1938-39-40-41. University of Mississippi, Prof. of Civil Eng. and Dean of Engineering, 1937-50. Tulane University, Professor of Civil Eng. and Dean of Engineering, 1950-date. Licensed, Miss. Member ASCE, ASEE, AAAS.

CHARLES LAWRENCE, Baton Rouge; age 57. Endorsed: J. B. Carter, Louis Duclos, R. B. Richardson, Cooper Unior Institute, N.Y.C., B.S.C.E., 1916. Golove & Lewis, Highway Engr. & Supt of Constr., 1920-22. Truscon Steel Co., Concrete Engineer, 1923-26. Knox-Mariani Corp., Highway Engr. & Supt. of Construction, 1927-32. La. Dept. of Highways, Office & Special Services Engineer, 1935-50. Licensed C.E., La. Member La. Highway Engrs. Ass'n.

GEORGE P. LEMOINE, Bunkie; age 31. Endorsed: F. H. Coughlin, C. P. Hoyt, G. C. Williams. Louisiana State University, B.S.Ch.E., 1940. Esso Standard Oil Co., Inspection Engineer, Regional Construction Engineer, 1940-47. General Contractor, 1947-date. Member Tau Beta Pi.

SIDNEY J. LEMOINE, Bunkie; age 35. Endorsed: F. H. Coughlin, G. C. Williams, L. J. Lassalle. Louisiana State University, B.S.M.E., 1936. La. Ice & Electric Co., Field Engineer, 1936-37. E. E. Rabalais & Sons, T. L. James Co., Gravier & Harper: supervised construction of buildings up to $1,000,000, 1937-40. Post Engineer, Camp Beauregard, Esler Field, Camp Livingston; retiring rank Lt. Col. CEC, 1940-45. Now practicing general contracting, S. J. Lemoine & Co., Bunkie, La. Member A.S.M.E.

JOHN E. McNAMARA, Sulphur; age 31. Endorsed: F. T. Clarke, J. B. Weldon, Frank McNamara. Port Arthur College, graduate in Radiotelephony and Radiotelegraphy, 1940. Port Arthur College, Radio Instructor, 3 yrs. Southwestern La. Institute, B. S. in Physics, 1949. Charter Member, Beaumont-Port Arthur Section, Institute of Radio Engineers. Several yrs. experience as Radio Engineer.

ALLAN G. MEAKIN, Baton Rouge; age 51. Endorsed: J. T. O'Brien, T. J. Innes, W. H. Mercier. Massachusetts Institute of Technology, B.S.Ch.E., 1923. Union Oil Co. of Calif., Research Engineer, 1923-27. Engineering Research & Equipment Co., Design Engineer, 1928-29; Foreman Steam, Water & Gas Dept., 1930; Asst. Supt. Utilities & Light Ends Dept., 1950.

RANDALL MEYER, Baton Rouge; age 27. Endorsed: F. A. Hannaman, Jr., E. W. McNeil, Jr., O. R. Menton. State University of Iowa, Mech. Eng., 1940-41, 1945-48, B.S.M.E. Day & Zimmerman, Inc., Design Engineer, 1941-45. State University of Iowa, Instructor of Mech. Design, Jan.-June 1948. John Deere Tractor Co., Sr. Plant Engineer, June-Sept. 1947. Esso Standard Oil Co., Mech. Engr., June 1948-date.

ANDREW MICHEL MOORE, Alexandria; age 30. Endorsed: F. H. Coughlin, H. R. Mason, P. E. Randol. Southwestern Louisiana Institute, 1937-40, 1945-46, B.S.E.E. Central Louisiana Electric Co., Inc., Electric Engineer, 1946-date.

KEITH HAL MORGAN, Baton Rouge; age 29. Endorsed: F. R. Adams, L. J. Lassalle, W. D. Morris. Louisiana State University, B.S.E.E., 1944. U. S. Naval Reserve, 1944-46. Southern Bell Tel. & Tel. Co., Junior Engineer, 1947-date. Member A.I.E.E.

CYRIL K. MORESI, Lafayette; age 45. Endorsed: R. E. Jenkins, L. J. Lassalle, H. R. Mason. Louisiana State University, Petroleum Geology, B. S., 1931, M. S., 1932. State Geologist for Louisiana, 1934-40. Consulting Geologist, 1940-42. U. S. Naval Reserve, 1942-45. Consulting Geologist, 1945-date. Member American Association of Petroleum Geologists, Geological & Mining Society. Partner, Mike-Baker Brick Co., Lafayette.

HENRY F. OWSLEY, JR., New Orleans; age 39. Endorsed: C. P. Knost, M. F. Knost, S. A. Theard. Texas A & M College, B.S.M.E., 1932. The Texas Company, Supervisor of Automotive Service Stations, 1933-37; Lubrication

Instructor, 1937-38. Insurance Executive, 1938-41 and 1946-date, dealing with mechanical safety engineering. U. S. Army Transport Division, Officer in charge of Maintenance & Repair Branch, 1942-45.

WILLIAM DAVID ROLAND, Alexandria; age 40. Endorsed: Soule Butler, Tom C. David, Chas. A. Myers. Louisiana State University, Mechanical Engineering, 1928-31. Clifford H. King, Baton Rouge, Construction Supt., 1931-35. Forcum-James Company, Baton Rouge, Heavy Construction Supt., 1937-39. Mid-State Construction Co., Alexandria, Construction Supt., 1940-46. Roland Construction Co., Partner, 1946-date. Licensed Contractor, Louisiana.

E. E. SHAFER, New Orleans; age 36. Endorsed: V. J. Bedell, B. M. Dornblatt, J. S. Janssen. University of Michigan, B. S. Agri. Eng., 1937. Wheeling Corrugating Co., Sales Engineer, 1937-41. U. S. Army Engineer Office, 1941-46. Veteran's Administration, Engineer Official, 1946-47. Partnership in Structural Consulting Office, 1947-49. Riccuiti & Stoffle, Engineer, 1950-date. Member Michigan Engineering Society.

JAMES M. SUMMERLIN, Shreveport; age 28. Endorsed: J. S. Broyles, T. F. Cash, W. W. Wilson. Centenary College, surveying course, 1941. University of Cincinnati, Aviation Cadet Training Course, graduate Bombardier and D. R. Navigator. United Gas Pipe Line Co., 9 years, various duties in connection with land & lease surveys, well locations, construction of natural gas pipe lines. Since 1945 in responsible charge of several major pipe line construction projects.

JACQUES H. WAGNER, Alexandria; age 60. Endorsed: T. C. David, C. A. Myers, F. H. Coughlin. University of Berlin, 1907-1912, E. E. and M. E. degrees. Engaged for past 17 years in private practice of heating and air-conditioning engineering in Alexandria, La.

HAROLD S. WILSON, New Orleans; age 30. Endorsed: S. C. Braselman, A. M. Hill ,A. J. Naquin. Clemson A & M College, B.S.E.E., 1941. Liberty Mutual Insurance Co., Safety Engineer, 42 months. Professional Engineer, Alabama, No. 1650. Associate Member AIEE, ASSE, Birmingham Engineers Club.

For Transfer from Junior to Full Member

THOMAS J. RENNIE, New Orleans; age 32. Tulane University, B.E. in C.E. City of N.O. Engineer's Office, Field Engineer, 1940-42. U. S. Marine Corps, Engineering Officer, 1942-46. City Engineer's Office, Maintenance Engr., Plan & Design Engineer, 1946 to date.

For Affiliate Member

JAMES E. DAVIS, Alexandria; age 47. Endorsed: Soule Butler, W. J. Keating, E. Levy. Camp Claiborne, La., Electrical Supt., 4 yrs. U. S. Navy, Camden, Ark., Electrical Inspector, 3 yrs. U. S. Navy, San Francisco, Calif., Electrical Inspector, 1 yr.

RAYMOND S. DERROUGH, Alexandria; age 23. Endorsed: Soule Butler, Barnet Brezner, Chas. A. Myers. Alexandria Trade School, Air-conditioning, Refrigeration, 1947-49. City of Alexandria, Rodman, Instrumentman, Inspector, 1949 to date. Member La. Public Service Ass'n.

PRESTON M. FLOYD, JR., Baton Rouge; age 51. Endorsed: F. G. Hornsby, A. J. Mary, J. A. Ellis. Wiggins Elec. Co., Shop Foreman, 1918-20. K Electric Works, Owner and Operator, 1936-47. Floyd Electric Works, President, 1947-date.

H. R. GILBERT, New Orleans; age 34. Endorsed: M. R. Guell, B. B. Pierce, G. H. Hundemer. Gaylord Container Corp., power plant operation and instrument work, 1934-41. E. I. DuPont Co., Instrument supervision, 1941-47. John H. Carter Co., N. O., Sales & Service Mech. Equipment, 1947-date. Member Instrument Society of America.

CLINT C. HAMM, Alexandria; age 46. Endorsed: Soule Butler, T. C. David, C. A. Myers. La. Dept. of Highways, Senior Concrete Inspector, 15 yrs. Camp Claiborne, La., Chief Inspector charge of Concrete Operations, 2 yrs. City of Alexandria, La., Senior Inspector, 1 yr.

JAMES C. HARRIS, Alexandria; age 37. Endorsed: Soule Butler, F. H. Coughlin, T. C. David. Louisiana State University, B.A. degree, 1935. Hill, Harris & Co., Dept. Head, 1935-41. U.S. Navy, Deck Division, Eng. Division & Chief Engineer (Lt.), 1942-45. Hill, Harris & Co., Dept. Head, building materials and construction, 1946-date.

WALTER L. HASTINGS, West Monroe; age 23. Endorsed: E. E. Ford, S. E. Huey, W. M. Saunders. Northeast Jr. College of La. State University, Pre-Engineering, 1943-45. Yale University, Fall Semester 1945, N.R.O.T.C. La. State University, Fall Semester, 1947, Petroleum Engr. Louisiana Well Co., Monroe, Sales Engineer.

OLLIE L. HYDE, Bunkie; age 46. Endorsed: F. H. Coughlin, E. Hogge, P. E. Randol. Responsible for electric distribution, construction and connection of D. C. to A. C. systems, 1925-26. Responsible for operation of small electrical and ice manufacturing plants, 1927-29. Electric serviceman, 1930-38. Division Supt., Electrical Transmission and Distribution System, 1938-47. Central Louisiana Electric Co., Operating Supt., 1947-date.

HAROLD IVAN MORRIS, Port Sulphur; age 32. Endorsed: J. R. Rombach, R. H. Earl, R. L. Williams. Tulane University, Mechanical Engineering, 1936-38. Rutgers University, Mechanical Engineering, 1943-44, Army Certificate of graduation in Engineering. New Orleans Public Schools, Industrial Arts Instructor, 1938-41. Army Service, 1941-45. Freeport Sulphur Co., Draftsman, 1945-date.

ROBERT W. SEYMOUR, New Orleans; age 53. Endorsed: C. P. Knost, N. H. Ross, D. W. Stewart. University of South Carolina, B.S.Ch.E., 1918. Electric Storage & Battery Co., Industrial and Railway Division, Sales Engineer, 1923-44; Manager New Orleans Branch, 1944-date.

JOHN C. STEPHENSON, Franklin; age 35. Endorsed: J. E. Jarman, C. E. Joubert, J. C. Watson. United States Engineer District, 1942-46. La. Dept. of Highways, Responsible charge, Nov. 1946 to date.

FRANK C. WALTERS, Baton Rouge; age 48. Endorsed: T. E. Peak, W. A. Whitaker, O. R. Menton. Lehigh University, Bethlehem, Pa., graduate 1925 (Marine Engineer, B.A.) Standard Oil Co. of N.J., Merchant Marine Engine Dept., 3 yrs. Esso Standard Oil Co., foreign affiliate (NKPM), Purchasing Agent, 2 yrs; Baton Rouge Refinery, Purchasing Dept., 18 yrs.

WALTER SCOTT WARE, Monroe; age 39. Endorsed: S. S. Gill, A. T. Givens, S. E. Huey. Texas A & M College, Mechanical Engineering, 1927-30. Union Bag & Paper Corp., Machine Shop Foreman, 1942-46; Master Mechanic, 1946-47. James Machine Works, Machine Shop Foreman, 1947-48. Negley Bag & Paper Co., Plant Engineer, 1948-50. Prior to 1942, 10 yrs. machinist work and engineering. Recently designed and built improved bag-making machine and now engaged in further work of this nature.

O. D. WHITE, Alexandria; age 46. Endorsed: H. L. Lehmann, T. F. Colbert, Soule Butler. University of Mississippi, Civil Engineering, 1924-27. La. Dept. of Highways, District Construction Engineer, 1947-50; Project Engineer, 1946-47. U.S. Navy Construction Battalion, 1943-46. La. Dept. of Highways, Project Engineer, Instrumentman, 1931-43. Missouri Pacific R.R. Co., Rodman & Instrumentman, 1928-31. Illinois Central R.R. Co., 1925-28.

For Junior Member

JAMES G. ATTEBERRY, Shreveport; age 24. Endorsed: J. E. Allen, H. N. Brown, R. H. Vaughan. Louisiana State University, B.S.C.E., 1948. Gulf Oil Co., Asst. Civil Engineer, 1948-49. La. Dept. of Highways, Senior Instrumentman, 1950. Licensed C.E., La.

JAMES H. BRADLEY, Shreveport; age 23. Endorsed: J. T. Folk, W. C. Sorensen, C. T. Watts. Louisiana Polytechnic Institute, B.S.C.E., 1949. Neild-Somdal Associates, Architects, June 1949 to date. Licensed C.E., La.

WILLIAM D. FORTNER, New Iberia; age 28. Endorsed: L. J. Lassalle, H. R. Mason, W. P. Wallace. Mississippi State College, 1940-42, Louosiana State University, 1946-48, B.S.M.E. United Gas Corp., Junior Engineer, Engineer, Utilization Engr. charge of Air-conditioning Dept., Jan. 1948 to date.

GEORGE C. FUGLER, New Iberia; age 23. Endorsed: L. J. Lassalle, W. J. Evans, L. H. Bartlett. Louisiana Polytechnic Institute, 1947-48. Louisiana State University, 1944-45, 1948-50, B.S.M.E. (Jan. 1950). La. State University Experiment Station, Research Asst., 1949-50. United Gas Corp., New Iberia, Junior Air Conditioning Engineer, Feb. 1950 to date. Student member ASME.

NEWTON HIMEL, Bunkie, age 27. Endorsed: F. H. Coughlin, E. Hogge, P. E. Randol. Southwestern Louisiana Institute, 1941-44, 1946-48, B.S.E.E. Jan. 1948. Central Louisiana Electric Co., 1948 to date, now in charge rural line construction.

GUY W. MILLER, Baton Rouge; age 25. Endorsed: J. A. Ellis, A. M. Melancon, A. J. Mary. Louisiana State University, B.S.EE., 1948. Geophysical Service Inc., Junior Observer on Seismograph Crew, 1948-49. Gulf States Utilities Co., Junior Engineer, Dec. 1949 to date.

MALCOLM LEO HURSTELL, New Orleans; age 22. Endorsed: M. C. Abrahm, L. J. Cucullu, F. E. Johnson. Louisiana State University, B.S.E.E., 1948. N.O Public Service, Asst. Engineer, 1948-50.

WALTER C. McCALLUM, JR., Maplewood; age 26. Endorsed: C. U. Schexnailder, R. L. Theaux(R. R. L. Ward. Louisiana Polytechnic Institute, 1940-41, 1945-49, B.S.M.E. Cit-Con Oil Corp., Draftsman Member ASME.

ROBERT WRAY ROHRMAN, Maplewood ;age 29. Endorsed: C. U. Schexnailder, R. L. Theaux, R. R. L. Ward. Texas A & M College, 1938-39, 1946-49, B.S.M.E. Cit-Con Oil Corp., Draftsman, 1949 to date. Member National Ass'n. Corrosion Engineers.

ASHBY B. STEVENS, St. Landry; age 26. Endorsed: E. Hogge, H. R. Mason, P. E. Randol. Southwestern Louisiana Institute, 1942-43, 1944-46, 1947-48, B.S.E.E. Central Louisiana Electric Co., Inc., Coughlin Operating Station, Test Engineer, June 1948 to date.

DANIEL H. VLIET, New Orleans; age 28. Endorsed: A. P. Whitman, Jr., C. W. Ricker, J. P. Fernandez. Tulane University, B.S.E.E., 1949. N. O. Public Service Inc., June-Sept. 1949. Tulane University, Instructor in E.E., Sept. 1949 to date.

CHARLES RAY WESTERCHIL, Alexandria; age 27. Endorsed: Soule Butler, T. C. David, C. A. Myers. Louisiana Polytechnic Institute, 1943-45, 1946-48, B.S.C.E. La. Dept. of Highways, Inspector, June-Sept 1947. City of Alexandria, Engineering Dept., Jr. Civil Engineer, June 1948-date. Licensed C.E., La.

CLAUDE D. WILKERSON, Alexandria; age 22. Endorsed: Soule Butler, T. C. David, C. A. Myers. Louisiana State University, B.S.M.E., 1950. Wilkerson Plumbing & Heating Co., intermittent employment during last 6 years, now Estimator & Supervisor installation of plumbing and heating on commercial work. Junior Member, ASME.

For Transfer from Student to Junior Member

The following graduates of Southwestern Louisiana Institute:

DONALD T. BOUMANS, graduate in Chemical Engineering

OLIVIER BROUSSARD III, graduate in Civil Engineering

FRANK I. KIEFER, graduate in Chemical Engineering

EMETERIO I. RAMIREZ, graduate in Electrical Engineering

VICTOR R. RAXDALE, graduate in Civil Engineering

ELMORE G. RUSSELL, graduate in Electrical Engineering

REUBEN D. STOGNER, graduate in Electrical Engineering

WALTER E. TANNER, graduate in Chemical Engineering

RAYNAUD J. THIBODEAUX, graduate in Civil Engineering

PAPERS AND DISCUSSIONS

CHEMISTRY AT WORK DEVELOPING NEW USES FOR FARM PRODUCTS

By Harry P. Newton*

I am very glad to have the opportunity of appearing before the Lafayette Section to discuss some of the chemurgic research by which scientists of the Southern Regional Research Laboratory hope to contribute to the industrial future of the South. In this aim of public service, I can say unreservedly that I feel an unusual bond with you who are surely as devoted as ourselves to gaining the present and the future economic security of the region.

I always use the word future carefully, for I recall what the British journalist and philosopher G. K. Chesterton said. "The future is a soft job," he said. "You can make it what you like. But it requires courage to face the past because the past is full of facts which cannot be got over."

Fortunately, the type of work we are doing at the Southern Regional Research Laboratory has reached a point of such undeniable achievement that we feel secure in looking back upon it. Of course, we are continually aware that research means "search again" and implies continual progression. We know that although what is scientifically new is understood to be better than what is past ,every new development in time is inevitably supplanted by what is newer and better.

Of the many movements started in our day with the idea of improving the welfare of the average man, I know of none more fitting to democracy than the chemurgic movement. The immediate aim of chemurgy—which means literally chemistry at work—is the enlargement of nonfood uses for farm products. Its ultimate goal is the enrichment of life equally for farmers, industrialists, and the millions of purchasers of their products. This principle is certainly not new in the history of man, but it ushers in a completely new philosophy of agricultural research.

In 1936 a group of foresighted Southern leaders met in Lafayette, Louisiana, with the express purpose of committing themselves to this new philosophy. They did this by launching the chemurgic movement in their region. These men realized that however well entrenched in usefulness agricultural crops may be, there is hardly one which may not some day have to battle against unexpected rivals. They recognized that no crop is so secure that it can afford

* An address before the Lafayette Section, Louisiana Engineering Society, Lafayette, La., October 10, 1950. Gen. Newton is Asst. Director of Southern Regional Research Laboratory at New Orleans, and is Vice-President of L. E. S.

to ignore the search for potential new uses to supplement its traditional markets. Their action, in fact, demonstrated that complacency today in any branch of agriculture or in any segment of industry is as out of date as the first steam engine.

The satisfaction that we at the Southern Regional Research Laboratory feel in contributing to the advancement of the chemurgic program I am sure can be well understood by each of you here.

You may be familiar with some of the ways in which the Southern Laboratory is applying chemistry to expand the markets of cotton and cottonseed; peanuts; sweetpotatoes; rice, tung, sesame seed, and a few other oilseeds. Do you also know that we carry out a large program of research on modernizing the gum naval stores industry—the industry which deals with the pine gum products, turpentine and rosin? Or that we also investigate chemical problems in connection with citrus friuts, sugarcane and sirup, and the brining and pickling of vegetables? In all our work, we place emphasis on bringing in results of dollars and cents value to agriculture and industry. To accomplish this, we necessarily maintain a close alliance with these two branches. Often we depend on their collaboration to take our developments into large-scale trials.

Another thing to keep in mind about the approach we make to our objectives is this: We constantly remember that true science possesses an "infinite capacity for taking pains," to use the phrase of Matthew Arnold when he was referring to genius. By this I mean to point out that science is long-suffering indeed, looks for distinguished results only after innumerable basic investigations, and even then expects the spectacular rarely.

The five specific projects which I have selected for discussion tonight each may represent a potential link with your interests. If and when these and others of our developments are fully practiced by industry, they can be expected to lead to the employment of engineers. While for most of the new operations involved, electric power may be purchased, sometimes it may be manufactured at the plants. Mainly, therefore, in their overall contribution to the improved economy of the locality our achievements may well lend support to some of your own developments. An article which points up the relation I want to emphasize between the use of industrial chemical processes and the power-producing companies appeared in Chemical Engineering Progress in March, 1948.* It reported a study of a cross section of plants in the chemical industries showing that the amount of electric energy consumed in any

---

* Pierce, David L., "A Common Denominator for Repair Costs." Chem. Eng. Progress 44 (No. 3) 249-52 (1948).

plant is a good measure of its entire activity. The writer, David L. Pierce, says: "It is possible to use 1,000 kilowatt hours as a unit of activity (of the plant) and to refer the various components of plant cost to kilowatt hours as a common denominator (in the comparison of different plants)***"

Cotton Fiber Research

I want to describe as my first example of our work one line of fundamental cotton fiber investigations. We attach a good deal of importance to this type of research, for it supplies the basic data upon which practical results are eventually obtained.

Cotton fiber is almost all cellulose, and cellulose is a carbohydrate containing chemical groups that combine with acids and alcohols to form cellulose derivatives, esters and ethers. These cotton cellulose derivatives have characteristics that differ from those of the original cotton, although they retain the fibrous qualities, the strength, and the appearance of the untreated cotton.

For instance, we have recently produced several entirely new types of fabrics by conversion of cotton cellulose into a new cellulose compound. Specifically, the reactive hydroxyl groups have been replaced with amino or with phosphate groups. We have demonstrated that aminized and phosphorylated cottons—among other new properties they acquire—become good ion-exchangers.

Ion-exchanger is a process used commercially to remove mineral impurities from solutions of certain products. For instance, calcium and magnesium compounds can be removed from water to soften it by use of ion-exchange materials. Another commercial use of ion-exchangers is to remove mineral salts to purify sugar syrups. At present, the usual commercial ion-exchangers are granular resins. Our cotton ion-exchange fabrics have the advantage over the resins in that their fabric form permits them to be more readily handled; yet they enter into the same desired reactions.

Ordinary textile machinery has been used at the Southern Laboratory to produce aminized and phosphorylated fabrics. The experimentally produced fabrics have then been used in an ion-exchange capacity in research on the production of peanut protein. Solutions used to disperse peanut protein have to be first made alkaline. Treatment with aminized fabric accomplishes this. The protein is precipitated out of solution by a process of ion-exchange. The phosphorylated fabric serves for this. With the fabric form of ion-exchanger, purer peanut proteins can be obtained since non-protein substances, like ash and phosphorous present in the dispersion, will remain on the fabric and will not be precipitated along with the protein.

How, you are asking, does this work tie in with any of your aims? The idea of a manufactured fiber from peanut protein is perhaps

new to you. Yet a beautiful silky and warm peanut protein fiber has been produced experimentally in our laboratory and also by a Southern manufacturer. Production of peanut protein fiber, technologically feasible, awaits the commercial availability of an adequate supply of high-quality protein obtained from solvent-extracted peanut meal. The manufacture of peanut and other proteins for use in synthetic fibers requires motor-driven machinery at every step of processing. Hence it is possible that the use of cotton fabrics as ion-exchange materials, by permitting purer proteins for production of new protein fibers, will contribute in a sense to the increased use of engineering knowledge, heavy equipment and power facilities.

Naval Stores Research

I can give you at least one truly spectacular example of assistance that our research has rendered to Southern farmers and to Southern industry. I refer to some of the radical results that the Naval Stores Research division of our Bureau of Agricultural and Industrial Chemistry has brought about in methods of processing turpentine and rosin. It can be said without the slightest reservation that because of this research the entire picture of pine gum distillation has changed over the last 10 years.

Naval stores production, as old as any industry in America,, is today exclusively centered in the Southeastern States. Only a very few years ago this industry was entirely carried out by methods dating from Colonial days. A copper kettle was set directly over a wood fire and the pine gum, just as it came from the woods, was dumped in and distilled. The techniques used were wasteful and entirely dependent upon the skill of the particular operator. Fire stills of this type have almost completely disappeared—they number only 100 today in contrast to about 2500 twenty years ago.

Instead, today the enterprise is carried out in 28 centrally located, highly modern plants using steam to preclean pine gum and to distill it into fine-quality turpentine and rosin whose superior properties make them suitable for entirely new uses. About 90 percent of all gum rosin and turpentine is steam-distilled from gum precleaned by sparging with steam. To realibe the maximum advantages from the speeded up steam processes, electrical auxiliary equipment is now used at every other step of manufacture. Installed throughout are automatic controls, regulating devices, pumps, lifts, which provide complete mechanization of production. This remarkable change-over from small-, individual-scale to large-scale operations I believe furnishes an excellent example of the beneficial and far-reaching effect that agricultural research achievements can have upon the overall economy of a whole region.

I want to say more about the unique pine gum precleaning pro-

cess. This method was invented by chemists and chemical engineers of the Division's field station in Olustee, Florida, and is known as the Olustee process. When pine gum is first manufactured in the tree it is clear and clean. But the moment it exudes on the surface of the tree, degradation begins. When the gum comes into contact with the air, oxidation, or rusting, occurs, caused by reaction of the metal cup with certain acids in the gum. Pine needles, bits of bark, and other particles of dirt also fall into the cup.

It is, of course, impossible to make clear rosin and pure turpentine from such trash-filled gum without precleaning. The rosin even after it is stranied through three media remains dark-colored, "speeky", or hazy; and, besides, a good part is wasted in the straining.

In the Olustee gum cleaning method the crude gum is diluted in turpentine; then melted, filtered, and washed in water. If the gum is stained with iron rust, oxalic acid is reacted with the iron to form iron oxalate which can be easily filtered out. By use of this process, no matter what amount of trash or how discolored a barrel of crude pine gum is ,it finds a ready market at the central processing plant. The gum farmer, within a few minutes of unloading his truck at the platform, is leaving the still with his cash payment. The central stiller who purchases the gum knows that whether the grade is up to Water White or down to "Harry" he can produce from it brilliant, microscopically clean rosin and sparkling turpentine.

Improved gum cleaning is just one of several developments of government research which together have so conspicuously modernized naval stores production.

The steam still to replace the fire still was another contribution of our Bureau. The Station is now working to perfect a continuous process of steam distillation to replace the present batch process.

Citrus Fruit and Sugarcane Investigations

Let me turn finally to two lines of research followed by the Agricultural Chemical Research Division of our Laboratory. My examples are chosen from the citrus fruit and the sugarcane investigations of this Division—one, a successful method of producing a highly concentracted frozen orange, grapefruit, or tangerine juice; the other, a commercial method for the recovery of aconitic acid, a compound in sugarcane of highly important industrial possibilities.

Again, these two achievements, like those mentioned in the naval stores field, furnish a distinguished example of that type of coopera-

tion between industry, agriculture, and science in which the chemurgic program is putting its faith.

Citrus Fruit Investigations. In Florida, particularly, where citrus fruits form the largest single agricultural crop, tremendous benefits have been derived as a direct result of cooperative research between the Agricultural Chemical Research Division and the Florida Citrus Commission.

Over a long period, scientists of the Division's field station in Winter Haven, Florida, have extensively studied methods of packing orange juice to retain its flavor and aroma. The method for producing a 4-fold orange juice concentrate is the most recent accomplishment in this phase of their research.

The national publicity given to this development has not been exaggerated; for the economic importance of the process to Florida citrus fruit growers cannot be over-emphasized. The process is in use by 16 large processors in Florida as well as by 11 in California. In the Florida 1950 season over 22 million gallons of concentrate were marketed, with production expected to go up to 35 million gallons next season. The excellence of this product has had the effect of raising the market price of Florida citrus.

Sugarcane Investigations. Louisiana and Florida are the two states significantly engaged in growing and processing sugarcane. Sugarcane farming and the sugar molasses industry are, of course, traditional in Louisiana.

Besides sugar, sugarcane contains a fairly long list of other compounds, all of which have not yet been separated and characterized nor channeled into end uses.

One of these components is aconitic acid. Esters of aconitic acid are useful as plasticizers and stabilizers; and in synthetic rubber they impart flexibility at low temperatures. A method we have developed for recovering this acid from sugarcane is in its fifth season of successful use at the largest sugar mill in Louisiana. Production of the acid at this mill has climbed to nearly one million pounds. Well over a million pounds is scheduled for next season. It is estimated that 4 to 5 million pounds can eventually be produced from Louisiana varieties of cane.

Briefly, the process of recovery consists of forming the insoluble calcium-magnesium salt of aconitic acid and separating this aconitate by centrifuging. Aconitic acid can also be obtained from sorgo sirup by this method. But only sugarcane molasses is produced on a large enough scale to make the application economical.

Costs of installation and operating costs are low in relation to the financial returns from the sale of the product.

Before this work, aconitic acid had long been considered only a substance that caused trouble during one step in sugar production. It precipitated from the sirups or molasses and occasionally caused scaling in evaporating equipment which reduced processing efficiency and had an injurious effect upon the products.

One significant effect of adoption of the process is that it can be used after the end of the regular grinding season. Last season the Louisiana mill which uses the process remained open several months beyond its normal shut-down date.

The many possibilities of this research for further developments are being assiduously pursued by the Agricultural Chemical Research Division. As just one example of the work that remains to be done, it is necessary to evaluate to what extent the content of aconitic acid is variously affected by the sugarcane variety, the type of growth, the location of the crop, and several similar factors.

Pilot-Plant Investigations. Since the chemical industries today are the largest users of electrical equipment, I think that it would be pertinent before closing my talk to mention our pilot-plant in which promising developments from the laboratory stage are further developed using larger units for studies of cost and processing problems and to produce materials and products for further study as to commercial possibilities. The specific function of any pilot plant, of course, is to obtain quantitative data for the design of a commercial plant.

The experimental plant is thus the forerunner of additional industrial plants using chemical processes. The solution of many technological and engineering problems prior to actual operation of the commercial plant reduces the risks of a new enterprise.

Our Southern Laboratory pilot-plant units provide sizeable quantities of cottonseed, peanut, and other oilseed products for research investigations by our own Laboratory and by outside research groups or companies. These products are manufactured by the conventional hydraulic and screw press methods of extraction or by the recently introduced solvent-extraction methods.

Other pilot-plant activities on oilseeds include solvent crystallization, refining, bleaching, and deodorization investigations. Also protein production research and the production of sweetpotato starch have been extensively carried out on this practical scale.

Conclusion. In conclusion I want to sum up a few of the points I have attempted to make. First, that the research program of your

Department of Agriculture's Southern Regional Research Laboratory is one part of a nationwide movement to utilize farm crops as a means of safeguarding the abundance of the good things of the earth to which we are used.

Second, that any institution doing chemurgic research attains its objectives only when it joins hands with agriculture and industry. As a final point, I want to stress that our scientists have a vital interest in making all they do understandable to the layman and continually desire to produce results that will be of practical benefit to many. This idea imbues, I believe, research institutions such as ours with an unusual animateness, an aliveness of purpose, which certainly will act favorably upon the future of research.

Considering the transformation in our everyday life which modern chemical science has worked in the century and three-quarters of its existence—saying that it began with the discovery of oxygen in 1774—it becomes possible to believe that chemistry at work for man may be only on the threshold of its potential achievement.

ENGINEERING BRIEFS

Aid to Sanitary Engineering Education. The shortage of doctors and other professional groups in the health field has been emphasized anew by the Korean situation. As a result there is now developing a **new demand for enactment of pending legislation to authorize a federal program of financial assistance for the education of those in the health fields.** The Senate passed a bill along this line last summer but the House committee handling a similar bill decided to table the matter for this session. With the situation completely changed now and with the prospect of Congress staying in session the House group may reopen consideration of the legislation.

The legislation would provide for payments to schools having courses in certain public health fields to meet costs of instruction, construction of new facilities, and equipment. The **original bills included sanitary engineering as one of the fields to be covered,** but the senate committee eliminated the sanitary engineering field on the ground that it is difficult to segregate the curriculum and cost of training sanitary engineers and because the bill included schools of public health, which give advanced training to public-health engineers. The committee recognized the shortage of sanitary engineers, however, and stated that the number of graduate sanitary engineers must be doubled.

The tabled House bill went along with this elimination of sanitary engineering but Representative Andrew J. Biemiller, D., Wis.), has now introduced a **new bill to revive the subject and his new** measure includes sanitary engineering. The immediate question is whether the House committee will reconsider its previous action in light of the present situation, and, if so, whether it will retain sanitary engineering or go along with the Senate in eliminating this field. (H.R. 888.)

* * *

Social Security Conferees Agree On P. E. Exclusion. Action on the social security revision bill is near completion with the tentative agreement of Senate-House conferees on the differences between the two bills. The House members have agreed to the Senate's changes regarding the status of self-employed professionals. Under the approved wording **self-employed persons in named professional occupations will not be covered. The bill names "professional engineers" as one of the groups to be excluded,** as contrasted with the House bill which had excluded engineers by designation of certain branches of engineering. Architects are also excluded, as well as doctors, lawyers, dentists, accountants, etc.

Other major provisions of the conference agreement are: the payroll tax on employers and employees will remain at 1½% for the next three years; **the tax will be against the first $3600; of pay instead of the present $3000;** the provisions for permanent disability payments has been discarded; **self-employed contributors will pay one-and-one-half times the tax of an employee contributor** federal, state, and municipal employees, not covered by another retirement system, generally would come under coverage; benefits payments are substantially increased.

It is expected that both Houses of Congress will approve the conference report without any delay.—Legislative Bulletin of the National Society of Professional Engineers.

* * *

Transforming old railroad rails into useful products such as fence posts, bedsteads, clothes poles, wheelbarrow handles and playground equipment, keeps about 20 mills busy in the United States and Canada, says American Iron and Steel Institute. The old rails are not remelted. They are heated to rolling temperature in a furnace and then are sliced into three parts—the head of the rail; the web, namely the middle parts of the rail; and the flange or base of the rail. Each of these sections is then rolled to the required size and shape. Concrete reinforcing bars, structural tubing and light rails are the principal products rolled. About 700,000 tons of finished product, mostly bars, are rolled each year from old material such as rails, axles and other products suitable for conversion by hot rolling without remelting. Rails have been used as a source of material for re-rolling since about 1860.—Power Engineering.

* * *

Automobile Horns can be made less raucus and yet just as loud, says an acoustics expert at Armour Research Foundation of Illinois Institute of Technology. The formula: cut out some of the high notes.

Daniel Callaway, associate physicist at the Foundation, describes a two-month study of horns, sponsored by the Foundation as part of a general survey of all city noises, which led to his assertion that the higher pitches of horn blasts ought to be removed. He said it could be done at lost cost, with the saving on nerves more than making up the difference.

Three types of car horns were investigated: 1.—electrically operated trumpet, made up in pairs and harmonically tuned. These are found on most new cars. 2.—compressed air, the long, deluxe models sometimes custom installed on expensive cars. 3.—vibrating diaphragm, or "beep-beep" type, the least expensive.

Models of all three types got the same treatment and analysis, both in the laboratory and the field. The horns ranged from 100 to 115 decibels at 10 ft, Callaway reported, which is "very loud," since the traffic measures from 70 to 90 decibels on the sound meter.

Callaway would cut out all sound above 1200 cycles per second, leaving the lower frequencies as they are. He did this electronically on a recording of a horn blast and reported improvement.

Work on a special horn using only the frequencies below 1200 cycles per second is going on at the Foundation.

"The worst thing about automobile horns is how people use them," admitted Callaway. "We can't solve that in the laboratory." —Power Engineering.

* * *

Aluminum Successfully Soldered by Ultrasonic Soldering Iron— Aluminum and other light metals can now be soldered successfully by means of a new soldering iron which is simple to use and requires no flux. By means of ultrasonic stimulation, it provides a clean surface by destroying the refractory oxides which form on aluminum and other light metals, and thereby facilitates soldering.

It consists essentially of a removable copper soldering head and a magnetostriction transducer. A conventional resistance winding heats the head, and the latter is secured to a brass block which is in contact with the nickel core of the transducer. An electronic amplifier supplies the ultrasonic power required to drive the transducer.

In use, the soldering head is brought to the desired temperature, the transducer is energized, and the head is tinned. Standard soft solders may be used, except that a solder with a tin-zinc base is preferable to a tin-lead alloy to avoid electrolytic action. After tinning the head of the iron, the soldering operation is performed in the conventional manner.

No discomfort is experienced by the operator, since the ultrasonic frequency used to operate this soldering iron is well above normal audible range.

This new sodering iron is being marketed by Mullard Electronic Products, Ltd., Century House, Shaftesbury Ave., London, W.C. 2, England.—Aminco Laboratory News.

* * *

New Television System Aids in Factory Supervision. Activities in factories can now be viewed by the superintendent without leaving his office desk, and classroom activities in the school can be noted from the principal's desk by means of a new industrial television system which is small enough and cheap enough for wide usage.

In addition to the applications suggested for the system, many others are possible. Important is the viewing of dangerous operations from a safe distance, as perhaps, where radioactivity is concerned.

The new system is a non-broadcasting type, and transmission from workrooms to the central office is by wire. The system is capable of transmitting a signal 500 feet over a coaxial cable closed circuit. In factory rooms or other places to be viewed frequently, a camera is kept in a fixed position and operated and even focused from a master unit in the central office. The picture is shown as in a conventional receiver.

The heart of the new system is a camera about the size of a personal-type 16-mm. movie camera. The key of the camera is a new pickup tube called a Vidicon, which is only one inch in diameter and six inches long. This new tube, and the industrial television system made possible by it, is a development of Radio Corp. of America.

A suitcase-size control box is the only other unit required for operation. This combines the power supply, a small synchronizing generator, a video amplifier strip, scanning deflection equipment, and a 7-in. kinescope monitor in a single housing. The entire system operates on ordinary 110-volt 60-cycle alternating-current, and consumes only about one-third the power used by a household electric toaster.

If desired, home television receivers can be adapted for use as monitors. To do this, an additional tube in the receiver is required, together with the accompanying resistors and capacitors.—Aminco Laboratory News.

* * *

New Camera Produces 100,000,000 Frames per Second. A camera, said to be capable of producing 100,000,000 frames a second, has been developed by the Army at Aberdeen Proving Ground, Md.

It is designed to take pictures of shock and detonation waves in explosions and other high-velocity phenomena.

The instrument, designed by Morton Sultanoff, may be of material aid in the future design of weapons of war, he declared, as well as in automotive gasoline engines.

By means of a framing grid consisting of a series of narrow parallel slits, cut at uniform intervals in an opaque plate, and a rotating mirror which sweeps a full-size image of the grid across a 4x5-in. photographic plate ,the camera can register up to 300 four-by-four frames on a single plate, he stated.

The resulting pictures on the plate can be viewed separately or

in sequence by moving the developed plate across a grill composed of parallel black lines corresponding to the space between the slits in the framing grid.

By using a specially designed viewing device with a micrometer which moves the composite image accurately across the grill, it is possible to see shock waves which radiate from an explosive charge at approximately 18,000 miles an hour, he added.—Aminco Laboratory News.

* * *

Good Engineering Logic? The taxpayer helps Farmer Brown pay his fertilizer bill, perhaps as much as 40% of the total. Farmer Brown then produces surplusses, which taxpayer has to buy at support prices because he helped with the fertilizer bill. Makes sense, doesn't it?

* * *

Ex Profundo. The problems of the ocean are being attacked with increased vigor and promise answers with widespread practical applications. While much is known about the land areas of the earth and their natural resources, most of the details of the seas, which cover three times as much area ,are still little known. In a hungry world, the food resources of the sea must be fully utilized, and in a world geared to rapid transportation and communication, the effect of the sea on weather, radio reception, and shipping must be fully understood.

Since oceanography deals with both the interrelation between marine organisms and their environment and between the ocean and its boundaries, many sciences and fields for research contribute to the slowly building body of knowledge. Oceanographers are usually trained in physics, chemistry, biology, or geology, and adapt the methods of each science to the parts of the problem. Much of the research is done in terms, for many sciences are needed to explain some of the oceans' complex phenomena. Students in oceanography usually supplement college courses with summer work at an oceanographic center. Several government agencies, universities, and private institutions carry on oceanographic research, and many universities offer some related work in connection with other courses, such as marine biology. The leading non-government centers of research and teaching are the independent Woods Hole Oceanographic Institution on Cape Cod, the Scripps Institution of Oceanography of the University of California at La Jolla, the Oceanographic Laboratories of the University of Washington, the Bingham Oceanographic Laboratory at Yale, the Marine Laboratory of Miami University, and the new Chesapeake Bay Institute of Johns Hopkins University.

Ocean floors charted

The sediment of the ocean bottom reveals much information on the history of the earth. New "coring" devices developed during and since the war can take samples up to 60 feet deep from the material covering the ocean floor. Since it probably takes 500 to 3000 years to deposit an inch of sediment in the deep ocean, the fossil remains in such a sample can give evidence of climatic changes occurring over the past million years or more. The deposition of marine sediments is of increasing interest to petroleum geologists in the search for new oilfields on the Continental shelves.

Continuously recording echo-sounders, which "bounce" sound waves off the bottom ,combined with use of the Loran radio network to fix the ship's position, help in charting the bottom accurately. It may also be possible for submarines with such charts to ascertain their positions by the use of recording echo-sounding devices. From the bottom profiles much has been learned of the gigantic mountains, canyons, and plains of the ocean floors. Both geological information and better navigational charts will result from such studies.

The problems of circulation of the water are fundamental to oceanography. Wind, climate, and the character of the ocean bottom influence ocean currents. Greater knowledge of the interaction of the ocean surface and the layer of air above it would help in advancing long-range weather forecasting. On a more local scale, recent studies of circulation in tidal waters have been invaluable to coastal communities and industries seeking to utilize the ocean for waste disposal.

Using Loran and the bathythermograph—an instrument for measuring and recording the temperature of the water from the surface down to 900 feet, from a vessel moving at full speed—a current can be followed. On recent cruises of the Woods Hole research ship, Atlantis, it was found that the Gulf Stream meanders in wide loops from its "mean" course as noted on the charts. Since unsuspected and constantly shifting eddies and countercurrents could influence considerably the course of a ship, an iceberg, or a storm, such studies are of immediate practical interest.

A new current-measuring device developed at Woods Hole may prove to be a valuable aid to navigation, although it was originally developed for charting currents. It uses the earth's magnetic field as a reference frame, and hence does not require celestial, terrestrial, or electronic landmarks, which are frequently unavailable. Since ocean currents are sometimes as swift as five knots, and many ships can make only ten knots or so, it is important to economy of operation as well as to navigational accuracy to know whether the

featureless wilderness of water is moving with, against, or across the ship's path.

Data accumulated over a number of years, and thought to be mainly of academic interest, led to many practical applications during the war. Extensive studies of wave formation, frequency, and height aided in planning amphibious landings and cargo movements. These studies are continuing; such information is useful also for naval architects and for engineers planning wharves, breakwaters, oil-well platforms, and underwater structures, as well as in preventing beach erosion.—Industrial Bulletin of Arthur D. Little, Inc.

* * *

Building On Air. New lightweight aggregates used instead of sand and gravel to make concrete and plaster have reached their stride with the current building boom, and prospects are for increasing use. Two materials widely used only within the past decade are already the basis of flourishing industries. Vermiculite, a type of mica, and perlite, a volcanic glass, both swell up when heated to give lightweight concrete and plaster aggregates with excellent thermal and acoustical insulating properties.

Expanded perlite and vermiculite weigh six to fourteen pounds per cubic foot, as compared with 50 pounds for the older medium-weight aggregates and 160 for sand, gravel, and stone. Although the new materials are usually not suitable for heavy load-bearing purposes, as are the medium-weight concretes, they are widely used in roof and floor slabs and fill, and in plasters, and are especially useful in fireproofing all-steel construction. Structural steel must be insulated from fire or the heat would make it sag, with resulting collapse of the building. If an 18-inch beam is fireproofed with perlite or vermiculite plaster and metal lath, the coating weighs only 20 to 30 pounds to the linear foot, compared with 220 to 240 pounds for concrete using conventional aggregates. The difference can reduce the weight of the skeleton of a large building by as much as 30 per cent.

Vermiculite was first used for fireproofing skyscrapers in 1941, although its properties had been discovered in 1922. It is mined principally in Montana and South Carolina. Sales of the product after "exfoliation" by heat totaled $15 million in 1949. Perlite, unknown ten years ago, is mined in the West and was introduced on a substantial scale in 1946; the popped product is already a $3 million business. Both products are used throughout the country and are usually expanded after shipment.

Thin interior partitions of lightweight plaster over metal or gypsum lath increase considerably the usable space within a building; they added 25 additional guest rooms to one hotel, for example. New six-inch "curtain" walls for fireproof buildings use perlite in

the outer shell and gypsum for the inner shell. Another advantage of the lightweight aggregates is that ceiling channels may be spaced farther apart when the plaster contains such fillers instead of the usual sand. Perlite and vermiculite form nailable compounds —vermiculite slab has been used in radiant heating systems where, in addition to its excellent insulation from the ground, its nailability results in lowered costs of installation, since pipes can be attached without drilling and bolting.

Medium-weight aggregates

For load-bearing purposes, there are the medium-weight aggregates, weighing about 40 to 60 pounds per cubic foot. A growing market for concrete has been in low-cost homes where mass production methods may be used; ease of handling has increased the market for block in this field. Cinder was the first and most popular medium-weight aggregate and his given its name to this type of concrete block. Demand has increased sharply, however, and decreased use of lump coal in favor of powered coal has made fewer cinders available; thus other materials have come into use. Expanded clay is made by mixing clay with coal or coke and burning it on grates to a temperature near fusing. As gas is developed, the mixture bloats to a viscous material, and then the cooled chunks are crushed to suitable sizes. In recent development work the clay is extruded and cut into small pellets, then expanded in a rotary kiln. Another type of aggregate uses expanded slag from the iron blast furnace, remelted, and treated with steam. Recently, natural pumice has shown a remarkable increase in use for aggregate.— Industrial Bulletin of Arthur D. Little, Inc.

MINUTES OF MEETINGS AND BUSINESS OF THE SOCIETY

Minutes of Meeting of the Board of Direction Held on Monday, July 10, 1950

The meeting was called to order by President Cucullu, with Messrs. Abrahm, Hill, Knost, Lehmann, McNiven, Newton, Seago, Sessums and Fernandez present. Minutes of the preceding meeting were accepted as read. President Cucullu reported that the license law had been passed and that the Society must recommend nominees for appointments to the new board prior to August 25. In this connection, he announced that several committees had been appointed to give the board suggestions and that a lengthy meeting of the board would be required for this matter. A discussion on the printing of the act followed, and it was decided to publish same in the August issue of the Society's Proceedings and that the president would officially express the board's thanks to the Legislative Committee and to all others who have helped secure the legislation, both this year and in the past.

Mr. Abrahm moved that the treasurer be authorized to pay $150.00 for expense incurred incident to the passage of the bill and that this amount be taken from the Surplus Capital Account. The motion was seconded by Mr. Hill and carried.

The secretary reported that all applicants named in the June ballot had been elected.

The semi-annual report of the treasurer was presented.

Mr. McNiven moved that an expenditure up to $750.00 be authorized to cover cost of the Technological Accomplishment Medal, and that the board should explore the possibility of securing a sponsor for this award. The motion was seconded by Mr. Lehmann and carried unanimously.

The resignation of Mr. Lauren W. Singleton was accepted with regret.

Mr. E. J. James of Alexandria was reinstated to membership.

President Cucullu read correspondence concerning the E.C.P.D. Vocational Guidance in high schools of New Orleans.

There being no further business, the meeting adjourned.

JOHN P. FERNANDEZ, Secretary-Treasurer

Minutes of Regular Meeting of The Society Held on Monday, July 10, 1950

The meeting was called to order by President Cucullu in the Jackson Room of the St. Charles Hotel, with approximately 100 members and guests present. Mr. Purinton moved that the reading of minutes of the preceding meeting be dispensed with, seconded by Mr. Graham and carried.

President Cucullu announced that the license bill had been signed by the governor and was now law. He stated that the full text of the act would be printed in the August issue of the Proceedings, and urged all who are eligible to obtain licenses.

The secretary announced that the annual outing would be held on July 27 at the Colonial Country Club and that Mr. J. R. Rombach, Chairman, and his committee had arranged an excellent program.

Mr. Albert A. Glodt then introduced the speaker of the evening, Mr. John E. McGee, District Supervisor of Geophysical Operations, Gulf Research and Development Company, Houston District, who delivered a most interesting and instructive lecture entitled "Geophysical operations in South Louisiana." After a lively question period the meeting adjourned with a rising vote of thanks to the speaker.

JOHN P. FERNANDEZ, Secretary-Treasurer

Murray-Baker-Frederic, Inc.

620-630 SOUTH PETERS STREET
NEW ORLEANS, LA.
RAYMOND 2185

REPRESENTING

Allegheny Ludlum Steel Corp.
E. C. Atkins & Co.
E. B. Badger & Sons Co.
J. T. Baker Chemical Co.
Bethlehem Steel Corp. (Wire Rope)
Black Cat Paint Corporation
Bristol Co.
Buda Company
Carboloy Company, Inc.
Clark Manufacturing Co.
Climax Engineering Co.
Cooper Alloy Foundry Co.
Corning Glass Works
Crane Co.
Crescent Truck Company
Crosby Steam Guage & Valve Company
The Dayton Rubber Co.
Durant Manufacturing Co.
Eagle Iron Works
Ford Meter Box Co.
Foster Engineering Co.
General Controls Co.
Globe Steel Tubes Co.
Heppenstall Steel Corporation
Hills McCanna Company
Jenkins Brothers
Kerotest Manufacturing Co.
Kieley & Mueller, Inc.
E. J. Lavino & Co.
Lyon-Raymond Corp.
Mercoid Corp.
Merrill Brothers
Moeller Instrument Co.
Moorehead Manufacturing Co.
New York Belting & Packing Co.
Nordstrom Valve Co.
Okonite Company
Ottumwa Iron Works
Pittsburgh Equitable Meter Co.
Robbins & Myers, Inc.
Standard Steel Spring Co.
Taylor-Wharton Iron & Steel Company
Trane Company
Tube Turns, Inc.
Weston Electrical Instrument Co.
Whiting Corp.
Worthington Pump & Mfg. Co.
Wright Manufacturing Division
John Zink Co.

COMPLETE WAREHOUSE STOCKS

Pipe, Valves, Fittings, Steel Plates, Structurals, Bars, Band and Strip, Stainless and Tool Steel, Machine Shop Equipment, Rubber Belting and Hose, Saws and Knives, Boiler Tubes, Thermometers, Laboratory Glassware, and Chemicals.

Minutes of Meeting of the Board of Direction Held on Monday, August 14, 1950

The meeting was called to order by President Cucullu, with Messrs. Abrahm, Burgess, Knost, Lehmann, Mary, McNiven, Seago, Sessums and Fernandez present. Minutes of the preceding meeting were accepted as read. Due to the importance of making recommendations for appointments to the new State Board of Registration for Professional Engineers and Land Surveyors, Mr. Lehmann moved that the order of business be dispensed with. The motion was seconded by Mr. Burgess and carried.

A letter from Mr. F. N. Banker suggesting a nominee for appointment was read.

After considerable discussion, it was decided that the President should suggest to the Governor that three members of the present board be appointed to the new board. It was also decided that the present board members would be listed in the order of years of service, since experience thus acquired will be a valuable asset to the new board. It was agreed that members of the old board would be recommended to serve for terms of one, three and five years.

The names of six engineers were selected, with the recommendation that one be appointed to serve for a period of two years.

The names of six engineers were selected, with the recommendation that one be appointed to serve for a period of four years.

The names of seven engineers were selected, with the recommendation that one be appointed to serve for six years.

The names of six engineers were selected, with the recommendation that one be appointed to serve for seven years.

All of the names selected are included in a copy of President Cucullu's letter to the Governor attached to these minutes.

Mr. T. C. Bruns of New Orleans was reinstated to membership in the Society.

The meeting then adjourned in order that the Society's general meeting could be opened on schedule.

JOHN P. FERNANDEZ, Secretary-Treasurer

COPY

August 17, 1950

The Honorable Earl K. Long,
Governor of Louisiana,
Baton Rouge, Louisiana.
Dear Sir:

Section 3 of Act 73 of 1950 specifies that, within 30 days after the effective date of the Act, the President of the Louisiana Engineering Society, duly authorized and acting on behalf of said Society, shall make nominations to the Governor for appointments to the State Board of Registration for Professional Engineers and Land Surveyors created by the Act. It further provides that at least five names shall be furnished to the Governor for each appointment required and that at least three of the members of the first Board shall be selected from the membership of the present State Board of Engineering Examiners.

In accordance with these provisions, I am pleased to transmit to you the following nominations and recommendations, authorized by the Board of Direction of the Louisiana Engineering Society on August 14, 1950.

With reference to the appointment of present members of the State Board of Engineering Examiners to the new State Board of Registration for Professional Engineers and Land Surveyors, we recommend that three such appointments be made and that the appointees serve for one year, three years,

and fiive years respectively. For each of these appointments we have nominated the following men who constitute the present Board of Engineering Examiners:

Donald Derickson, New Orleans, La.
F. N. Billingsley, New Orleans, La.
F. F. Pillet, Baton Rouge, La.
J. J. Mundinger, Baton Rouge, La.
L. M. Odom, Baton Rouge, La.

Your attention is respectifully directed to the fact that experience acquired by the present Board of Examiners in the licensing of Civil Engineers and Surveyors will be a valuable asset in guiding the new Board of Registration in its function of licensing all types of professional engineers and surveyors. I am advised that Mr. Derickson, President of the present Board, has served it for 33 years, and that Mr. Billingsley, its vice-president, has served for seven years, Mr. Pillet for five years, Mr. Mundinger for four years and Mr. Odom for eight years.

In addition to the nominations from the present Board for the terms of one, three and five years, we present to you the following nominations for new appointments to complete the seven-man Board of Registration:

To serve 2 years (select one name)

Louis Duclos, Head Bridge Designer, Dep't. of Highways, Baton Rouge.

R. E. Evans, Sec'y.-Eng'r., Lincoln Parish Police Jury, Ruston.

A. D. Jackson, Road Design Engineer, Dep't. of Highways, Baton Rouge.

J. E. Jarman, District Construction Engineer, Dept. of Highways, Baton Rouge.

R. B. Richardson, Director, Dept. of Highways, Baton Rouge.

Harry Waugh, Construction Eng'r., T. L. James Co., Ruston.

To serve 4 years (select one name)

Dr. Jesse Coates, Professor, Dep't. of Chemical Engrg., L. S. U.

B. C. Craft, Head, School of Petroleum Engineering, L. S. U.

H. J. Molaison, Acting Head, Engr'g. and Development Division, U. S. Southern Regional Research Laboratory, New Orleans.

J. C. Posgate, Petroleum Eng'r., La. Division, Humble Oil and Refining Co., 1405 Canal Bldg., New Orleans.

Dr. R. W. Richardson, Associate Director, Esso Laboratories, Standard Oil Co. of N. J., Baton Rouge.

R. A. Steinmayer, Head, Dep't. of Geology, Tulane University, New Orleans.

To serve 6 years (select one name)

J. M. Todd, Consulting Engineer, 217 N. Peters St., New Orleans.

B. B. Pierce, Chief Eng'r., Pulp and Paper Mill Division, Gaylord Container Corp., Bogalusa.

J. M. Robert, Dean of Engineering (Retired), Tulane University, New Orleans.

G. F. Matthes, Professor of Mech. Engineering, L. S. U.

B. T. Bogard, Professor of Mech. Engineering, L. P. I., Ruston.

V. E. Sicks, Chief Eng'r., Cities Service Refining Corp. Basic Plant, Lake Charles.

B. S. Nelson, Chief Eng'r., A. M. Lockett & Co., New Orleans.

To serve 7 years (select one name)

C. W. Ricker, Head, School of Electrical Engrg., Tulane University, New Orleans.

S. M. Sharp, Chief Eng'r., Southwestern Gas & Electric Co., Shreveport.

M. J. Voorhies, Professor of Electrical Engineering, L. S. U.

E. E. Taylor, Manager, Concordia Electric Cooperative, Ferriday.

H. J. Nethken, Head, Dep't. of Electr. Engrg., L. P. I., Ruston.

J. T. O'Brien, General Foreman, Utility & Light Ends Division, Standard Oil Co., Baton Rouge.

If you desire information relative to the qualifications of any of these men, we will be glad to furnish it. I understand that all of them have expressed willingness to serve if appointed. Although the appointments can be made any time prior to October 26th and still comply with the requirements of the Act, we solicit your prompt disposition of this matter in view of the importance of convening the new Board at any early date. We stand ready to assist in any manner that we can be of service to you in that connection and would greatly appreciate notification as to when the appointments are made and the name of the appointees selected.

Respectfully,
L. J. CUCULLU

Minutes of Regular Meeting of the Society Held Jointly with the New Orleans Chapter, American Public Works Association, August 14, 1950

The meeting was called to order by President Cucullu at 8:00 p. m. in the Jackson Room of the St. Charles Hotel, with approximately 125 in attendance. The President welcomed the New Orleans Chapter, American Public Works Association, members and guests. Reading of minutes was dispensed with.

President Cucullu reported that 176 members and guests were present at the dinner held at the Colonial Country Club on the occasion of the Annual Outing, and expressed his appreciation for this gratifying representation.

It was announced that, in compliance with the Engineering Registration Law just enacted ,the Board of Direction had selected nominees for appointment to the new Board of Registration for Professional Engineers and Land Surveyors, and that memebrs of the Society would be informed of any further developments concerning the new law.

The chair was relinquished to President James S. Janssen of the New Orleans Chapter, American Public Works Association ,who conducted the business of that organization and then called upon Mr. Kenneth M. King to introduce the speaker of the evening, Mr. Brooke H. Duncan, Director, City Planning and Zoning Commission, who gave most a interesting talk on "Coordinated Plan for the Development of the City of New Orleans."

A very lively question period followed, after which the chair was returned to President Cucullu, who urged members to send in the reply cards recently forwarded to them in connection with the proposed Engineers' Club.

The meeting then adjourned with a rising vote of thanks to the speaker.

JOHN P. FERNANDEZ, Secretary-Treasurer

Minutes of Meeting of the Board of Direction Held on Monday, September 11, 1950

The meeting was called to order by President Cucullu in Room 422 of the St. Charles Hotel. Those present were Messrs. Abrahm, Freeman, Hill, Knost, Mary, McNiven, Newton, Seago and Fernandez. Minutes of the preceding meeting were accepted as read.

President Cucullu read a communication from Governor Long's secretary written in reply to the Society's letter pertaining to the Engineering License

Act. He read a wire received from the R.E.A. Association's president. He also read a letter from a member of the Louisiana Engineering Society submitting objections to one of the nominees recommended by the Board for membership on the State Board of Registration for Professional Engineers and Land Surveyors. After much discussion, General Newton moved that the nominee referred to be requested to verify in writing the information received by the Board concerning his qualifications and that he complete his experience record with particular reference to the character and duration of the various positions he has held. The motion was seconded by Mr. Abrahm and carried.

General Newton also moved that the writer of the letter referred to be advised that his objections to the qualifications of the nominee are now being reviewed and that the matter will receive very careful consideration; also that the writer be further advised that, should the nominee's name be withdrawn from the list of recommendations, no other person would be recommended for the reason that the time for submitting names under the law has expired. The motion was seconded by Mr. Mary and carried.

Mr. Seago suggested that the president advise Mr. Davis, President of the State Association of R.E.A. Cooperatives, that all nominees for the State Board of Registration for Professional Engineers and Land Surveyors have been selected purely on the qualifications of the individual and not upon the recommendation of any organization.

President Cucullu then reported the gist of correspondence received from the National Society of Professional Engineers, and then read his letter to Mr. Frank Reeves on this subject. Following this he requested that the matter be tabled until it could be studied more carefully.

General Newton, Chairman of a committee appointed to investigate the possibility of increasing revenues of state sections, reported on same and then requested that the committee be dissolved. The request was granted.

The selection of winners of the Technological Accomplishment and Civic Activities awards was tabled until a special meeting could be held.

President Cucullu read a letter from Colonel Tate appointing him to serve on the Army Advisory Board for National Guard and Reserve Deferrments. He then asked the board for suggestions for an alternate to serve on this board.

A letter from Mr. J. H. Booksh, Jr., requesting full membership in the Society, was read. Following a review of his qualifications, Mr. Hill moved that Mr. Booksh be transferred from Junior Member to Full Member. The motion was seconded by Mr. Abrahm and carried.

It was decided to hold a special meeting of the Board on Sunday, September 24 at 2:00 p. m. in order to dispose of several important matters pending before the Board. This date and hour was selected in order to make it more convenient for out-of-town Board members to attend.

Following this, the meeting adjourned so that the Society's general meeting could be opened on schedule.

JOHN P. FERNANDEZ, Secretary-Treasurer

PROCEEDINGS

OF THE

LOUISIANA ENGINEERING SOCIETY

October, 1950

"PATRONIZE OUR ADVERTISERS"

INDEX TO ADVERTISERS

PROCEEDINGS

OF THE

LOUISIANA ENGINEERING SOCIETY

VOL. XXXVI DECEMBER, 1950 No. 6

CONTENTS

EDITORIAL NOTES AND COMMENTS

Board of Registration. The Louisiana State Board of Engineering Examiners has operated since 1908 as a licensing body for civil engineers and surveyors in our state. It was the second board founded in the nation.

The new board, whose title is Board of Registration for Professional Engineers and Land Surveyors took over the records, of the old board on Nov. 16, 1950.

The present board will license all branches of professional engineers and land surveyors. An engineer may apply for license

in more than one branch, for the single fee of $25, but upon renewal, a separate fee will be charged for each branch.

The members of the Board are as follows: Dr. Donald Derickson, chairman; Prof. B. T. Bogard, vice-chairman; A. D. Jackson, secretary; J. J. Mundinger, member; Leo M. Odom, member; E. E. Taylor, member; Prof. Jesse Coates, member.

The Executive Secretary is Prof. Frank W. Macdonald, P. O. Station 20, New Orleans, La., from whom additional information and application blanks may be obtained. Phone number, WAlnut 0970.

Our Annual Meeting. The following papers will be presented at our meeting, January 18 - 20, 1950:

THURSDAY, JANUARY 18, 1951

Keynote Address: Hal. S. Dumas, President, Southern Bell Telephone and Telegraph Company.

Title: "REPORT OF PROGRESS IN COMMUNICATIONS"

FRIDAY, JANUARY 19, 1951

9:15 A. M. Speaker: Victor Horner, National Lead Co., Tulsa, Okla.
Title: "MUD CONTROL AND DESIGN"

10:30 A. M. Speaker: Harold H. Watson, General Electric Co., Bridgeport, Conn.
Title: "APPLICATION OF REMOTE CONTROL WIRING SYSTEM"

SATURDAY, JANUARY 20, 1951

8:45 A. M. Speaker: Dr. William P. Yant, National President A. S. S.E., Director of Research and Development, Mine Safety Appliances Co., Pittsburgh, Pa.
Title: "SAFETY ENGINEERING IN RETROSPECT AND PROSPECT"

10:00 A. M. Speaker: Clay V. Bankston, District Sales Manager, Industries Sales Corporation, New Orleans, La.
Title: "PROCESS AIR CONDITIONING"

11:00 A. M. Speaker: F. J. Crandell, Assistant Vice-President, Liberty Mutual Life Insurance Company, Boston, Mass.
Title: "EFFECT OF GROUND VIBRATIONS ON BUILDING CONSTRUCTION"

The technical papers committee headed by Chairman Robert Rombach, Vice-Chairman Howell Peebles, is to be congratulated upon the caliber and variety of the papers.

Medal Awards. During the current year the Society has taken an important step in the direction of greater recognition for meritorious service and achievement by Louisiana engineers. This

consists of the establishment of two medal awards to be given as conditions warrant, but not more often than annually, for distinguished service by members of our profession. One of these, designated "The Louisiana Engineering Society Civic Activities Medal—Andrew M. Lockett Award," will be given in recognition of outstanding civic service by an engineer, in the interest of the public, without compensation for his services. The second award, designated "The Louisiana Engineering Society Technological Accomplishment Medal," will be presented for distinguished service in the field of technological advancement or discoveries, as contribution to the advancement of engineering.

These medals are being designed by Miss Angela Gregory, who has won wide recognition as an artist and sculptor, and they will compare most favorably with medal awards administered by the national engineering societies. The names of the individuals chosen as the first recipients of these awards will be announced in the program for our Annual Meeting, and presentation will be made on the night of January 18th, at Dixon Hall, Tulane University.

An important purpose of honoring men is to encourage and inspire them to reach even greater heights of professional achievement. It is believed that the establishment of these awards will not only provide well-deserved recognition for outstanding engineers but also will be an important public service through the stimulating and promoting of civic consciousness and technological proficiency.

Let's Watch Our Step. Under the pressure of the national emergency now existing, those who would have more and more government control enjoy a Roman field day. In the people's enthusiastic patriotism, which of course is proper at a time like this, citizens will agree to "temporary" controls which have a way of becoming permanent after the crisis has passed. These controls are of course, always tied up with a "bureau", whose employees represent votes for the administration in power. With each war for the freedom of the peoples of the world, comes economic servitude for the people of the U.S. The end results for the American citizens are more federal encroachment, more dictatorial presidential powers. The latter might not be so bad if our presidents were statesmen; too often they are politicians — party leaders, not national leaders. Beware the cry of "crisis"; it is deluding us into delegating powers to the President and federal agencies which would have been abhorrent to the framers of the Constitution. Only by keeping our freedom, can we help others to gain theirs.

PAPERS AND DISCUSSIONS

ACCURACY PROBLEMS IN GEOPHYSICAL PROSPECTING*

Introduction. In the oil business the word Geophysics has come to have a peculiarly restricted meaning. The word is applied as a rule only to those processes which have immediate value in prospecting. This usage ignores the numerous geophysical measurements made in the borehole which actually make up the bulk of geophysical application to oil finding, these latter being generally included under engineering.

The distinction is probably a concession to the organization chart, but, however convenient it may be from that standpoint, the unfortunate result is that it keeps separate two groups of personnel, whose problems and methods have much in common. Of course, it has advantages too. It keeps those like myself from having to compete with engineers.

In talking about accuracy in geophysics I will stick with the restricted usage and will confine my remarks to the magnetic, the gravity and the seismic methods as used in petroleum prospecting. These three, which are the most widely used in this country, possess widely different abilities with respect to the light each can throw on subsurface conditions. I shall try to touch upon the relative fields of usefulness as between the three and also upon the degree of accuracy inherent in each.

Magnetic and Gravity Methods. In order to set up a background for judging, perhaps we ought to state what we would like in a geophysical method. Obviously, we would like it to tell us where the oil was, how much there was, its depth, type, and a few other things. This we can forget, for the present at any rate.

Next best would be a method capable of mapping the subsurface in three dimensions so as to tie in with and extend geological concepts.

That is, the good method should give the geologist the shape of the structure at depth, the location of critical points and critical zones, etc.

Of the three methods mentioned only the seismic is intrinsically capable of yielding data on size, shape and depth. Since magnetic and gravity cannot directly map structure at depth, it will be necessary to still further reduce standards in order to discuss their fields of usefulness.

* By Neal J. Smith, Geophysicist, The California Co. Presented at a joint meeting of the Society with American Institute of Mining and Metallurgical Engineers on November 13, 1950.

When discussing such factors as size, location of an area of interest, or orientation of an interesting area on the basis of either a magnetic or a gravity map, it is possible to be qualitative only. A fourth factor, qualitative also, is depth.

As a prospecting tool the magnetometer has been in use for so long a time that it seems unnecessary to describe it. The gravity meter, on the other hand, is a comparatively new instrument, hence a word or two on it may be in order.

The gravity meter of practical design is simply a spring balance of fantastic precision. The gravity meter, since it weighs the same mass each time, simply measures this discrepancy in weight from place to place. The common mapping unit is one-tenth milligal, equivalent to a force difference of one ten-thousandth dyne. The approximate pull of gravity on a gram mass being 1000 dynes, it is seen that the instrument is measuring differences to better than one ten-millionth of the normal gravity force. That sort of accuracy is not uncommon in physical measurements under laboratory conditions but not, I think, under day in day out field conditions.

The regions in which magnetic data are closely assocated with structure are more restricted than for the gravity case, because where magnetic anomalies indicate structure so as a rule do gravity anomalies, while the converse is not necessarily true. For instance, the gravity meter can pick up the structures associated with the buried granite ridges of southwestern Oklahoma and the Texas Panhandle as well as or better than the magnetometer can, whereas the magnetometer is quite useless in locating salt domes, a problem in which the gravity meter excels. These limitations on the magnetometer are related to the fact that significant changes in magnetic susceptibility, upon which the magnetometer acts, rarely exist within the sediments themselves, whereas significant changes in density, which motivate the gravity meter, often do. In petroleum prospecting it is the structure within the sedimentary beds that interests us. The magnetic anomaly then can have structural meaning only where the sediments are draped over a high feature on the basement floor or, more generally, only in those cases where igneous material is involved in the folding. By virtue of the strong density contrast existing between basement and sedimentary rocks the gravity meter will be able to pick up the bulk of this type structure and, in addition ,can respond to structures existing entirely within the sedimentary column.

Not only does the gravity anomaly have a higher probability for usefulness over a wider area than the magnetic, but requires, to reach a given stage of interpretation, less qualifying information. Gravity interpretation is not hampered by possibilities of reman-

ent polarization at an angle with the earth's primary field as is the interpretation of magnetic data, and gravity has a further advantage in that density changes occur over a comparatively narrow range as compared with the changes possible in the magetic susceptibilities of rocks.

Both gravity and magnetic are alike in that a structure may exist in the sediments without giving rise to either type anomaly. Conversely, both gravity and magnetic anomalies can exist in the complete absence of structure in the sediments. From these considerations it can be seen that neither is of much use by itself.

But, in the presence of other information magnetic and, especially, gravity data become increasingly helpful and valuable. This seems to imply that magnetics and gravity, which are primarily considered reconnaissance tools, are really not fitted for that job. However, successful prospecting of any sort is a matter of intelligent guessing and guided imagination so that it is quite legitimate in reconnaissance work to substitute imagination for fact. It is the correctness of the assumptions guiding the guessing upon which success depends. For instance, the gravity meter shows quite definitely the locations of the producing salt dome structures in the Gulf Coast Area, so that given a gravity meter and a divine hunch, say 30 to 40 years ago, some one company or individual could, in theory, have captured all such. Of course, had the hunch been not quite as inspired, the play might have been made in the interior salt dome basins in the northern part of Louisiana and in central and south central Mississippi where the bulk of the haul would have consisted of a large number of salt domes having splendid gravity anomalies but no oil. Even here there would have been a considerable measure of success because the consistent playing of gravity minima would have located such fields as the Lake St. John Field, Louisiana, and the Tinsley, the Heidelberg, Gwinville, Eucutta, and Baxterville Fields in Mississippi, and a number of other valuable producing fields in Mississippi and Louisiana. On the other hand, if the decision had been to play gravity minima in Oklahoma, most parts of California, Kansas or in many other oil producing regions the results would have completely negative. Similar illustration could be made for the reconnaissance use of the magnetometer.

Both the magnetic and the gravity methods have potential value beyond mere reconnaissance usage when supported by auxiliary, geologic or geophysical data. Depending upon the amount and quality of the supporting data, either method, but particularly the gravity, can be made to yield results which are roughly quantitative.

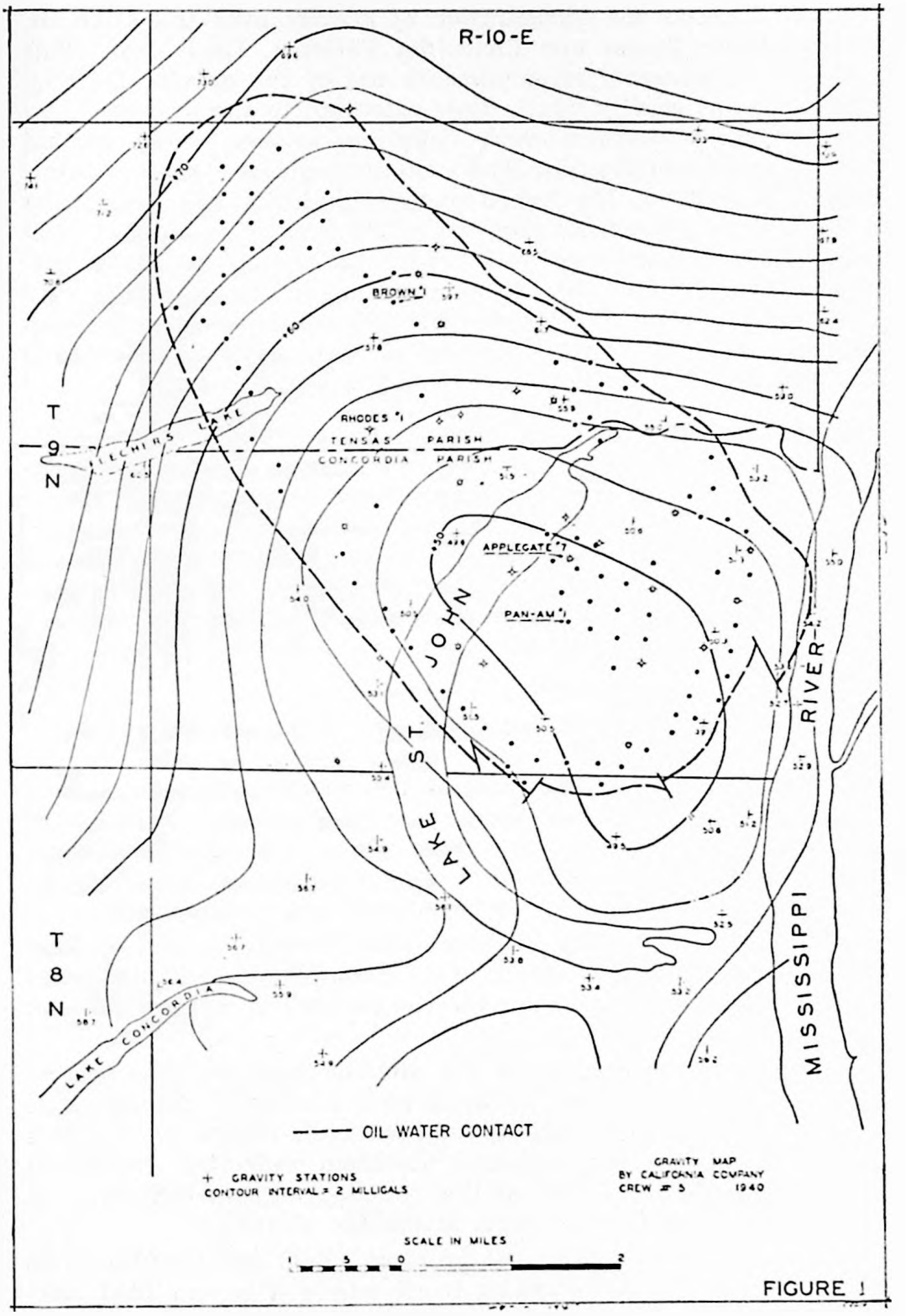


Figure 1. Gravity map of the Lake St. John Field, Tensas and Concordia Parishes, Louisiana.

Figure 1 shows the configuration of gravity over the Lake St. John Field in Tensas and Concordia Parishes, Louisiana. This illustrates a successful reconnaissance use of the gravity method, because it was gravity which drew attention to the area and encouraged the subsequent more definitive seismic work leading to the discovery of the field. The contours indicate a gravity minimum or gravity low. The dashed enclosure indicates the subsequent limits of Upper Cretaceous production. The gravity anomaly is well located and well oriented with respect to the subsequently discovered structure. Here, an operator, drilling on the basis of gravity alone, would have had an excellent chance of discovering the field. Unfortunately this happy condition of congruency is something that cannot be determined on the basis of gravity alone.

The Seismic Method. The seismic method, which is the only present means of dependably mapping subsurface structure without resort to the drill, contains two divergent systems, the reflection and the refraction. Refraction was the first to come into prominence but has been largely supplanted by the reflection technique on the basis of the latter's all around superiority in depth of penetration, accuracy, speed, and convenience. The refraction method still has its uses but they are special and will not discussed this evening.

Figure 2 is a schematic representation of the reflection seismic process. The seismometer, or geophone, indicated here on the ground may employ any one of several types of electro-mechanical transducer. It may, for instance, give an electrical analogue of ground displacement, as in capacitance types; or of ground velocity, as in the inductance or reluctance types, or it may measure acceleration as in piezoelectric and some other kinds of transducer.

Whatever the type, to be acceptable it may have sufficient sensitivity to report, say, velocities on the order of a few millionths of a centimeter per second, or the counterpart in displacement or acceleration.

The explosion generated in the shallow borehole sets up an acoustic wave that travels outward with a velocity characteristic of the rock and which will be reflected back toward the surface from boundaries across which a sufficient reflection coefficient exists. The reflection cofficient is a function of both difference in density and of elastic constants across the boundary.

The seismometers receive the returned signal and transmit it in electrical form to the recording truck where it is amplified anywhere from a few hundred to several thousand times, filtered, otherwise mixed as desired and recorded as a function of time on photo-sensitive paper.

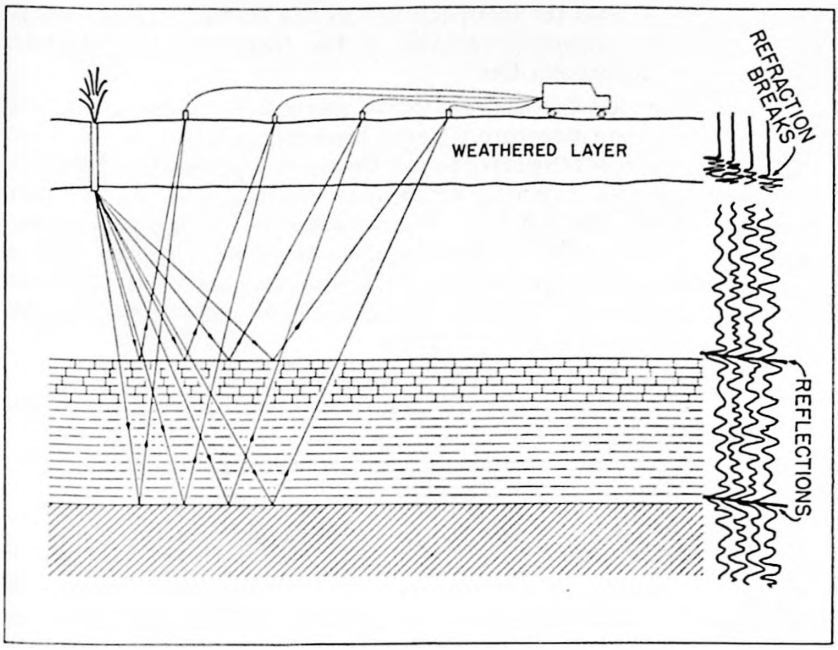


Figure 2. Schematic seismic set-up.

The explosion instant is recorded ,probably with an accuracy of one or two thousandths seconds. The arrival instant of a given reflection may not be known absolutely within ten or twenty thousandths, but its relative arrival time as between seismometer positions on the ground or with respect to other reflections ahead of it or behind may ordinarily be picked within two or three thousandths would be equivalent to an error of between 6 and 10 feet, depending upon velocity.

There is almost invariably at the surface a comparatively thin layer in which seismic waves have a much lower velocity than in the material beneath it. It is commonly called the "weather layer" although it has only a qualitative relationship to the strictly geological weathered layer. The problems imposed by this layer are extremely important in seismic work. For instance, as the diagram suggests, it is necessary to drill through it in the usual case so that the explosion can be set up at the base of the layer or slightly below. Also, it is the weathered layer which is responsible for the refraction breaks, or so called "first breaks" seen on the typical record. These represent the arrival of energy which has traveled first along the base of the low velocity with the velocity of the higher speed material beneath it and then by refraction

sharply upward into the seismometers at the surface. These refraction breaks are extremely valuable in the correction of reflections for weathering irregularities.

I have suggested that the reflection method is quantitative with respect to mapping structure. That is probably not true in the sense that an engineer would prefer to use the term. The relative accuracy of the method—the extent to which it is quantitative—is a function dependent upon the validity of a number of necessary assumptions, and upon several types of variables. Some of these things we can control; some we can control in part; and some are presently beyond our powers to modify. The influential factors can be conveniently grouped in five categories.

1. The response of the area.
2. Available knowledge in the area both geologically and geophysically.
3. Quality of the instruments used and the quality and experience of personnel on the job.
4. Field effort.
5. Interpretive effort.

Category one, the basic response of the area, plays a somewhat negative but important part. If we can get no reflections from the structure, we will not know there is a structure. Or, the reflections may be few, poor, and scattered so that we suspect a structure but are vague as to its size, shape, and orientation. If plenty of reflections are available, then we have something to work with.

Category two considers the influence on the accuracy of the seismic picture of the state of knowledge, or it might be better to say, the stage of exploration development of the region.

That is, if the geologist has an accumulation of subsurface information and if he communicates this to the seismologist, the validity of the interpretation will be proportionately increased. This obvious fact does not seem to be recognized completely because there are some who virtually force the geophysicist and the geologist to work separately as though collaboration were a form of cheating.

Geophysical data with which the sesimologist should be supplied would include, of course, any previous geophysical work done in the area. But what he would like most is information on the velocity with which sound waves travel through the rocks of the area. Obviously, if he is going to be able to convert *time* into *distance* and *dip*, he must know the velocity and, the more exactly he knows it, the most accurate the result.

The diagram on the left in Figure 3 illustrates the configuration of a wave-front in a semi-infinite, isotropic medium, the point of

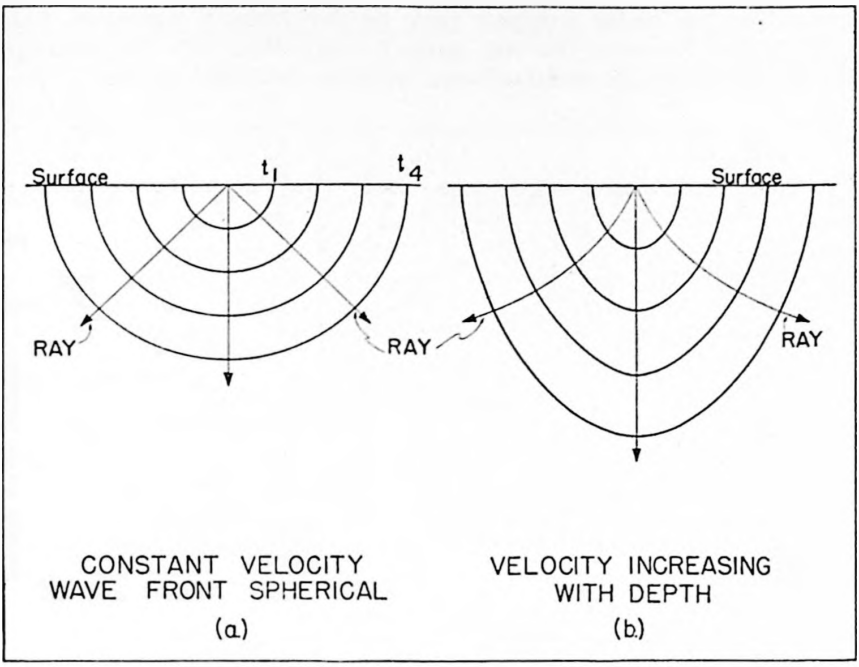


Figure. 3. Isotropic and Linear velocity increase with depth

origin being in the surface. At successive instants the envelopes are hemi-spheres. The ray paths will be straight lines radial about the shot point. Situations as simple as this do not exist in nature, *at least for the seismologist*, although he may some times pretend they do.

In general, velocity increases with depth as a result of the influence of increasing age and pressure in that direction. (see Fig. 3). This relationship of velocity to depth can often be expressed closely enough for a given area as a simple function, generally either linear or parabolic. These functions are useful for making up computation charts or curves and form a basis for extrapolations in depth and across areas from one point of velocity information to another. Because they are easy to handle there is always a temptation to take them as gospel—to extend their use belond the proper range.

The prime source of velocity data is from velocity surveys made in the borehole, surveys made by lowering a special seismometer into the bore hole to measure the direct travel time of a shock wave set up by explosions at the surface. It is against these actual measurements that the seismologist properly does his curve fitting —assuming of course that he has a nearby survey available. Very

often the particular prospect may be far from a surveyed hole forcing him to make the best guess he can. Naturally his assumptions will be simple in accordance with the few data he has.

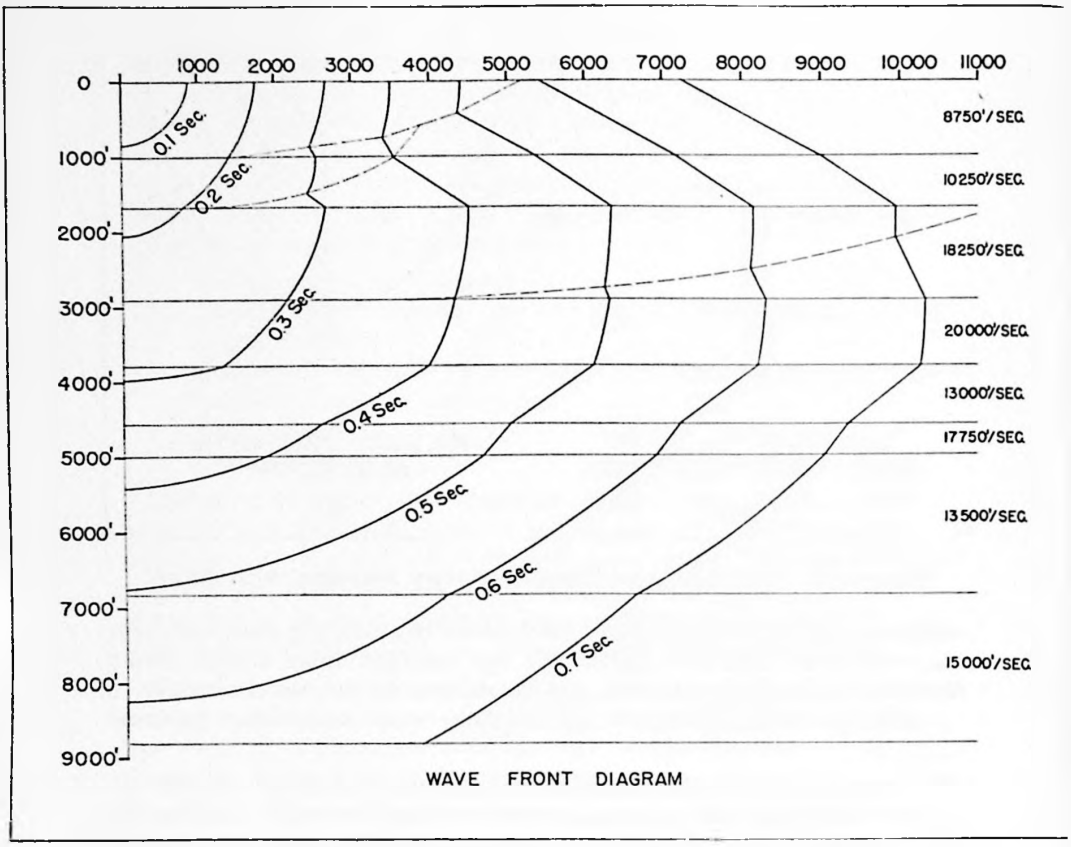


Figure 4. Wave front chart from actual case.

Here, in Figure 4, is a wave front chart made up directly from a borehole velocity survey. Note how far removed it is from the smooth envelopes just shown. The figure represents only half the wave front section—the other side would be presumably symmetrical.

The reason for the lumpy character of the wave front chart is apparent from a glance at the survey data itself (Figure 5). The step-like curves indicate instantaneous velocities at the depths shown—called interval velocity. The more gentle curve is the average velocity down to a given depth. Note that interval velocities are quite irregular and that in some places they invert the

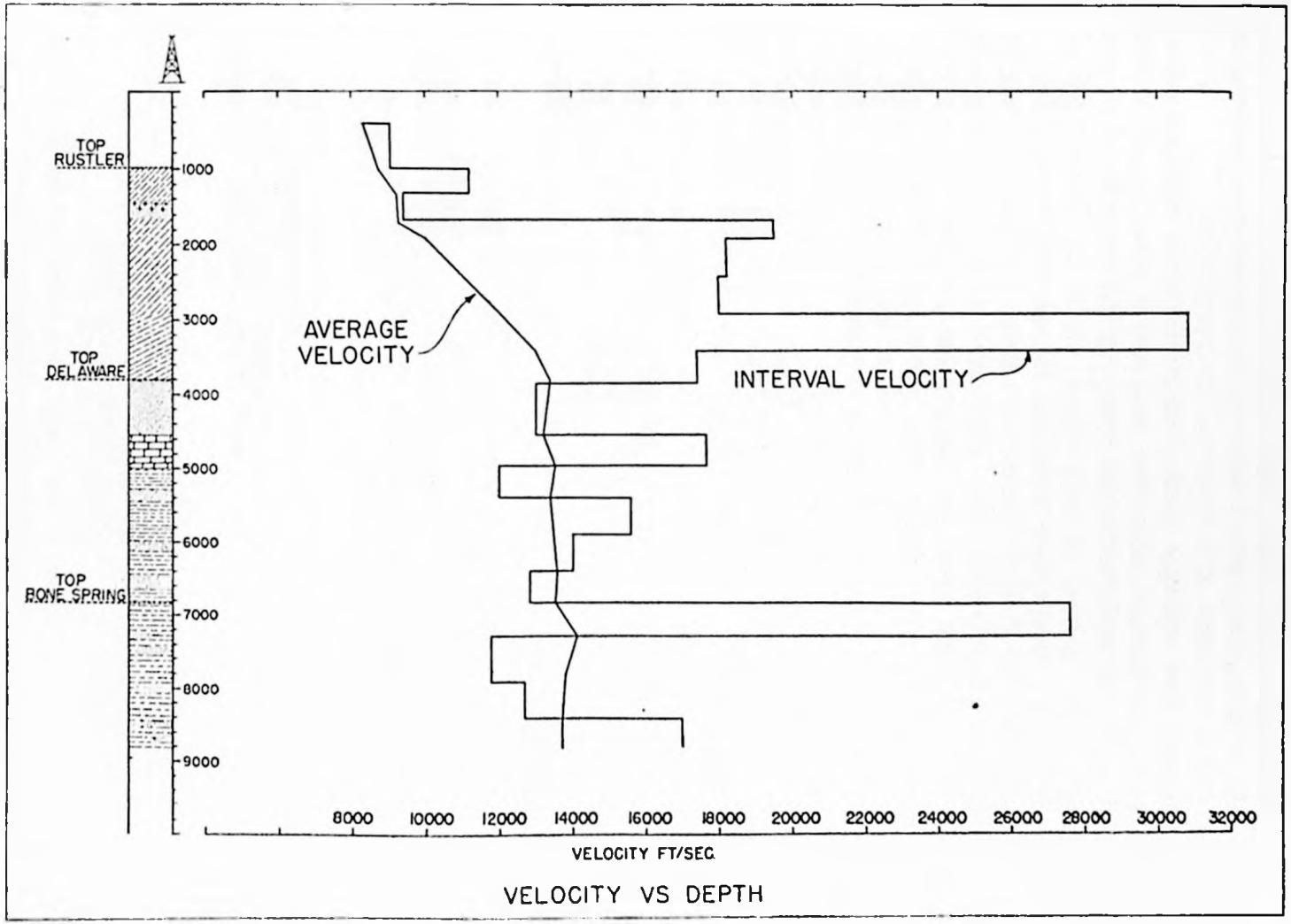


Figure 5. Borehole velocity data. Velocity vs. Depth.

supposed natural order of things by showing local decreases in velocity with depth. The carrying of simplified velocity assumptions into an area as complex, velocity-wise as this could hardly lead to anything but a confused and doubtful interpretation.

It so happens that velocity varies horizontally as well as vertically. Neglecting this can affect the shape and orientation of the mapped structure as well as the accuracy of the calculated depth.

For instance, an ignored or undetected variation in velocity in the horizontal may result in a distorted interpretation whereby a nose may be contoured as a closed structure, or, more seriously, permitting a closed structure to be contoured as a nose and hence neglected. Several such cases are widely known and many more, no doubt, are kept in the closet with the corporate skeleton.

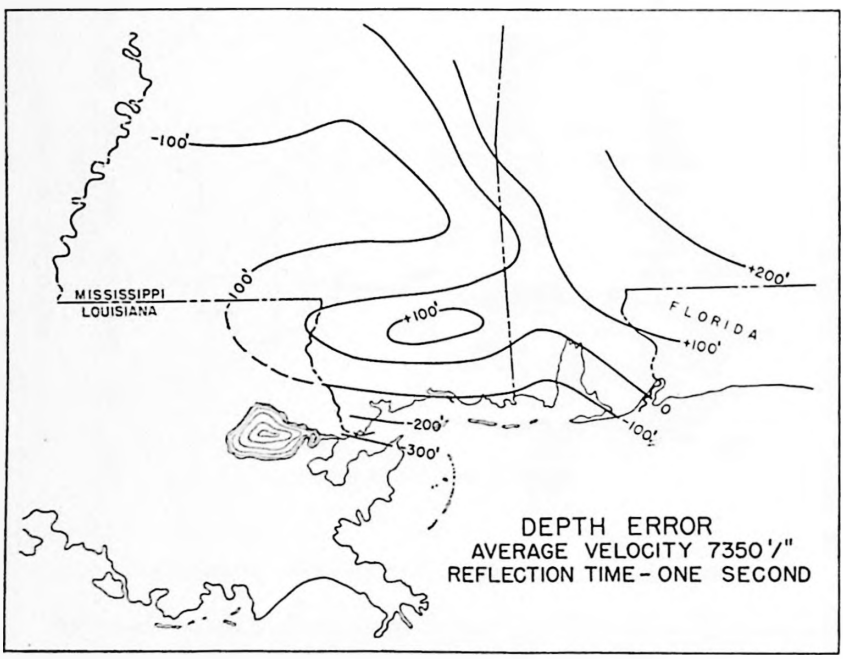


Figure 6. Velocity depth-error map.

Figure 6 can be called an error map. The contours indicate the approximate depth error which will result from the use of a constant velocity for reflections having travel times of about one second. The particular velocity of 7350′ per second is correct as an average over the region for reflections of one second but, because the changes in velocity are progressive, it is proper to use it only along the zone indicated by the zero line. In Stone County, Miss.,

calculated depths would be 100' short. Over in Alabama, calculated depths would be short by 200 feet. Down toward New Orleans, the trend is the other way; computed depths would be 300 feet too deep.

So long as these effects are on a regional basis and so long as there are enough subsurface points to tie to, such changes won't be especially damaging. The tilt would not be noticeable on a local basis.

But the question is "Do all the velocity variations fit the regional pattern?" The map suggests that this is the case but the map was prepared from scattered control. In many regions the first few bits of velocity information often create a false impression of continuity and smoothness.

As the amount of velocity control grows in an area, it is not uncommon to discover that velocities may vary sharply within a small compass. Seismic surveys made in such areas which neglect these variations may be distorted to the point of uselessness, either indicating spurious structure or wiping out those that are interesting. Frankly, it is impossible to have too much velocity control.

Category three deals with instruments and instrumentation or, perhaps more clearly, instruments and field technique.

Both instruments and the manner of their use are profoundly important as regards the quality of the result. This hardly needs statement. Nor is it surprising that instruments that are excellent in one region, as say in the marsh, may be poor to useless in another. The same goes for techniques. Personnel experienced in Rocky Mountain work may be helpless in Oklahoma. An experienced crew from Oklahoma will flounder for months in Mississippi. And almost any land-bred crew will look with shocked amazement on our practices in the marsh.

Category four, field effort or density of data, is easy to understand. Obviously the more data of a given quality that is obtained per unit area the more detailed and accurate the final picture will be.

Category five, the influence of interpretive effort on the accuracy and dependability of the seismic picture, is also easy to appreciate. As an extreme example Figure 9 illustrates a situation which old seismologists use to frighten the young ones. The odd part is that it has happened.

The figure shows a series of profiles across a steep-sided syncline. Each record receives reflections from both limbs of the syncline—possible if the reflector has sufficient curvature. An interpreter, not experienced in steep dip work—for instance, one from the Gulf Coast,—might plot the data from each shot point directly below that shot point as he would in low to moderate dip areas.

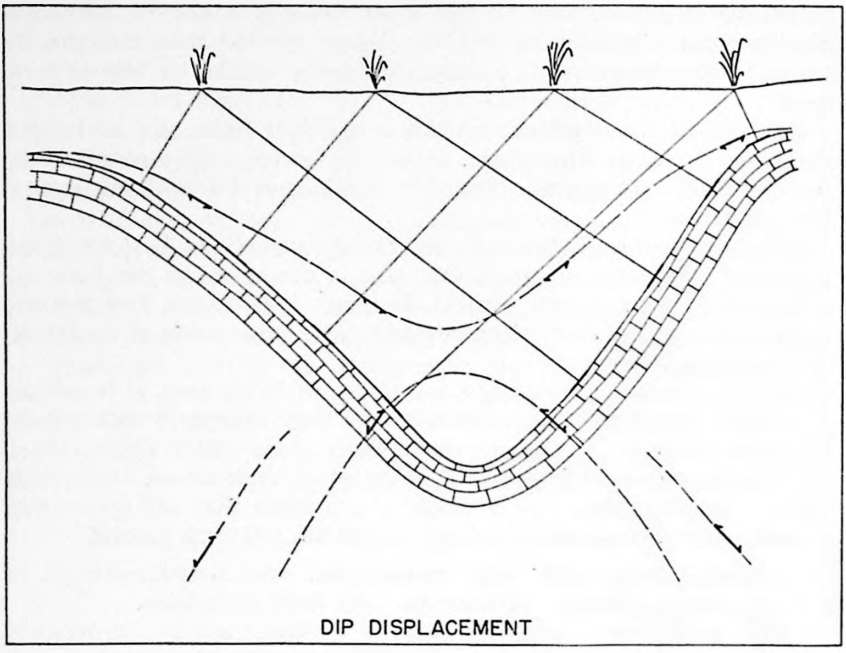


Figure 7. Spurious Anticline.

But if he did, the dip segments would appear to show him a shallow syncline lying above an anticline. If he worried about the geologic probabilities, he would assume that the two were separated by a profound unconformity or might have been superimposed by thrust faulting.

The true picture is obtained by migrating the dip segments to their proper special positions, something which is often easier said than done.

Specific Accuracy: You will notice that although I have said a great deal about certain things that bear on the accuracy of the seismic method, I have not been definite as to what that accuracy might be. It should be fairly obvious that this is a difficult point to make, except for a specific case. However, in bringing this talk to a conclusion. I will discuss this quantitative issue in a qualitative way.

When the record quality is good, when there is reasonable velocity control, when the shooting program is detailed, it isn't uncommon to find the interpreter predicting depths to a given marker within plus or minus 50′ and to have the drill prove him out.

With regard to relative position on a given structure he may even do better than that. I have heard seismologists, after a little

prodding perhaps, indicate that one particular location will be, say, twenty or thirty feet higher on the formation than the location adjacent and have seen them right *enough* of the time to begin to believe that they, at least half-way, believed their own predictions.

On the other hand, no one is especially surprised if such predictions fall far wide of the mark so that in a strict sense it would be incorrect to say that even high quality seismic work can definitely be relied upon to within a plus or minus 10 or 15 feet. However, since successful exploration contains a high risk factor and cannot be maintained under a cloak of pessimism, it may be sound policy not to weigh our mistakes too heavily against us. Perhaps it should be assumed in each particular case that the seismic accuracy is going to be what the seismologist *hopes* it may be. Under these convenient conditions we can claim an accuracy for high grade work on the order suggested.

Summary. In summation, as between the three methods considered, the magnetic method, though fastest and cheapest, is the least definitive; the seismic method, though the slowest and most expensive, is the most precise and definitive; while gravity lies between the two but closer to the magnetic method that the seismic.

Within each method the accuracy in a particular case is a function of the amount of subsidiary and corrallary geophysical and geological data available, of the caliber of the personnel involved, and of the time allotted to the problem.

NEWS ITEMS

General Electric's "More Power to America Special" Exhibit Train To Visit Southeast in January. The "More Power to America Special," the General Electric Company's 10-car exhibit train of products for industry, will head into the Southeastern states early in January on the third lap of its 30,000-mile nationwide tour.

The "Special" will be on display in New Orleans on January 8 and 9 according to H. H. Blakeslee, manager of GE's apparatus department office in New Orleans. He estimated that more than 25,000 industry leaders will inspect the train when it visits 21 key Southern industrial centers.

One of the primary objectives of the train, Blakeslee said, is to stimulate greater American production through the use of electricity. More than 2,000 electric products, systems and techniques are aboard the traveling showcase. It is the first attempt to display, in one series of related exhibits, the complete range of products for producing, distributing and using electric power.

The train will be visited by invited representatives of industry, government, the armed services, and civic groups, he said. He ex-

plained that the exhibits have been designed specifically to interest those who produce electric power and those who put it to work in industry and the community.

Exhibits for the quarter-mile-long train follow a planned, logical order — visitors first see equipment for producing power, then apparatus for transmitting and distributing it, then finally, techniques and products for efficiently using it.

Among the exhibits are turbines, substations, motors, drives and controls, diesel-electric locomotives, jet engines, and ship propulsion equipment.

The streamliner is powered by a 4500-horsepower two-unit Alco-GE diesel-electric locomotive that itself in one of the displays.

The train arrives in the Southeast from a six-months tour of the New England, East Central and Atlantic states, and from here it will continue into the Southwest. By the end of its trip across the country in 1951 the "Special" will have visited 150 industrial centers and been inspected by approximately 200,000 leaders of industry.

Agricultural Engineering at L.S.U. Accredited by Professional Council. Official approval from the accrediting group of the Engineering Council for Professional Development has been accorded the Agricultural Engineering Department of the College of Engineering.

Also accredited was the industrial engineering and management option curriculum in Mechanical Engineering, initiated here in 1946.

Prior to this current inspection of engineering colleges and universities, only five schools in the country had accredited agricultural curricula, Dean Leo J. Lassalle reported.

"In granting approval," Dean Lassalle said, "the committee was particularly impressed by our new buildings, the calibre of the faculty and the student enrollment."

University of California, Iowa State College, University of Nebraska, Kansas State College, and Oregon State College are the other schools which were accredited in agricultural engineering before the current inspection.

This official approval means that students will be able, without difficulty, to acquire licenses in other states.

Re-accredited were the major departments of chemical, civil, electrical, mechanical, and petroleum engineering, and the aeronautical engineering option in mechanical engineering, said the dean.

The University was visited last spring by the accrediting group of the engineering schools committee of the council. All United States schools and some in Canada have been rechecked since World War II. — *The Daily Reveille.*

ENGINEERING BRIEFS

Better Military Shells Now Made by Cold Extrusion Process. Better and cheaper military shells are made by a process developed in Germany before the late war and are now in use in the United States Army and Navy ordnance departments. The shells are made by the cold extrusion of steel instead of conventional forging.

The process is described by Col. Merle H. Davis, U. S. Army, in the July-August issue of *Ordnance,* page 31.

A 40% reduction in shell-steel needs may be expected with the new process, he declares. He said that 960,000 tons of steel and 12,500 tons of maganese can be saved in machining 100,000,000 shells of 105-mm. size.

"Another advantage of only slightly less importance is the saving in machining operations," the article states. "Three simple machining operations are the most we would have on an extruded shell body. A relatively simple single-purpose machine could probably do the whole job in one step. — from *Aminco Laboratory News.*

Three-dimensional X-rays Now Possible by New Method. A new method of taking X-ray photographs in three dimensions enable a physician to see the inside of a patient in actual perspective.

The inventor is Maurice Bonnet of Paris, who was granted U.S. patent 2,511,097.

These X-rays-in-relief are called selectoradiographs, and are taken with a single X-ray lamp and a single camera. Either the patient is swung on a moving table, or the camera and lamp are swung around the patient. In either case, successive images on a fluorescent screen are photographed onto a single negative through a special grating.

The physician can view the negative or even a positive print. Using a similar selected grating or selectoscope, he sees a slightly different image with each eye. The X-ray thus appears in relief, and by moving his head, the physician gets the impression of walking around the X-rayed patient, seeing his insides from all angles. — from *Aminco Laboratory News.*

New Drug Eliminates Need for Surgery in Ulcer Patients. Ulcers of the stomach can be treated successfully without surgery through the use of a new chemical called banthine. Even peptic ulcers of considerable severity and long standing were relieved and healed by banthine doses in the clinical trial reported to the *Journal of the*

American Medical Association by Drs. Keith S. Grimson, C. Keith Lyons, and Robert J. Reeves, of Duke University, Durham, N. C.

Banthine is a quarternary ammonium compound with the chemical name of betadiethylaminoethyl xanthene-9-carboxylate. Because of the encouraging results obtained in the Duke Medical School tests, general distribution of banthine is planned in order that physicians may use it. The drug is produced by G. D. Searle & Co., Chicago, Ill. — from *Aminco Laboratory News.*

Color Photographs Made Quickly by New Process. Color photographs, said to be better for wartime camouflage detection are made quickly and as easily as black-and-white prints by a process developed at Wright-Patterson Air Force Base, Dayton, Ohio.

With the new method, the time required for processing color film is reduced from 90 to 20 minutes, and the printing time from 90 to 15 minutes. The time saving is of particular importance from a military standpoint.

Basis of the new method is a prehardener which permits the processing to be done at 80 degrees Fahrenheit instead of the 68 to 70 degrees used ordinarily. — from *Aminco Laboratory News.*

New Form of Carbon Hard Enough to Scratch Glass. British scientists have developed a new form of carbon hard enough to scratch glass. Delanium, the name given to the new product, is manufactured by Powell Duffryn Carbon Products, Ltd., 140 Battersea Park Rd., London, England.

Details of the manufacturing process are not revealed, but it is made directly from coal without primary carbonization to the coke, charcoal, or carbon powder normally employed in existing techniques.

The new process enables strong impermeable carbon, free from cracks or fissures, to be made in a single stage. The material produced is not only hard enough to scratch glass, but tough enough to greatly reduce danger from breakage in handling fragile shapes, such as long tubes.

Delanium has high thermal conductivity and has proved to be a better material for use where this property is a requirement than glass, stoneware, or rubber. In the chemical field it is suitable for lining vats and retorts. In the electrical and engineering fields, it is suitable for use as electrodes, brushes for generators and motors, sealing rings for pumps and turbines, and oilless bearings. —from *Aminco Laboratory News.*

Beaten To A Pulp. Hardwoods are now becoming an important source for wood pulp, after decades of limited use, as stands of softwoods dwindle and demand for paper grows. Two high-yield processes are in use for making hardwood pulp; one new one makes "groundwood" for newsprint and other products, and the other,

developed in 1926, is now being widely used for paper for shipping containers. Both processes combine aspects of the chemical and mechanical methods of making pulp.

In making pulp, the objective is to separate the cellulose fibers of the wood, either by grinding the log against a grindstone, or by cooking wood chips in any of a variety of chemicals to dissolve the lignin and then washing the lignin away. Both these methods are better suited to the softwood of Northern spruce or Southern pine than to the second-growth hardwoods, such as birch, maple, and beech. Hardwood fibers are shorter than those of softwoods, and contain cells that vary in shape and size. Despite the short fibers, however, pulp from the new groundwood process for hardwoods is said to equal or surpass that from spruce.

The new groundwood process, called Chemigroundwood, was developed at the New York School of Forestry, in a program sponsored by a group of paper manufacturers, some of whom are now putting the process into commercial production. Whole logs are prepared for grinding with a six-hour treatment in hot neutral sulfite liquor. Initial vacuum, followed by the chemical under 200 pounds pressure, aids penetration of the liquor into the wood. After this softening, it is ground to give a high yield of pulp. The fibers are more completely separated than in regular spruce groundwood, and there are no broken fiber bundles. It is said to bleach to a whiteness comparing favorably with ordinary bleached groundwood. Various mill tests indicate that the pulp can be used in newsprint, tissues, some book papers, and types of paperboard. Paper napkins from the pulp have been successfully tested in retail markets. Because of the high yield from hardwoods, which are cheaper than spruce by the cord and also heavier, the production cost of pulp from the Chemigroundwood process is said to be about $40 a ton, or about two-thirds the current price of spruce groundwood.

The older process, called "semichemical" and developed by the U. S. Forest Products Laboratory, has awaited mechanical adaptations and the right economic conditions to give the spark to expanded production. Several mills in hardwood areas have adopted the process. The logs are reduced to chips, which are digested with a relatively weak, low-cost cooking liquor. There are many modifications of the original formula for this liquor; a recent variation consists of merely soaking the chips in a solution of caustic soda at room temperature. The softened chips readily break down under mechanical treatment in water to the point where conventional paper mill equipment can turn the product into paper. The pulp is only partially cooked or softened and contains much of the lignin and other non-cellulose portions of the wood, thus increasing the yield. These processes have been used mostly in the manufacture of pulp for heavy boxboards and corrugated paper, where weight

and stiffness are desirable and the color imparted by the lignin is not objectionable. Recent work has shown that semichemical pulps can be bleached for book, bond, tissue, and glassine papers.

USED FOR SOUTHERN PINE

Although this process was originally developed for hardwoods, it has also been extended to Southern yellow pine. For many uses the lower-cost long-fibered pulps produced by this method compare favorably with pulp made by the older and more costly sulfate or kraft process. Hardwoods were actually the first to be used when the demand for paper began to exceed the capacity of the rag paper processes brought over from Europe. As the easy-grinding poplar became scarce, however, and other hardwoods proved unsuitable, spruce became the chief source of groundwood, and yielded a pulp of high brightness, with good color and strength. The sulfite cooking process produced pulps with long, strong fibers from the Northern conifers and the sulfate or kraft process, developed for Northern pines, was adapted to the Southern pines. Except for a limited use in book papers and other specialties, hardwood pulps have not been able to compete economically with softwood pulps made by the chemical processes.

Many softwood species do not reproduce themselves readily when cut, but frequently come back after cutting or fire to mixed hardwoods for the second growth. As stands of Northern spruce become depleted, and new sources are more remote from mills, costs rise — both U. S. and Canadian spruce groundwood pulp are now $65 a ton. The two processes now being put into use should go far toward utilizing the plentiful supplies of hardwoods now available in both North and South. — *Industrial Bulletin of Arthur D. Little, Inc.*

Battle of Manpower. The latest "battle" in Washington revolves about the mobilization activity. It is being referred to as the "Battle of Manpower."

For several months officials concerned with manpower have been at odds over the question of jurisdiction. The protagonists are: Major General Lewis B. Hershey, National Selective Service Director; W. Stuart Symington, Chairman of the National Security Resources Board; and Maurice Tobin, Secretary of Labor. Each of those agencies has some responsibility for manpower mobilization but their *respective functions have not been clearly defined.*

Of major interest in this situation to professional engineers is the question of deferments from service for professional and scientific personnel, and the *status of students in engineering or science courses.* General Hershey brought this particular question to a head when he appeared on a forum discussion on manpower and declared that the American people had been "sold a lot of baloney" about the necessity for deferring scientists and professional men from military service.

Murray-Baker-Frederic, Inc.

620-630 SOUTH PETERS STREET
NEW ORLEANS, LA.
RAYMOND 2185

REPRESENTING

Allegheny Ludlum Steel Corp.
E. C. Atkins & Co.
E. B. Badger & Sons Co.
Badger Meter Mfg. Co.
J. T. Baker Chemical Co.
Bethlehem Steel Corp. (Wire Rope)
Briggs Filtration Co.
Bristol Co.
Buda Company
Carboloy Company, Inc.
Clark Manufacturing Co.
Climax Engineering Co.
Cooper Alloy Foundry Co.
Corning Glass Works
Crane Co.
Crescent Truck Company
Crosby Steam Guage & Valve Company
The Dayton Rubber Co.
DeVilbiss Company
Durant Manufacturing Co.
Eagle Iron Works
Ford Meter Box Co.
Foster Engineering Co.
General Controls Co.
Globe Steel Tubes Co.
Goddard & Goddard Co.
Heppenstall Steel Corporation
Hills McCanna Company
Jenkins Brothers
Keasby & Mattison Co.
Kerotest Manufacturing Co.
Kieley & Mueller, Inc.
Wm. F. Klemp Co.
E. J. Lavino & Co.
Lyon-Raymond Corp.
Mercoid Corp.
Merrill Brothers
Moeller Instrument Co.
Moisture Register Co.
Moorehead Manufacturing Co.
New York Belting & Packing Co.
Nordstrom Valve Co.
Okonite Company
Ottumwa Iron Works
Robbins & Myers, Inc.
Rockwell Manufacturing Co.
Taylor-Wharton Iron & Steel Company
Trane Company
Tube Turns, Inc.
Union Gear & Sprocket Co.
Weston Electrical Instrument Co.
Whiting Corp.
Worthington Pump & Mfg. Co.
Wright Manufacturing Division
John Zink Co.

COMPLETE WAREHOUSE STOCKS

Pipe, Valves, Fittings, Steel Plates, Structurals, Bars, Band and Strip, Stainless and Tool Steel, Machine Shop Equipment, Rubber Belting and Hose, Saws and Knives, Boiler Tubes, Thermometers, Laboratory Glassware, and Chemicals.

A storm of protest broke about the head of General Hershey following his statement. NSPE issued a statement declaring that General Hershey's remark indicated a failure to take cognizance of the critical results flowing from our experience in this field during World War II and citing authorities as to the necessity for a proper policy on scientific and technical personnel.

Other organizations also denounced the Hershey statement and Chairman Symington indicated the next day that he was not in sympathy with Hershey's attitude. After being blasted from all sides *General Hershey acknowledged that some deferments may be necessary for technical persons.*

The problem, as it affects engineers and scientists in key work, is really more academic than practical at the present time in view of the fact that the draft is applicable only up to the age limit of 26. It will become a major problem, however, if the draft age limit is extended any appreciable degree.

On the other hand, a major and pressing problem relates to the status of students in engineering and scientific fields. Within a few days after the Hershey statement a *special conference of educators was held in Washington* to consider the future of education in relation to the draft. At this conference a special committee appointed by General Hershey two years ago reported its recommendations for a long-range policy on student deferment. General Hershey has indicated basic agreement with the recommended policy but it has not been officially adopted as yet.

The major features of the policy are: there should be a deferment policy for students in colleges and universities, it should extend to all fields of study and not be limited to scientific categories, there should be a national aptitude test for all students with a required score equivalent to 120 on the Army General Classification Test, the student must be certified by educational authorities as giving promise of definite progress in higher education, there should be a cut-off point according to class standings and students below the appropriate percentile should be dropped from the deferred status. *Under the plan all freshmen would be eligible for deferment.* After that the student would have to be above the 50th percentile for the sophomore year, above the 33rd percentile for the junior year, and above the 25th percentile for the senior year. For graduate study the student would have to be above the 50th percentile of his previous undergraduate study.

Following completion of his education the individual would be retained in his deferred status for four months and after that would be eligible for the draft unless he had meanwhile obtained work placing him in a position essential to the national defense under present regulations.

The conference of educators endorsed the plan in principle but a *number of them indicated serious reservations about the details.* It

was indicated at the meeting that there should be some requirement for national service after the student receive special deferment treatment. Others indicated some doubt about a failure to tie in the deferment with needs of the nation. The plan is receiving close scrutiny by government officials, educators, and professional groups. *Present indications are that some long-range deferment plan will be developed in order to continue a steady flow of trained professional personnel in face of the possibility that the mobilization period may extend for many years.*

The heart of the problem was recently stated by Gordon Dean, Chairman of the Atomic Energy Commission, who said: "one consideration is to see that we 'keep the seed corn coming' for future growth and development by maintaining in full vigor, year-in-year-out, in wartime as well as in peacetime, the staff for scientific training in the universities. The corrollary of this is that we also maintain the flow into the universities of the talented youngsters who can carry scientific and engineering training over to new accomplishments.

Private Enterprise. A short time ago the largest hydroelectric development, began and finished since the war, was dedicated in California.

A great many people, reading that brief statement of fact, will assume this was one of the projects of the federal government. But this project was all "private enterprise"—it was built at a cost of sixty-two million privately-owned dollars by a business-managed, heavily-taxed, state-regulated power and light utility.

That is not the end of the story. This project is just one part of a six-year postwar development program to cost $750,000,000.

At the dedication of the project the chairman of the county board of supervisors said that the utility paid 52 per cent of his country's taxes, and the chairman of still another board of supervisors described the utility as "a stockholder in his country."

In the light of this, who can rationally argue that the only way to get enough electric power for this country is to have the government provide it from tax-exempt plants, with the taxpayer paying for it and, in the process, supinely submit to socialization and regimentation of our resources and energies.

All over the nation other utilities, large and small, are expanding and improving their plants, and meeting every demand made upon them. They are, at the same time, creating new sources of taxation for all levels of government.

Private enterprise built America's economy, and private enterprise will keep it going if it is given a chance. — *The Weekly Labor Forecast and Review.*

MINUTES OF THE MEETINGS AND BUSINESS OF THE SOCIETY

Minutes of Regular Meeting of the Society Held on Monday, September 11, 1950

The meeting was called to order by President Cucullu at 8:00 p.m. in the Jackson Room of the St. Charles Hotel. The President welcomed members and guests present, numbering approximately 125. Mr. Richard N. Graham moved that the reading of minutes be dispensed with, seconded by Mr. Austin J. Mary and carried.

Mr. Waldemar S. Nelson announced that the Petroleum Division of ASME would hold its Fifth Annual Petroleum-Mechanical Engineering Conference in New Orleans on September 25-27, and invited those present to attend.

The President then introduced the main speaker of the evening, Mr. Paul S. Ristroph, City Civilian Defense Director, who spoke on "Civil Defense for New Orleans." Following the usual discussion period, the meeting adjourned with a rising vote of thanks to the speaker.

JOHN P. FERNANDEZ, Secretary-Treasurer

Minutes of Special Meeting of the Board of Direction Held on Sunday, September 24, 1950

The meeting was called to order by President Cucullu, with Messrs. Abrahm, Freeman, Hill, Knost, Lehmann, Mary, McNiven, Newton, Sessums and Fernandez present. Minutes of the preceding meeting were accepted as corrected.

The matter concerning the qualifications of one of the nominees submitted for membership on the Board of Registration for Professional Engineers and Land Surveyors was discussed. Mr. Freeman moved that, upon further examination of the nominee's experience, the Board of Direction of L.E.S. again find him qualified to serve on the aforementioned board. The motion was seconded by General Newton and carried.

General Newton moved that the President advise the objector of the board's decision, seconded by Mr. Freeman and carried.

Correspondence between the National Society of Professional Engineers and several members of this Society, particularly that of Mr. Henri Molaison, was read. General Newton moved that the President appoint a committee to study the qualifications for voting membership outlined in the Society's constitution, and to recommend any changes or amendments that may be needed. The motion was seconded by Mr. Sessums and carried.

After studying the achievements of nominees for the Society's two awards, a secret ballot was taken, in which Mr. Lester F. Alexander was selected to receive the Civic Activities Medal and Mr. A. Baldwin Wood was selected to receive the Technological Accomplishment Medal. It was decided to request the Annual Meeting Committee to select an appropriate time and place for presenting these awards.

President Cucullu read a letter from Mr. James S. Janssen, General Chairman of the 1951 Annual Meeting, in which he deplored the present condition of the Society's headquarters. Mr. Lehmann moved that the House Committee be authorized to proceed with the electrical and plumbing work, the cost of same not to exceed $100.00.

There being no further business, the meeting adjourned.

JOHN P. FERNANDEZ, Secretary-Treasurer

Minutes of Meeting of the Board of Direction Held on Monday, October 9, 1950

The meting was called to order by President Cucullu in Room 422 St. Charles Hotel. Those present were Messrs. Abrahm, Freeman, Hill, Lehmann, Knost, Newton, Seago and Fernandez. Minutes of the preceding meeting were accepted as corrected. The Treasurer's report on the annual outing was accepted as presented.

It was reported that the Banquet Committee for the 1951 Annual Meeting had been unable to obtain the Grand Ball Room in the St. Charles Hotel for the annual banquet on January 13, but that it would be available on the 20th. Mr. Lehmann moved that the 1951 Annual Meeting be held on January 18, 19, 20 instead of the week earlier as originally planned. The motion was seconded by General Newton and carried.

A recommendation by the Annual Meeting Committee that the Society subsidize a part of the annual luncheon cost for student members was read. Mr. Seago moved that the charge for students attending the luncheon be fixed at $1.00, seconded by Mr. Lehmann and carried.

A letter addressed by President Cucullu to Mr. John E. McAdam was read.

Mr. Lehmann moved that the Lafayette Section be given a rebate on dues paid since July 1, 1950, seconded by Mr. Freeman and carried

The following student members who were transfered to Junior membership grade in the June ballot have not been heard from; in accordance with Section 10 of Article 2 of the constitution, they are hereby considered as having resigned:

Raymond W. Babaz, Ellis L. Begnaud, Cleveland J. Bergeron, Dewey D. Billodeau, Albert Crews, Cesir J. Decareaux, James Fayard, Melvin S. Fisher, J. W.

Fleshman, Charles Gibson, C. J. Glaubrecht, Calvin B. Klotz, James O. Lysoght, George P. Moresi, Ridley A. Naquin, John A. Nepueux, Frank Robert Jr., Charles Sellers, James A. Tocho.

It was moved by General Newton, seconded by Mr. Abrahm, that the President appoint the following to serve as a Nominating Committee for the forthcoming election of officers: H. L. Lehmann, Chairman; K. P. Kammer, B. H. Grehan.

President Cucullu announced that the Society had formally presented a charter to the new Lafayette Section on October 10, following which the meeting adjourned.

JOHN P. FERNANDEZ, Secretary-Treasurer

Minutes of Meeting of the Louisiana Engineering Society Held Jointly with the New Orleans Chapter, Illuminating Engineering Society, on Monday, October 9, 1950

The meeting was called to order by President Cucullu, with approximately 135 members and guests present. The President welcomed the membership of the New Orleans Chapter, Illuminating Engineering Society. Mr. Knost moved that the reading of minutes be dispensed with, seconded by Mr. May and carried.

President Cucullu announced that, to his knowledge, the Governor had not yet appointed the new Board of Registration for Engineers and Land Surveyors.

Mr. James S. Janssen, General Chairman of the 1951 Annual Meeting, reported on the progress of his committee.

The chair then was relinquished to Mr. Ben Z. Segall, Chairman, New Orleans Chapter, I.E.S., who introduced a representative of the Community Chest who gave a short talk in behalf of the Chest campaign. Following this the main speaker of the evening, Mr. J. D. Mitchell, Westinghouse Electric Manufacturing Company, Atlanta, Georgia, gave a most interesting and demonstrative lecture entitled "New Industrial Light Sources and Their Application." An extensive discussion period followed the lecture, after which the chair was returned to President Cucullu, who closed the meeting with a rising vote of thanks to the speaker.

JOHN P. FERNANDEZ, Secretary-Treasurer