

THE PROCEEDINGS

OF THE

LOUISIANA ENGINEERING SOCIETY

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Arthur M. Hill, Editor

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Suite 422 St. Charles Hotel

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St.

Delta Society of Safety Engineers, P. O. Box 2522, New Orleans 16, La.

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NOTE—Please advise editor of any changes in officers.



PRESIDENT CLAYTON L. NAIRNE

PROCEEDINGS OF THE LOUISIANA ENGINEERING SOCIETY

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No. 1

CONTENTS

EDITORIAL NOTES AND COMMENTS:

A Message from Our President	6
Our New President	11
Newly Elected Officers	11
The Annual Meeting	12
The Front Cover	12
New Members	12
Let's Make the Drivers License Law Work	15
ENGINEERING BRIEFS	18
PAPERS AND DISCUSSIONS:	
"Engineer Services of the U. S. Waterways Experiment Station" By C. T. Newton	19
MEMBERSHIP LIST	32
MINUTES OF THE MEETINGS AND BUSINESS OF THE SOCIETY	60
INDEX TO VOLUME XXXII	83

EDITORIAL NOTES AND COMMENTS

A MESSAGE FROM THE PRESIDENT

As your newly elected President, I deeply appreciate the honor of being selected for this high office, and I am fully aware of the responsibilities that it entails.

I am very glad to have this opportunity to communicate with you through the medium of the Proceedings, as I want you to know what your newly elected management will attempt to accomplish during its tenure of office.

Your other Officers, your Board, and I are singularly fortunate in that the affairs of the Society, since its inception, have been so capably managed, as to promote a steady growth in membership and an increasingly stronger financial position

through times of war, prosperity, and depression. It is the general objective of your present Officers and Board to maintain the same high standards of management that have been set by their predecessors, and we earnestly solicit the help of the membership in consummating our aims in this respect.

Specifically, your President proposes the following major objectives for the coming year.

- 1. Increasing the Usefulness of the Society as a Medium of Co-ordination Between the Various Engineering Groups in Louisiana.**

Engineers have, for obvious reasons, organized themselves into groups or chapters composed of members identified with the same branch of the profession. Each of these groups concerns itself primarily with problems, technical or otherwise, that are of direct interest to their particular division of Engineering.

Where questions arise that affect the Engineering profession in its entirety, it would appear to be most advantageous to clear matters of policy through one central body. Since many of the members of the groups concerned with specific phases of engineering are also members of the Louisiana Engineering Society, this Society would seem to be the logical organization to serve as such a coordinating agency.

This idea is not original. Steps for its consummation were taken by former president C. Glenn Cappel who suggested the formation of a group to be known as the Louisiana Council of Engineers. This body is now in existence, a meeting having been held March 11, 1946 attended by representatives of five of the local Engineering groups, Dean Lassalle, then President of the Society, and Society Secretary John Fernandez.

This body is a medium through which policies, affecting members of the various groups, can be formulated and effectuated by combined action of the Society and the groups represented on the Council.

Meetings of the Council will be requested where the need for such action is apparent.

2. Preparation of a State Licensing Law For Engineers To Be Introduced at the Next Meeting of the Legislature.

Much work has been done on this matter, but circumstances have been such as to preclude the passage of the bills submitted.

The Louisiana Council of Engineers should provide a means of assistance in resolving the difficulties that have been experienced in the past. Action on this matter will be initiated by the Legislation Committee in the near future.

3. Professional, Civic and Industrial Affairs.

Article I of the Constitution states the objects of the Society to be: "the professional improvement of its members, the encouragement of social intercourse among engineers and men of practical science, and the advancement of Engineering . . ."

Since the "advancement of Engineering" in the State of Louisiana will be promoted by the industrial and agricultural growth of the State and the entire Mississippi Valley, it is recommended that the Society endorse and assist any project or endeavor designed to accomplish such improvements.

It is further recommended that the members of the Society cooperate with civic organizations on questions of local and state-wide significance.

4. Constitution and By-Laws

The Constitution and By-Laws under which the Society operates have, during the years, been admirably suited to its needs. However, your President feels that any organization should, from time to time, review its rules and general objectives to be certain that they fit conditions that may have changed from those existing at the time they were first prepared.

Accordingly, a committee has been appointed to review our Constitution and By-Laws and to make recommendations for any changes or alterations they deem to be necessary.

5. Membership

It is, of course, highly desirable to add to the membership of the Society, qualified engineers who practice within the geographical scope of its activities.

I urge that each member consider it his duty for the current year to make every effort to bring into the Society at least one engineer who can qualify for one of our several grades of membership.

Membership applications can be secured from Secretary John Fernandez at Tulane University.

6. State Sections

The Society is fortunate in having an active and growing Section in Baton Rouge, Louisiana.

Prospects are bright for the establishment of another Section in Lake Charles and we are requesting the assistance of our District Contact Representatives in building the nucleus of other Sections throughout the State.

Our 2nd vice-president, Mr. H. L. Lehmann of the Baton Rouge Chapter, has taken a most active interest in the expansion of our Society.

7. Junior and Undergraduate Member Activities

An intensive effort should be made to stimulate student interest in the Society. Not only should the Membership and Student and Junior Activities Committees work together to secure more undergraduate and Junior memberships, but also greater participation in the Society's affairs by this group should be encouraged.

It has been suggested that the Student and Junior Member Group accept the responsibility for planning and carrying out the program for at least one meeting per year. The Chairmen of the Program and Student and Junior Activities Committees have been requested to develop this idea, and to make recommendations as to the most suitable monthly meeting to be allocated.

8. Housing

There has been much discussion from time to time as to the feasibility of establishing headquarters for the Society which would include among other things, a library, club room, rooms for out-of-town members, facilities for serving simple meals, and other appointments similar to those in engineers clubs in cities of comparable size to New Orleans.

While it is extremely improbable that a project of this kind could be realized in the very near future, plans can be made for the type and location of quarters desired and the methods of financing both the initial and operating costs investigated.

Considerable information has been accumulated on this subject by past president Dave Stewart and we hope to have a report for the membership on this matter before the next annual meeting.

9. Revenue and Expenses

Since the budget for this year has not yet been developed, it is only possible to discuss this subject in generalities.

The principal sources of revenue to your Society are dues from its members, and payments derived from advertisements in the Proceedings. Due to excellent work by the Publications Committee, the revenue from advertising has been materially enhanced which has helped to compensate for the increased cost of printing the Proceedings. However, in the face of increased costs of everything else required to operate your Society, dues per member have remained static since the year 1935.

While the present financial state of your Society is sound, a careful study should and will be made to determine whether its membership can continue to be adequately served under present and contemplated future conditions.

10. Entertainment, Outings, and Fellowship

Your President, subject to the wishes of the Board and the general membership, will endorse the same type of recreational activity as has been customary in the past.

New ideas and suggestions for additional functions will be welcomed, and will be carefully evaluated with due consideration given to the expense involved and the benefit accruing to the general membership.

In closing, I again wish to urge that you attend the monthly meetings and make it a point to increase your acquaintanceship with other members on these occasions.

I admit quite candidly that there are a great many members that I don't know personally, and I'm sure that this is true of the other Officers and Directors.

A larger attendance at the meetings, a little more attention paid to fitting the name on the membership list to the individual it identifies, will bring our organization closer together which will make for an even better Society—and that is what we want to accomplish.

Our New President. Clayton Ludlow Nairne, the recently elected President of the Louisiana Engineering Society, was born April 1, 1903 in New Orleans, Louisiana. He attended Rugby Academy and later studied Mechanical and Electrical Engineering at Tulane University, graduating in 1924.

Immediately subsequent to his graduation, President Nairne was employed as a Student Engineer by the New Orleans Public Service Inc. serving in this capacity until December, 1925, when he accepted a position with the Florida Power and Light Company in Miami.

He remained with this company as Efficiency Engineer at their Fort Lauderdale Steam Electric Station until October, 1928 at which time he returned to New Orleans Public Service to fill the position of Combustion Engineer in the Gas Department. Later he successively served in this Department as Superintendent of the Meter and Appliance Division, Superintendent of the Distribution Division, General Superintendent of the Department, and in April, 1943 was made assistant to the Executive Vice-President of the company, which position he now holds.

President Nairne has been a member of the Society for 18 years and has also taken active interest in the affairs of the Southern Gas Association recently serving as first vice-president of this latter organization.

He is also active in welfare and civic affairs in New Orleans, and is currently a vice-president of the Tulane Alumni Association.

Newly Elected Officers. In addition to President Clayton L. Nairne, the following officers will serve the Society during 1947: First Vice-President, W. Stone Leake; second vice-president, H. L. Lehmann; directors, Frank W. Macdonald, Ernest L. Mire, and Harry P. Newton. Directors from the previous

administration are L. J. Cucullu and past-president, L. J. Lassalle.

Our cheerful and efficient Secretary-Treasurer, John P. Fernandez, continues in office.

All of these men are able and will discharge their duties conscientiously. However, each needs the assistance of the individual members of the Society. Without this assistance the Society cannot continue to progress.

The Annual Meeting. During January, the 12th annual meeting was completed under the able guidance of R. M. Seago and his associates. The meeting has increased in scope and activity since its inception in 1934 by James M. Todd. Technical papers, student conference, the industrial exhibit, the "home engineering panel discussion" and the banquet and dance were all interesting events. All the committee chairmen and their members and participants deserve praise for making the meeting such an outstanding success. The total registration was 505.

The Front Cover. Pictured on the cover of this issue is the New Orleans plant of the American Creosote Works. This plant has four treating cylinders, measuring from nine feet in diameter and one hundred seventy-two feet in length, to one six feet in diameter and fifty feet in length. Dock facilities are available for discharging creosote from tankers directly into plant storage. Loading wharves are also available for the finished products. The photograph was provided us by Past President Kerr.

New Members. The following members were elected during December, 1946. A review of the annual report of the society will show a considerable increase in membership. The membership committee has done an excellent job, but each member should assist by endeavoring to interest eligible engineers in society membership.

For Member

ALVIN P. ANDREWS, Monroe; age 38; endorsed: J. E. Jarman, N. E. Lant, S. C. Smith. La. Dept. of Highways, 1929-45, Instrumentman, Construction Inspector, Asst. Resident Engr. La. Dept. Public Works, 1945-date, Resident Engineer.

JOHN HENRY BATEMAN, Baton Rouge; age 54; endorsed: G. N. Cox, B. W. Pegues, F. F. Pillet. U. of Mich., B.S. 1915; C.E., 1922. Mich. State Hw. Dept., surveying, road design, construction, 1915-24. La. Highway Dept.,

- testing materials (also part-time teaching civil eng. at LSU), 1925-29. Barrow-Agee Lab., Memphis, Tenn., testing and inspection of construction materials, 1929-30. Mich. Committee on Covert Road Tax Relief, Lansing, Mich., consultant, 1931-32. Berrien County Road Comm., St. Joseph, Mich., engineer-manager, 1932-36. Louisiana State University, Baton Rouge, Professor of C.E., 1936-date. Registered Mich. and La. Societies: N.S.P.E., A.C.I., Highway Research Board (Assoc.).
- GERARD O. COIGNET, Baton Rouge; age 36; endorsed: L. W. Harrell, H. L. Lehmann, J. J. Saurage. La. State University, B.S.E.E., 1932. U.S. Coast and Geodetic Survey, topographic mapping, 1934-35. La. Hwy. Comm., highway engineering and plans, 1936-37. La. Geological Survey, engr. and cartographer, geological surveys, research and exploitation of natural resources, 1937-date.
- GEORGE S. COVERT, Baton Rouge; age 46; endorsed: H. L. Lehmann, J. J. Saurage, Hugh Worley. Miss. State College, B.S.C.E., 1922. B. W. Montgomery, C.E., Jackson, Miss., Resident Engineer, 1922-30; La. Hwy. Comm., Res. Engr., Acadia and St. Landry Parishes, 1930-31. Miss. State Hwy. Dept., Bituminous Engr., 1931-42. U.S. Engr. Corps, Asst. Dist. Engr., C.D.C., Panama, 1942-46. Anderson-Sunham Co., Baton Rouge, Mgr. Asphalt Division. Registered Miss. Member A.S.M.E.
- GEORGE ANTHONY CROWDER, New Orleans; age 29; endorsed: V. J. Bedell, W. S. Nelson, J. E. Hassinger, Jr. Georgia Tech, B.S.C.E.; U. S. Naval Academy, Certificate in Aerological Engineering. U. S. Engr. Dept., Miami, Fla., hydrographic surveying, 3½ mos. City of Atlanta, Ga., sewerage disposal plant operation, 7 mos. Haile Gold Mine, Kershaw, S. C., topographic mapping and underground surveying, 3½ mos. Hendry Corp., Tampa, Fla., surveying and engineering inspection, 3 mos. Ala. Ord. Wks. Childersburg, Ala., Jr. Engr., 7 mos. V. J. Bedell Co., survey and design, 3 mos.
- EARL B. GAINES, New Orleans; age 35; endorsed: A. M. Hill, W. S. Leake, G. H. Menefee. Tulane University, B.E.M.E., 1943. General Electric Co., Field Engr. in turbine installation and service, 1943-date.
- OMER J. HEBERT, Baton Rouge; age 37; endorsed: J. Clifton Hill, P. S. O'Brien, B. W. Pegues. Louisiana State University, B.S.C.E. 1931. 1932-date, Civil and Consulting Engr., Hebert Bros. Engrs. and Gen'l Contractors, Plaquemine, La. 1934-date. Div. C.E. for The Solvay Process Co., Baton Rouge. Registered La. Member La. State Institution of C. E.
- WALTER G. HORSTMAN, Baton Rouge; age 50; endorsed: P. J. Guelfi, H. L. Lehmann, T. E. Peak. Shurtleff College, Alton, Ill., B.S. 1921. U. of Chicago. Post graduate work, majoring in chemistry, 1923. Shell Oil Co., Refinery operation supervisor, 1924-41. Plantation Pipe Line Co., Division Supt., Operation and Mtee., 1941-present.
- RALPH E. LIND, JR., New Orleans; age 26; endorsed: Ben J. Haney, R. E. Lind, Sr., Albert E. Marks. Louisiana State University, B.S.C.E. 1939. U.S. Housing Authority, Asst. to construction advisor, 1939-41; U.S. Engineers, structural design, 1941. U.S. Army, Engr. company commander, 1941-46. Sewerage and Water Board, structural design, 1946-present.
- KENNETH M. LOUGHMILLER, Baton Rouge; age 32; endorsed: L. J. Lassalle, H. A. Marceux, W. P. Wallace. Purdue University, B.S.M.E. Industrial Engr. since 1935. Two years teaching and developing courses in Industrial Engr. at Texas A&M, 1939-41. U.S. Army, 3 yrs. College of Engineering, LSU, 1945-46.
- WILLIAM J. MATTOX, Baton Rouge; age 39; endorsed: J. T. O'Brien, P. S. O'Brien, F. A. Hannaman, Jr. Univ. of North Carolina, M.A. Chemistry 1929, Ph.D., 1931. Universal Oil Products Co., petroleum research and development, 1931-45. Standard Oil Co. 1945-date. Societies: Am. Chemical Soc., Am. Inst. Chemists, Sigma Xi, Alpha Chi Sigma.
- WALTER H. MERCIER, Baton Rouge; age 49; endorsed: F. A. Hannaman, Jr., T. E. Peak, W. A. Whitaker. Tulane U., B.E., M&E., 1921. La. Board of Underwriters, electrical inspector, 1921-22 Standard Oil Co., Baton Rouge Refinery, Mech. Engr., 1922-date.
- WILEY D. POOLE, Baton Rouge; age 32; endorsed: W. H. Carter, F. J. Germano, H. L. Lehmann. Louisiana State University, B.S. in Agri. Eng., 1938; M.S., 1941. La. State Agri. Exp. Station, Baton Rouge, 1938-42. U.S. Army Air Forces Radar Laboratory, 1942-45. La. State Agri. Exp. Station, Asst. Agricultural Engineer, 1945-present.
- THOMAS B. SMART, Baton Rouge; age 44; endorsed: L. J. Lassalle, Leo M. Odom, Chas. A. Myers. Louisiana State University, B.S.C.E. 1925; C.E., 1933; M.S., major in hydraulics, 1934. American Bridge Co., structural designer, 1928-32. TVA, Jr. Engr., 1934-35. La. Dept. of Hwys., structural designer, 1935-41. La. Dept. Public Works, Office Engineer, 1941-present. Registered La.
- LAWRENCE P. STREET, Baton Rouge; age 46; endorsed: L. W. Harrell, H. L. Lehmann, J. J. Saurage. W. Va. University, B.S.C.E. 1925. W. Va. Highway Dept., 1925-33. Dravo Contracting Co., Pittsburgh, 1933-34. P.W.A., 1934-35. American Bitumuls Company, District Manager, 1935-present. Registered. Maryland and West Virginia.

CHARLES P. WALTERS, Baton Rouge; age 47; endorsed: P. J. Guelfi, C. A. Ibach, J. R. Murphy. Hays Institute course in combustion; I.C.S. course in refrigeration. Baton Rouge Elect. Co., Govt. St. Power Plant, 1917-30. Gulf States Utilities Co., Watch Engr., La. Station Pwr. Plant, 1930-42; Station Engineer in charge of operation, 1942-present.

EDMUND J. WHEELAHAN, New Orleans; age 30; endorsed: J. E. Hassinger, Jr., J. E. Morehiser, Jr., Felicien Perrin. Rensselaer Polytechnic Inst., Troy, N. Y., B.Met. Engr. 1939. Reed Roller Bit Co., Houston, Metallurgist, 1939-41. U.S. Navy Air Corps, Engr. Officer, 1941-46. Metal and Thormit Corp., N. J., Engineer, Feb.-June 1946. Treen Eng. Co., Metallurgist, present. Member Am. Society for Metals, Am. Soc. Testing Mtls.

BURRIS D. WOOD, Baton Rouge; age 46; endorsed: C. M. Kerr, B. P. Lyons, L. M. Odom. I.C.S. Surveying and Mapping course, 1917-18; Tulane University, night course in structural design, 1942. I.C. and L.&N. R.R., various construction jobs, 1914-22. La. Hwy. Comm., Chief Draftsman, 1922-29. Standard Oil Co. of La., Asst. Term. Supt., 1929-42. U.S. Engr. Dept. Prin. C. E. Aide, 1942-43. Delta Shipbuilding Co., Asst. Engr., 1943-45. La. Dept. Public Works, Eng. Aide IV, 1945-present.

For Affiliate Member

RICHERSON D. RHODES, New Orleans; age 30; endorsed: C. B. Gamble, W. B. Moses, W. S. Nelson. Weil and Moses, mech. and air conditioning drafting, 5½ yrs. U.S. Engr. Dist., Camp Claiborne, mech. and topographical drafting, 1½ yrs. Consolidated Aircraft, electrical, radio and radar drafting, 2¼ yrs. V. J. Bedell Co. (present employer), mech. and top. drafting, ¾ yr.

For Reinstatement to Membership

ROBERT L. ARGUS, Destrahan, La., age 36; endorsed: A. M. Hill, J. M. Robert, F. M. Taylor. Tulane University, B.E., M.&E., 1933. Pan American Petroleum Corp., Lab. Tester, Inspector, Asst. Engr., 1933-41 U.S. Army, Combat Eng. Regt., 1941-46. Pan American Petroleum Corp., Engr. of Mtce. and Construction, present.

C. CARTER BROWN, Baton Rouge; age 34; endorsed: L. M. Odom, D. L. Pyburn, B. P. Lyons. Louisiana State University, B.S.C.E. 1934. U.S. Const and Geodetic Survey, Instrumentman, 1934-35. Bogue Chitto-Pearl River Soil Cons. Dist., Hydraulics and Erosion Control Engr., 1935-41. La. Dept. Public Works, Chief of Planning Div., 1942-date. Licensed La.

JOHN S. BURKE, New Orleans; age 45; endorsed: L. V. Cressy, K. P. Kammer, R. F. Legeai. Spring Hill College, Eng. Prep., graduated 1920. Loyola Univ. Arch. Eng. 1920-22. N. O. Public Service Inc., Industrial Gas Engineer, 1928-33, Sales Engineer, 1933-41, Coordinator Engineer, 1941-present. Member Am. Soc. H. & V. Engrs. N. O. Electrical Ass'n.

LOUIS DUCLOS, Baton Rouge; age 43; endorsed: H. L. Lehmann, N. E. Lant, Leo M. Odom. Tulane University, B.E., M.&E., 1925. Ira G. Hedrick, Inc., Hot Springs, Ark., in responsible charge design and construction of bridges, 1929-31. La. Dept. of Highways, Head Bridge Designer, 1931-present. Licensed C.E., La.

JOSEPH J. FRIEDLER, JR., New Orleans; age 43; endorsed: Louis Aleus, L. V. Cressy, Walter Moses, J. M. Todd. Yale University, B.S.E.E. 1925. Ilg Electric Ventilating Co., Chicago, 1925-date, present position Southern District Mgr. Member A.S.H.V.E., N. O. Electrical Ass'n.

GERALD C. WILLIAMS, Baton Rouge; age 32; endorsed: J. T. O'Brien, B. W. Pegues, T. E. Peak. La. State University, B.S.M.E. 1934, M.S. 1938. Freeport Sulphur Co., Engineer-draftsman, 1934-36. Solvay Process Co., 1937-38. Standard Oil of La., Inspector, Mtce. Engineer, 1938-present. Member Tau Beta Pi and Phi Kappa Phi.

For Junior Member

WALTER C. BYRNE, JR., New Orleans; age 24; endorsed: L. C. Brune, J. M. Miazza, W. J. Verlander. Tulane University, B.E. in M.E., 1942, U. S. Army, Jr. Engr., 1942. U. S. Naval Officer, 1942-46. Corps of Engrs., U. S. Army, Jr. Engr., present.

SEYMOUR CAMBIAS, JR., New Orleans; age 22; endorsed: J. K. Mayer, A. P. Whitman, J. P. Fernandez. Tulane University, B.E. in E.E., 1945. U.S.N.R., Ensign serving as Asst. Editor for confidential Naval Radar Magazine. Presently employed by Miss. Valley Electric Co. Member A.I.E.E.

HENRY RICHARD DAVIES, JR., New Orleans; age 25; endorsed: C. Nielsen, T. E. Peak, J. Y. Snyder. Tulane University, B.E. in M.E. 1943. U.S. Naval Reserve, 3 yrs. Davies Sales and Eng. Co., 6 mos.

JAMES ANTHONY EVANS, New Orleans; age 26; endorsed: J. M. Robert, A. M. Hill, J. K. Mayer. Tulane University, B.E. in M.E., 1943.

JOHN L. MARTINEZ, New Orleans; age 24; endorsed: A. M. Hill, J. K. Mayer, J. P. Fernandez. Tulane University, M.E. 1943. Now employed as Instructor in Experimental Engineering, Tulane U.

HERBERT A. SCHAEFFER, JR., New Orleans; age 24; endorsed: C. A. Burton, R. L. Nall, H. A. Timken, Jr. Louisiana State Univ., B.S.E.E. 1943. 6 mos. army electronics training; Harvard and M.I.T. 3½ yrs. U.S. Army Signal Corps. Member Tau Beta Pi, Omicron Delta Kappa, A.I.E.E.

SPENCER GRAY SMITH, New Orleans; age 24; endorsed: C. A. Burton, A. M. Hill, J. Y. Taylor, W. J. Verlander. Tulane University, M.E. 1942. Fairbanks-Morse Co., part-time draftsman, 1940-41. Eads Johnson M.E. Inc., summer 1941. U.S.N.R., Const. Corps (Naval Arch.) Lt., 1942-46. Now at Flintkote Co., Engr. in charge of mach. installation.

JAMES TENNY TAYLOR, New Orleans; age 22; endorsed: L. J. Lassalle, J. E. Morehiser, Jr., F. G. Perrin. Louisiana State University, B.S.M.E. 1946. North American Aviation, Eng. Loft, layout lofting, 1942-43. Higgins Aircraft, Eng. Dept., 1943-44. LSU, 1944-46. Treen, Engineering Co., Asst. Exp. Eng., present.

For Transfer from Junior to Full Member

WALTER E. BLESSEY, New Orleans; age 27; Tulane University, B.E. in C.E., 1940; C.E. 1943. United Gas Pipe Line Co., Jr. Engr., 1940-41. City of N. O., Asst. Engr., 1941-42. Geo. P. Rice, Consulting Eng., 1942. Tulane University, Asst. Prof. of Experimental Eng., 1942-45. U.S.N.R., Ensign Civil Eng. Corps, 1945-46. Tulane University, Assoc. Prof. of Civil Engineering, 1946-present.

For Transfer from Student to Junior Member

JOHN A. LAURENT, JR., Electrical Engineer; PRESTON MOTTRAM, Mechanical Engineer; ANDERSON B. RITTER, Civil Engineer; ROBERT W. SEIDLER, Mechanical Engineer; all graduates of Tulane University.

For Student Member

ROBERT D. ALLEN, Mechanical Engineering Student, Tulane University.
CARLISLE DAVIDSON, JR., Mechanical Engineering Student, L. S. U.
WILLIAM M. FORTENBERRY, Mechanical Engineering Student, L. S. U.
JOHN MALLORY GRACE, Mechanical Engineering Student, L. S. U.
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IRWIN ISAACSON, JR., Mechanical Engineering Student, Tulane University.
E. O. LAKIN, Mechanical Engineering Student, L. S. U.
RAYMOND J. MEYER, Mechanical Engineering Student, L. S. U.
THOMAS F. RUFFIN, Mechanical Engineering Student, L. S. U.
ERNEST C. SINGLETARY, Mechanical Engineering Student, L. S. U.
JACOB B. SWANSON, JR., Mechanical Engineering Student, L. S. U.

Let's Make the Drivers License Law Work. The Legislature in its last session, after careful consideration of the information submitted to it, enacted a Driver's License Law for the State of Louisiana. We believe the Legislature acted in this manner because of two things; first, as users of the highways, they recognized the necessity for some control over the drivers of all motor vehicles; second, we believe they recognized and paid tribute to the sincerity of our Public Safety Director, Hunter H. Huckabay, in his presentation of the facts to them, forcefully illustrating the need for such legislation and that if they passed the law, he would enforce it efficiently, yet fairly and courteously.

It is estimated that there will be a total of 600,000 drivers. Knowing that the task of giving each driver in the state an

actual road test, as well as the filling in of the necessary forms to obtain the desired information was so big that it would have required the services of all of the 15,000 employees of the state of Louisiana, (if they were properly trained), to give these tests, the proponents of the Drivers License Law(and this included representatives of LMTA), asked the Legislature to write into the measure a provision that all drivers would be blanketed in under the law for a period not to exceed two years.

There were one or two exceptions to this provisions; one, that all children becoming of legal driving age should be given an actual examination in which they would be required to prove their skill; two, that all citizens from other states moving into Louisiana and establishing a residence should be required to take the same type of examination.

In addition to this, the Director of Public Safety and his deputies are given the authority to require an actual examination, where, in the opinion of the Director or his deputies, such an examination was required as the result of: one, physical handicaps such as the loss of limbs, poor eyesight, etc.; two, addicted to the use of narcotics, and excessive use of alcohol. All of these provisions and the exceptions thereto were designed with one purpose in mind—to get the law working, train the necessary personnel for giving examinations, establish a system of records which would give complete information on all the drivers of the state. These things, to our way of thinking, are just as clear and comprehensive as is the fact that night follows day.

Yet, there are many people who, not knowing the meaning of the act, are beginning to refer to it as another “tax-grabbing” law. In some cases some individuals have even gone so far as to refer to it as a “racket”. We think that the people who are guilty of this type of thinking have no true interest in a comprehensive highway safety program in this state.

The new law became effective the first of the year. However, due to a series of state holidays and apparent misunderstanding on the part of the general public every office maintained throughout the state was completely jammed with automobile drivers, seeking application blanks. People became impatient

because of having to stand in line. We had too much of that during the war. Many came there with the idea (because they hadn't taken the trouble to read the law which was printed in every newspaper in Louisiana) that they would have to take an actual examination, proving their skill with a vehicle. When they were not required to do this, they became convinced that they were simply having a dollar taken away from them. And that's the way criticism starts towards most progressive measures. The way to overcome this criticism is for men and women who are interested in safety on our highways to take the time to explain the actual conditions under which we are placing our new law in operation.

To those who doubt the true purpose of this act, if this is done, we believe you will see an ever-increasing number of people talking in favor of the measure.

We have stated, and we repeat that we have full confidence in the sincerity of Director Hunter H. Huckabay and his announced program of enforcement of the act. We have personal knowledge of the integrity and efficiency of his director of this program, Major Joe Green. We participated in the training school for examiners, and we, from our own knowledge, know that the state of Louisiana has a small but efficient force of men engaged in such work and that future schools conducted by the Department of Public Safety will produce more of these.

The Drivers License Law will work. Let's do our part to make it work.—Louisiana Highway News, Jan. 13, 1947.

ENGINEERING BRIEFS

Synchronous Condensers. Compressed air is utilized in a novel way in connection with hydro-electric stations. Air under about 100 pounds per square inch pressure is introduced into the turbine casing and depressed the water level so that the runner is exposed. The generator is then operated as a synchronous condenser for power factor correction. As an example of saving in load on the generator when operating as a motor, a case is cited where 4,000 kw. would be the load with the runner submerged in water, and only 700 kw. when the runner is rotating in air. Automatic controls assure the water being kept at the proper level.

New Building Block. Recently a building block has been developed and placed on the market. The materials entering into the block are rice hulls, rice hull ash and cement. By varying the proportions the product's density may be as low as 40 pounds per cubic foot or as high as 100. It is claimed that nails and screws will hold in this material, and that it may be cut with a saw.

Unit Heater. As an outgrowth of air plane heating, a manufacturer has developed a compact household heater. It is claimed that the heater has an efficiency of 80%. The overall dimensions are 14" x 30" x 9½", which will allow it to be placed between the walls of a room. Two tubes are used to connect it to the outside, one supplying fresh air, the other removes products of combustion.

Gas from Unmined Coal. The prospect of obtaining gaseous fuel from low grade coal is being developed by the Alabama Power Company. It is planned to fire a mine near Gorgas, Ala. Two six foot diameter shafts will be driven into a low grade vein. One shaft will supply air, for incomplete combustion, the other shaft will remove "producer gas". The combustible constituent of the gas is carbon monoxide. The possibility of adding oxygen to the gas is being considered. The project cost is estimated at \$50,000 to \$75,000.

PAPERS AND DISCUSSIONS

ENGINEER SERVICES OF THE U. S. WATERWAYS EXPERIMENT STATION *

COLONEL C. T. NEWTON, C. E.

The U. S. Waterways Experiment Station, an agency of the Mississippi River Commission in the Engineer Department, is maintained for the purpose of carrying out special studies and investigations in hydraulics, soil mechanics and concrete, and for increasing professional knowledge in these and related fields. The Experiment Station started modestly in its present Vicksburg location in 1931 under the Mississippi River Commission--purely as a hydraulic laboratory. During succeeding years the Station broadened its hydraulic model activities to become the center of model investigation for the Engineer Department-at-Large. In the early 30's a soil mechanic laboratory was added, and this Department was broadened at the start of the war to include a flexible pavement laboratory for studying airplane landing-field surfaces. During the past few months the incorporation of the Engineer Department Concrete Testing Laboratory into the Waterways Experiment Station has been accomplished.

The Station is rapidly becoming a major center of professional research and study in most of the diverse engineering fields with which the Engineer Department is concerned. This evening I wish to point out how the Station renders engineering services in assisting and augmenting the activities of the major Engineer Offices of the Department.

As you know, the Engineer Department is charged with those Federal projects and works entailed by the problems of flood control and navigation. In any project, regardless of scope, there is a certain basic and logical sequence of development. A searching investigation of the problem is the first essential operation; then comes an integrated design, followed by actual construction. In each of these three phases the Experiment Station renders a definite and contributory service.

* Presented before a joint meeting of the Louisiana Engineering Society, and the Society of American Military Engineers, 8:00 p. m., Monday, 12 August 1946, at the Jackson Room of the St. Charles Hotel, New Orleans, La.

Investigation

In practically any engineering project there are problems similar to those encountered in earlier works, and a review of the literature pertaining to these previous, similar problems can be exceedingly helpful to the responsible office in establishing criteria on which to base design. To facilitate this process the Engineer Department Research Center maintains in its library a voluminous collection of documents, reports and papers dealing with aspects of engineering problems in hydraulics, soil mechanics and concrete; this literature is made available to interested offices—by library loan—upon request. Upon request for general or specific information on some particular question, the Research Center staff will compile bibliographies, prepare translations of foreign papers, correspond actively with American and foreign source agencies, and otherwise strive to assemble data pertinent and relevant to the question at hand.

Initial site and location investigations, and analysis of local foundation and construction materials, are conducted by both

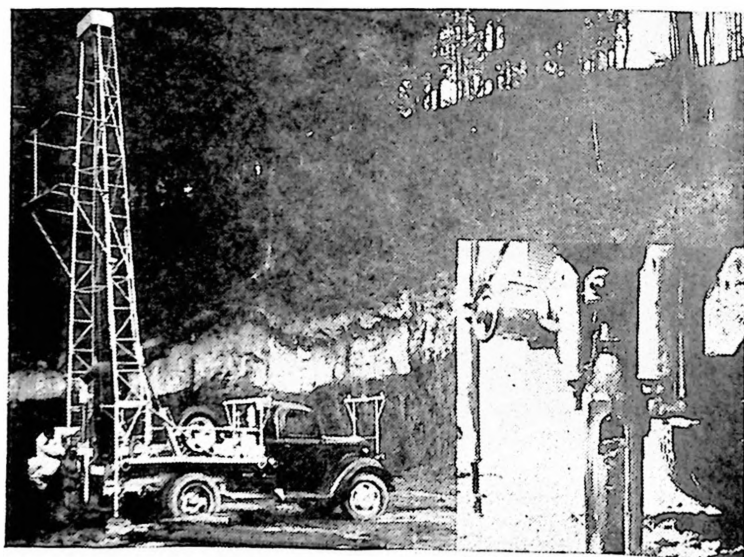


FIGURE 1—Mobile drill rig in operation. The insert shows a hinged Iwan-type earth auger.

the Soils and Concrete Divisions of the Station. An exhaustive file of geological data has been developed by a staff of geologists, presently located at Baton Rouge, who are constantly engaged in research and study to promote a greater knowledge of the geological characteristics of the alluvial valley of the Mississippi River.

In order to properly design an earth structure, or forecast the behavior of a foundation, it is necessary—and imperative—that a full knowledge be gained of soil characteristics at the site. For this purpose four mobile drill rigs, with experienced soils-sampling crews, are constantly active in the field, and are frequently called upon to make initial borings at selected project locations.

Aggregate samples forwarded to our Concrete Laboratory are given exhaustive tests to determine their suitability for use in proposed concrete structures. Petrographic examinations, including photo-micrography, are made. Occasions fre-

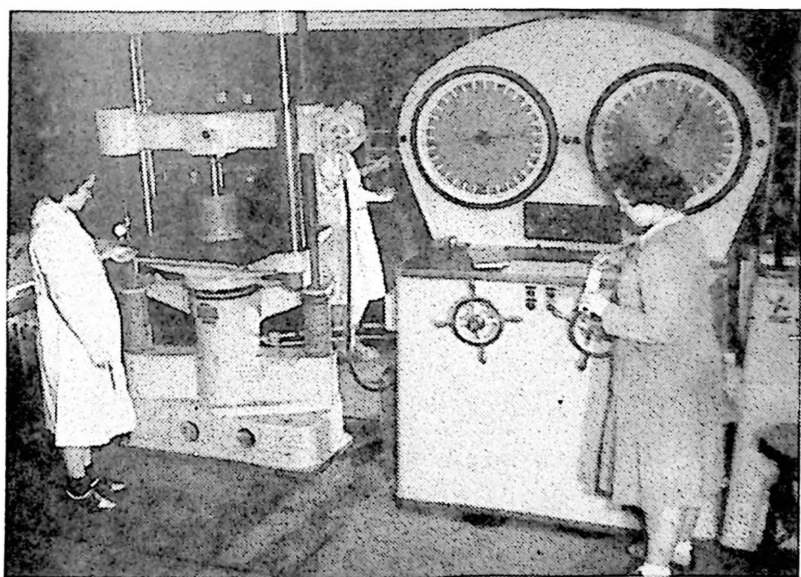


FIGURE 2—A view in the Soils Laboratory; the apparatus shown is a general-purpose compression or tension testing machine.

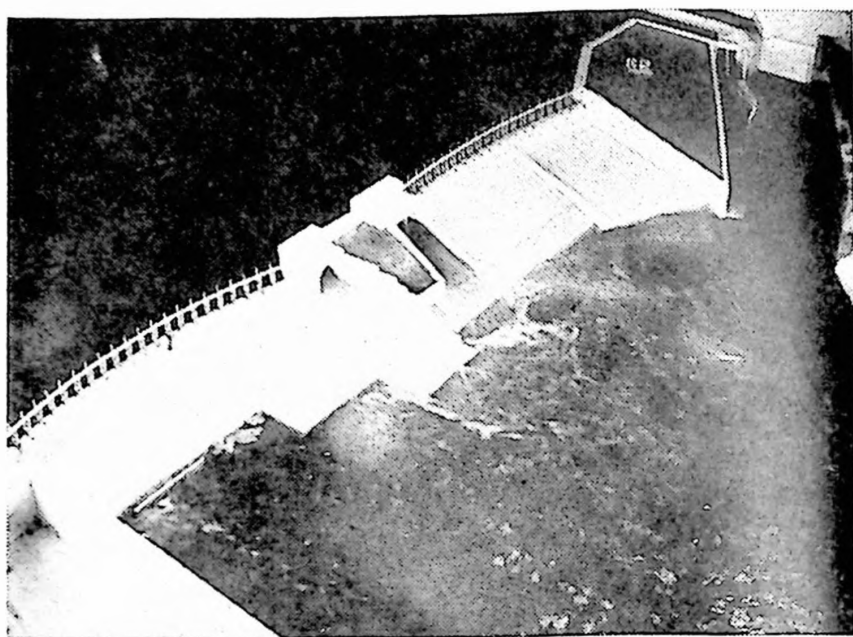


FIGURE 3—Model of the Prattville Dam and exit channel. The study was accomplished for the Mobile Engineer District, and had for its purpose the study of the hydraulic characteristics of the dam and the design of the stilling basin to prevent flooding of the town of Prattville, Alabama.

quently arise wherein the results of tests dictate major changes in design, or the selection of a site location different from that originally contemplated.

Design

The development of sound, practical design is the function in which the Experiment Station offers the greatest engineering service.

In the field of soil mechanics, an accurate analysis of the soil characteristics forms the basis for any detailed plans or specifications for a foundation or an earth structure. The staff of the Experiment Station Soils Division handles all design work in that field for the Mississippi River Commission, (which is identical to the Lower Mississippi Valley Division).

The hydraulic implications of the Rivers and Harbors, and Flood Control activities of the Engineer Department are basic.



FIGURE 4—A model of a portion of the spillway for John Martin Dam. The study, concerned with operating characteristics of the spillway under full and partial gate openings, was conducted for the Caddoa Engineer District.

In developing the design or plan for any hydraulic structure or improvement, the engineer is often confronted with a combination of forces and variables so formidable—and so little understood—that a purely mechanical solution is impossible. Here the engineer must of necessity revert to the only remaining expedient—experimentation. To experiment in the nature system would for obvious reasons be a tremendously costly, difficult and dangerous undertaking; but he can study his problem on a miniature system—the hydraulic model—which can be made to conform to the same physical laws, costing little, and in which the factors controlling fluid motion can be easily regulated. The basic design or plan is, of course, the responsibility of the initiating office, but the Experiment Station is organized and equipped to study any of the many hydraulic problems which prove to be unorthodox.

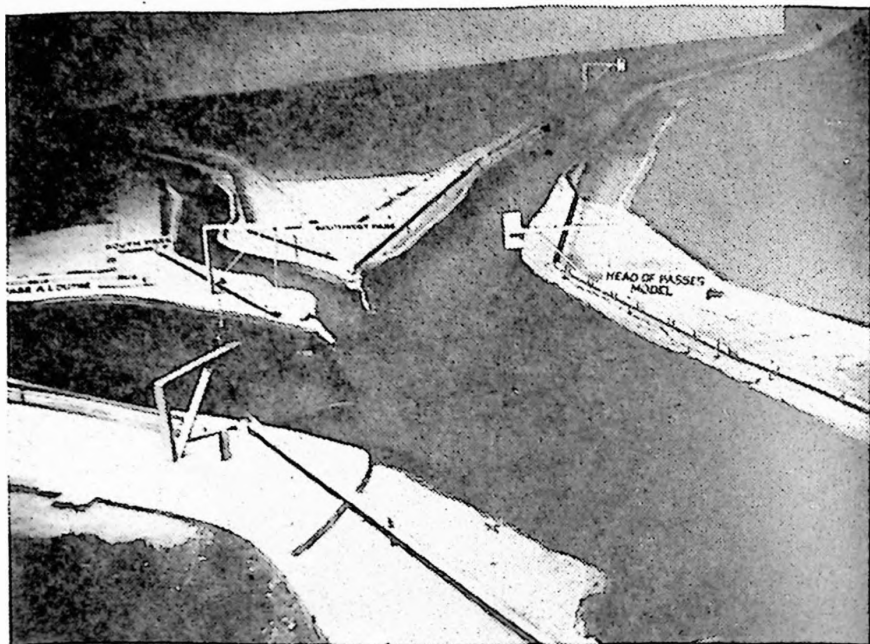


FIGURE 5—A large proportion of our model studies have been concerned with river navigation and flood-control problems. One such study, involving plans for the maintenance of navigable depths in the vicinity of Head of Passes, was conducted for the New Orleans Engineer District.

To date, over 250 model studies have been conducted by the Experiment Station for Engineer Offices and other agencies. These studies have included flood-control and navigation problems; all such types of hydraulic structures as spillways, stilling-basins, outlet and intake works, surge-tanks, drydocks, etc.; and special investigations of such phenomena as tides, wave-action, salt-water intrusion and shoaling. A few slides will serve to illustrate some typical problems.

**MODEL STUDIES OF DAMS AND APPURTENANT STRUCTURES
CONDUCTED AT U. S. WATERWAYS EXPERIMENT STATION**

Project	District Office	Summary of Results
Allatoona Dam Spillway Etowah River, Ga.	Mobile, Ala.	Safe stilling-basin design developed. Training walls lowered and shortened resulting in saving of about \$20,000.
Arkabutla Dam Spillway Coldwater River, Miss.	Vicksburg, Miss.	Stilling basin raised 3 ft. reducing excavation by 2700 cu. yds. Stilling basin shortened 15 ft. reducing paving by 4500 sq. ft. Stilling-basin performance improved.
Bluestone Dam Spillway New River, W. Va.	Huntington, W. Va.	Shape of baffle pier developed which eliminated cavitation.
Canton Dam Spillway North Canadian River, Okla.	Tulsa, Okla.	Stilling basin raised 5 ft. reducing excavation by 300 cu. yds. Stilling basin shortened by 15 ft. reducing paving by 11,670 sq. ft.
Center Hill Dam Spillway, Caney Fork River, Tenn.	Nashville, Tenn.	Satisfactory bucket design developed. Sluice alignment changed to give satisfactory performance.
Conemaugh Dam Spill- way, Conemaugh River, Pa.	Pittsburg, Pa.	Stilling basin shortened 27.5 ft. reducing paving by 15,000 sq. ft.
Denison Dam Outlet Works, Red River, Tex.	Denison, Texas	Stilling basin redesigned to give satisfactory performance.
Denison Dam Spillway Red River, Tex.	Denison, Texas	Stilling basin shortened 200 ft. reducing paving by 300,000 sq. ft. Baffle piers and end still eliminated.
Detroit Dam Spillway, North Santiam River, Oregon	Portland, Oregon	Stilling basin reduced to give satisfactory performance.
Fort Gibson Dam Spillway, Grand River, Okla.	Tulsa, Okla.	Stilling basin shortened 50 ft. reducing paving by 75,000 sq. ft. Baffle piers eliminated.
Great Salt Plains Dam Spillway, Arkansas River, Okla.	Little Rock, Ark.	Two rows of baffle piers eliminated. Training walls 60 ft. in height, shortened 150 ft. on each side.
Prattville Dam, Autauga Creek, Ala.	Mobile, Ala.	Exit channel below dam designed to prevent flooding of Prattville, Ala.
Wappapello Dam Out- let Works, St. Francis River, Mo.	Memphis, Tenn.	Stilling basin and side walls on each side shortened 64.5 ft. reducing paving by 8,400 sq. ft.

FIGURE 6—This list of typical studies of hydraulic structures is presented by way of emphasizing the benefits to be gained from the use of model analysis in hydraulic design work.

In the field of concrete the Station does not concern itself with structural design, but is interested in concrete purely as a structural material. Determination of the proper admixture for any given set of conditions is a prime consideration. For any mass concrete structure planned by an Engineer Office, the specifications for the concrete mixture are developed with the assistance of the Concrete Laboratory. The procedure runs

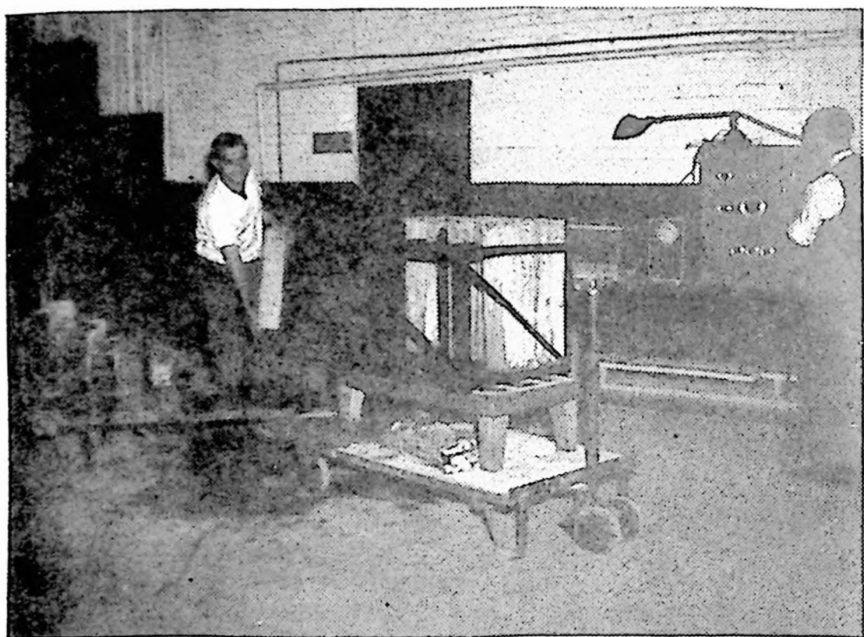


FIGURE 7—Vibro-electronic (conic) testing of concrete specimens in the laboratory.

Note: It is known that good, sound concrete, when struck by a hammer, has a solid ring or resonance. The period of resonance is an indication of its modulus of elasticity. The apparatus pictured here has been calibrated to indicate by sonic vibration the modulus of elasticity of the specimen. The great advantage is that the same sample may be tested repeatedly, whereas in the conventional methods of testing, the specimen is broken and lost. Specimens are tested during curing and at intervals while undergoing durability tests.

somewhat like this: A carload of aggregate is shipped in; water from the site is analyzed; proposed pouring and curing

processes are reviewed; cement from the bidder is obtained and concrete samples are prepared and tested under conditions similar to those anticipated at the project location. A few examples of some of the tests may be appropriate at this point.

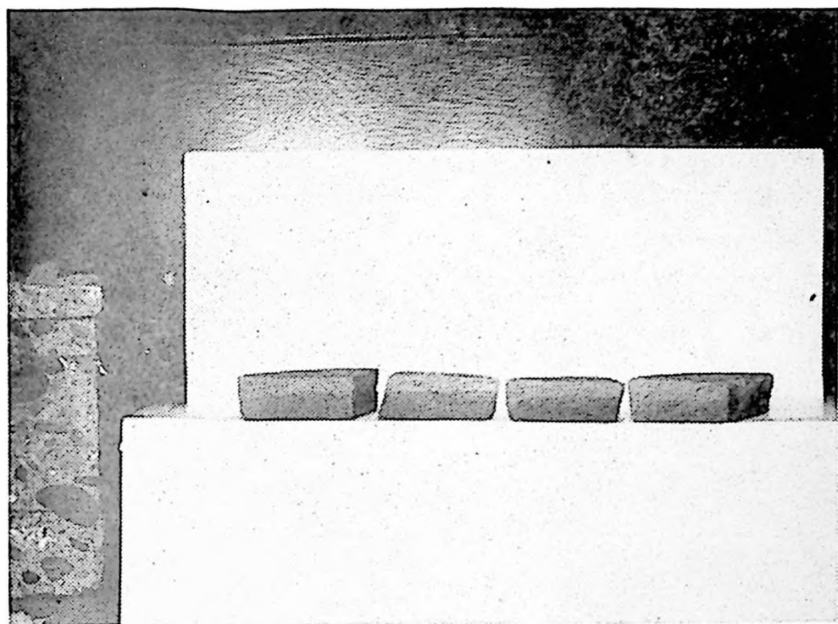


FIGURE 8—Concrete specimens examined under ultra-violet light to determine permeation by salts or carbonation.

Thus the Concrete Laboratory, working closely with the responsible Engineer Offices, performs a major service in connection with the establishment of design and construction specifications.

Construction

During the actual construction phase of a project, the Experiment Station again contributes. Codes for uniform and sound construction practices and procedures have been developed in the soils and concrete fields; these are constantly subject to revision and change as new methods and techniques are indicated by tests and research in the Soils and Concrete Divisions.

Simple field tests for the control of operations involving earth fill have been devised by the Soils Division and are widely used. The Station avoids the actual routine production-type control testing that can best be handled at the project site. However, the facilities of the Station laboratories are prepared

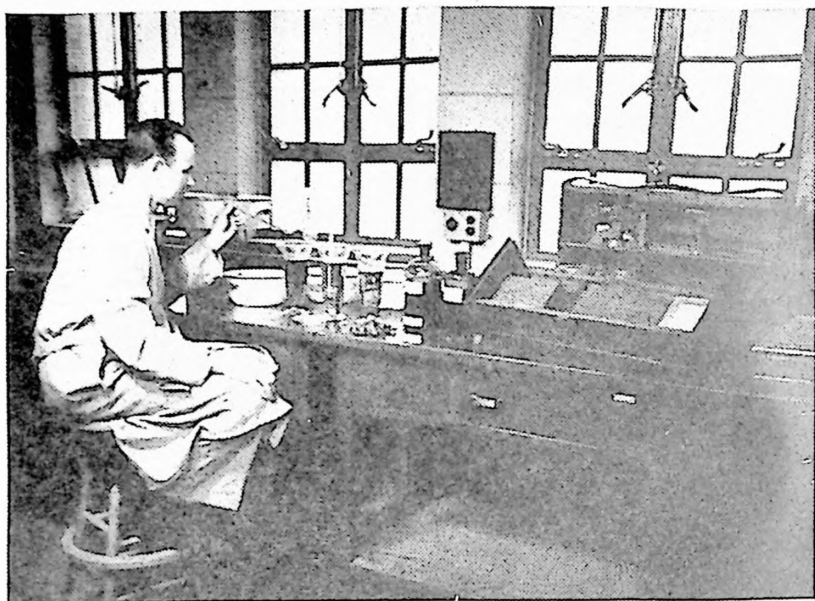


FIGURE 9—As an example of a simple control procedure in the field to assure the consistency of concrete aggregate at the site, our Concrete Laboratory has developed the field kit pictured here. The kit contains three liquids of varying specific gravity. If a sample floats when placed in the selected liquid, it is poor; if it sinks, it is acceptable.

to assist in any circumstance where unusual conditions or construction difficulties indicate a desirability for special analysis or non-routine tests.

In the hydraulic field, construction difficulties are frequently encountered and unsatisfactory conditions are disclosed which could not be foreseen at the time of design, but which serve to enforce a change of plan, procedure or basic design. As a consequence it is sometimes necessary during the construction phase to evolve corrective measures, or modifications to the original design, by means of model analysis.

General Engineering Services

The foregoing discussion has presented some examples whereby the Station assists in the accomplishment of specific and active engineering works. We like to think we also contribute to improving general engineering knowledge and in the solution of miscellaneous problems.

The Instrumentation Branch has developed pressure cells for the indication of positive and negative pressures in gates, on sea walls, and in earth structures; it has built a mechanism for recording wave phenomena—information that is essential in designing harbor or shore protective works.

The concrete laboratory was a pioneer in developing air-entrained admixtures, and in perfecting laboratory technique to rapidly test concrete resistance to alternate freezing and thawing.

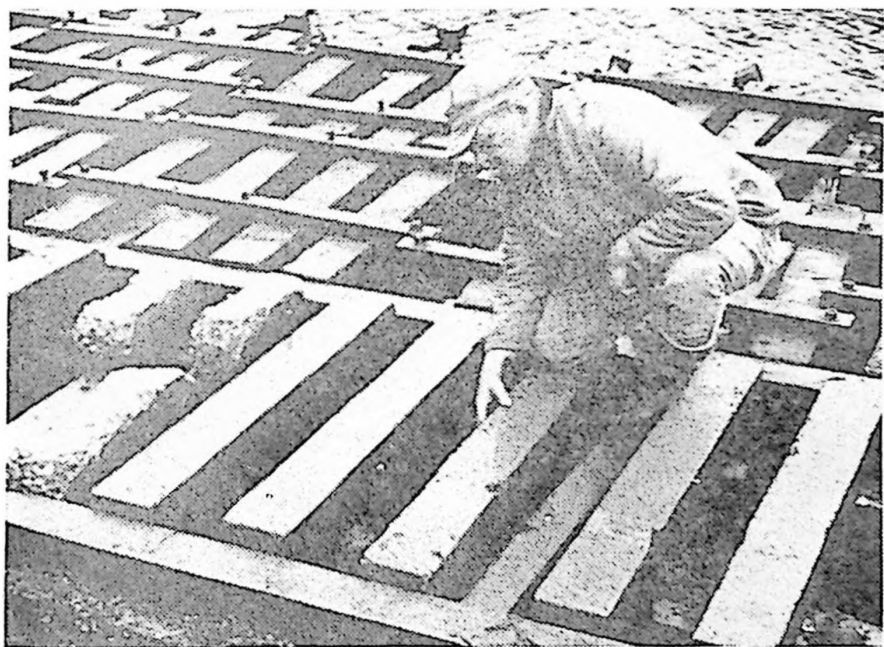


FIGURE 10—Our exposed testing racks on Treat Island near Passamoquoddy, Maine. In winter the large tide differential in that locale subjects the specimens to freezing when exposed and thawing when submerged. Freeze and thaw with every tide cycle. Specimens at right made with air-entraining admixture, at left, without.

The Concrete Laboratory maintains a core drilling rig to obtain specimens from existing structures. Tests of such specimens, together with a knowledge of conditions under which placed, enables long range evaluation of design and adds materially to professional experience.

A full understanding of soil mechanics is still obscure. Much profound study is still indicated. The Soils Department is currently active on many of these subjects. In tests areas on the Station grounds dozers and rollers are compacting varieties of soils under different controlled conditions to establish the most efficient field methods.

The war-time activated flexible pavement laboratory is still developing basic criteria for the design of sub-grade and surfaces for airfields—knowledge applicable to highway construction as well.

A special vacuum tank is under construction to study and analyze the effects of cavitation.

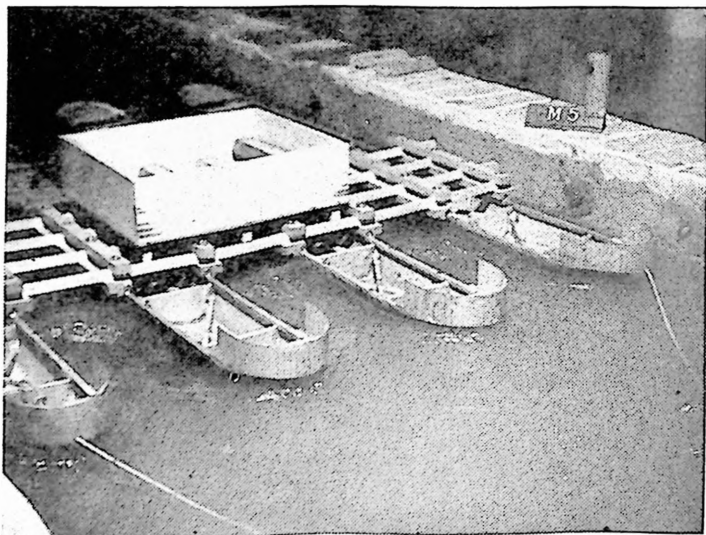


FIGURE 11—The Hydraulic Division contributes to Military Engineering by assisting the Engineer Board in the design of new high-capacity pontoon bridges.

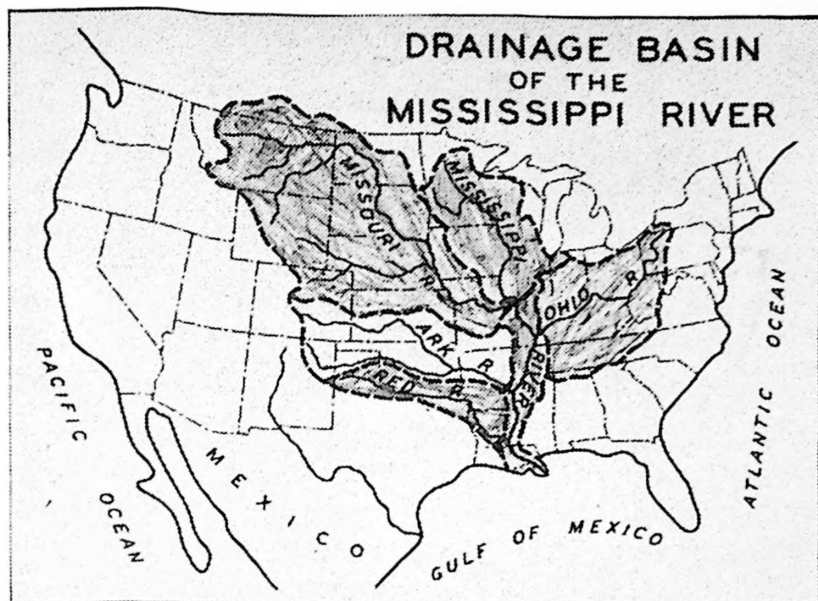


FIGURE 12—A model of the entire Mississippi River drainage basin covering 220 acres will enable the Engineer Department to determine far-reaching effects of local reservoir operation and changes in local protective works.

Most spectacular of all is the construction of the largest hydraulic model in the world. I have presented a variety of fragmentary information, purposely avoiding the detailed technical aspects of any—which individually constitute interesting reports.

I like to feel that our diverse activities all fall into one of the essential elements of project investigation, design and construction, or tend to improve professional knowledge and technique.

Coordination of the talents and professions represented at the Waterways Experiment Station enables this installation to provide engineering services in a major portion of the fields with which the Engineer Department is concerned.

A few members of the Station Staff are here this evening; Mr. Fenwick, Assistant Chief of the Hydraulics Division; and Mr. Patterson, Chief of the Engineer Department Research Center.

1947

MEMBERSHIP LIST

C. M.: Charter Member
H. M.: Honorary Member
L. M.: Life Member

A.: Affiliate Member
Assoc.: Associate Member
J.: Junior Member

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- CHARLES J. WYLER, (1919), *Mechanical Engineer*, Assistant Chief Engineer, A. M. Lockett & Co., Ltd., 308 Whitney Bldg. Mail: 530 Jackson Ave., New Orleans 13.

— Y —

- LOVETT YOUNG, (1943), *Chief Chemist*, Gulf States Utilities Co. Mail: 2404 Hale St., Baton Rouge, La.

— Z —

- MARIO G. ZERVIGON, (1943), *Electrical Engineer*, Associate Professor of Electrical Engineering, Tulane University. Home: 732 Third Street, Metairie. Mail: College of Engineering, Tulane University, New Orleans 15.
- COMDR. ANTHONY MICHAEL ZIBILIOH, (1941), *Chief Engineer*, U. S. C. G., Assistant Maintenance Office, Senior Coast Guard Officer, 8th Naval District, 327 Customhouse Bldg. Mail: 969 Wilton Drive, New Orleans, La.
- ROBERT W. ZIFLE, (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*, Asst. Supervisor of Engineering, Freeport Sulphur Company, Port Sulphur, La.

Student Members

- ROBERT D. ALLEN, 1403 Broadway, New Orleans 18.
- CARLISLE DAVIDSON, JR., Box 5249, University Sta. Baton Rouge.
- WILLIAM M. FORTENBERRY, Box 6940, University Sta. Baton Rouge.
- JOHN MALLORY GRACE, 970 Ingleside Drive, Baton Rouge 12.
- JAMES L. FRIER, JR., 3031 Jackson Avenue, Baton Rouge.
- IRWIN ISAACSON, JR., 2413 Pine Street, New Orleans 18.
- E. O. LAKIN, 344 N. 16th Street, Baton Rouge.
- RAYMOND J. MEYER, Box 8172, University Sta., Baton Rouge.
- CARL J. PARK, 2506 Jasmine Street, New Orleans 17.
- THOMAS F. RUFFIN, Box 5948, University Station, Baton Rouge.
- ERNEST C. SINGLETARY, 2108 Plank Road, Baton Rouge.
- JACOB B. SWANSON, JR., Box 6244, University Sta., Baton Rouge.
- CHRISTIAN M. VOELKEL, JR., 2762 Wisteria St., New Orleans 17.
- T. J. WILLIAMS, JR., 415 Bouny Street, New Orleans 14.

Summary

Honorary Members	3	
Charter Members	1	
Life Members	47	
Members:		
Local	287	
State	201	
Non-Resident	49	
Address Unknown	7	544
Associate Members		2
Affiliate Members		24
Junior Members:		
Local	58	
State	22	
Non-Resident	22	
Address Unknown	8	110
Student Members		14
Total		745

Past Presidents

*Sidney F. Lewis.....	1898	Donald Derickson	1922
*Thos. L. Raymond.....	1899	*J. S. Bareli.....	1923
Henry J. Malochee.....	1900	James M. Robert.....	1924
*Frank M. Kerr.....	1901	Marcel Garsaud	1925
*Alf. F. Theard.....	1902	Farrar P. Hamilton.....	1926
*Alf. Raymond	1903	*Edward S. Lanphier.....	1927
*J. F. Coleman.....	1904	John L. Porter.....	1928
W. B. Wright.....	1905	Frederick H. Fox.....	1929
*W. H. Hoffman.....	1906	James M. Todd.....	1930
*G. W. LAWES.....	1907	*Frank G. Frost.....	1931
*C. W. Wood.....	1908	Frederick N. Billingsley.....	1932
*J. T. Eastwood.....	1909	John H. O'Neill.....	1933
*W. B. Gregory.....	1910	A. L. Dunlap.....	1934
*J. C. Haugh.....	1911	Edward S. Bres.....	1935
D. S. Anderson.....	1912	Allen S. Hackett.....	1936
*A. M. Shaw.....	1913	C. S. Williamson.....	1937
W. H. Williams.....	1914	Bernard H. Grehan.....	1938
*L. C. Datz.....	1915	David W. Godat.....	1939
*Samuel M. Young.....	1916	William H. Rhodes.....	1940
A. T. Dusenbury.....	1917	David W. Stewart.....	1941
John Klorer	1918	C. Glenn Cappel.....	1942
Olo K. Olsen.....	1919	Karl P. Kammer.....	1943
John Riess	1920	Charles M. Kerr.....	1944
R. S. Manley.....	1921	Reinhard A. Steinmayer.....	1945
		Leo Jos. Lassalle.....	1946

* Deceased.

MINUTES OF MEETINGS AND BUSINESS OF THE SOCIETY

Minutes of Meeting of the Board of Direction, November 11, 1946

The meeting was called to order by President Lassalle, with Messrs Cucullu, Leake, Mayer, McNiven, Nairne, Steinmayer and Fernandez present. Minutes of the previous meeting were accepted as read.

A letter from Mr. Allen Betz, Chairman of the Banquet Committee for the Annual Meeting was read. The Secretary was instructed to request Mr. Seago, General Chairman for the Annual Meeting, to give a complete report on the progress being made by his committees at the next Board meeting.

Mr. Nairne announced plans for the Thursday Night General Interest Program to be held on January 9.

It was decided to hold a joint meeting of the Board of Direction and members of the Annual Meeting Committees on Friday, January 3, at 8:00 p. m., at Tulane University.

A letter from Mr. McNiven was read, in which members of the Society were invited to attend a banquet to be held during International Week.

The Secretary announced the receipt of books donated to the Society's library.

There being no further business, the meeting adjourned.

JOHN P. FERNANDEZ
Secretary-Treasurer

Minutes of Joint Meeting of the Louisiana Engineering Society with the New Orleans Section, American Institute of Chemical Engineers, November 11, 1946

The meeting was called to order by President Lassalle, with approximately 90 members and guests present. Reading of the minutes of the previous meeting was dispensed with.

The President announced that the Nominating Committee would receive suggestions for nominations during the ten days following the meeting. Mr. Charles Williamson explained that nominations of officers should be made in writing and not directly from the floor.

The Secretary announced the receipt of the 1947 A.S.M.E. Catalog and Directory for the library, and called attention to a listing in the October Proceedings of members whose addresses are unknown.

The meeting then was turned over to Mr. J. J. Ganucheau, Chairman of the New Orleans Section, A.I.E.E., who introduced the speaker of the evening, Mr. Robert M. Read, Process Engineer for The Girdler Corporation of Louisville, Kentucky, who gave a most interesting lecture on "Gas Processing Problems".

Out-of-town members and guests were introduced, and the meeting adjourned with a rising vote of thanks to the speaker.

JOHN P. FERNANDEZ
Secretary-Treasurer

Minutes of Meeting of the Board of Direction, December 9, 1946

The meeting was called to order by Vice-President Nairne, with Messrs. Leake, Mayer, McNiven, Steinmayer and Fernandez present. Mr. R. M. Seago, General Chairman of the Annual Meeting, was present by invitation. Minutes of the previous meeting were accepted as read.

Mr. Seago gave a verbal report upon the progress of his committees towards the annual meeting. In accepting his report, the Board expressed thanks to the committee personnel for their splendid work.

Mr. Steinmayer, Chairman of the Nominating Committee, submitted the following nominations for the forthcoming election of officers: For President, Clayton L. Nairne; for Vice-President, W. Stone Leake; for Second Vice-President, H. L. Lehmann; for Secretary-Treasurer, John P. Fernandez; for Director for 2 years, Harry P. Newton; for Director for 2 years, Frank W. Macdonald; for Director for 1 year, Ernest L. Mire.

The Secretary read a report of the Membership Committee and it was moved and passed that all applicants' names approved therein be placed on the December membership ballot.

A letter from Mr. Joseph A. Carruth, Secretary-Treasurer of the Lake Charles subsection, A.I.E.E., pertaining to the professional license law for engineers, was referred to Mr. Charles M. Kerr, Chairman, Legislative Committee, after being read to the Board.

A letter from Mr. Rudolf Hertzberg was read.

A letter from the Internal Revenue Department, declining the Society's claim for exemption from Federal Insurance Contributions Tax, was read.

The resignation of John P. Tobin and Mace H. Bell were accepted with regret.

There being no further business, the meeting adjourned.

JOHN P. FERNANDEZ
Secretary-Treasurer

**Minutes of Meeting of the Louisiana Engineering Society,
December 9, 1946**

The meeting was called to order by Vice-President Nairne, with approximately 100 members and guests present. Minutes of the previous meeting were accepted as read.

Mr. Nairne briefly explained the process of nomination, and also gave a concise report on the progress of the annual meeting in behalf of the General Chairman, Mr. Seago.

Mr. R. A. Steinmayer, Chairman of the Nominating Committee, reported that his committee had unanimously recommended the following ticket: For President, Clayton L. Nairne; for First Vice-President, W. Stone Leake; for Second Vice-President, H. L. Lehmann; for Secretary-Treasurer, John P. Fernandez; for Director for 2 years, Frank W. Macdonald; for Director for 2 years, Harry P. Newton; for Director for 1 year, Ernest L. Mire.

Mr. Chris Nielsen moved that the report of the Nominating Committee be accepted and that the names of those nominees be placed on the ballot; the motion was seconded by Mr. John H. Bernhard and carried. Mr. Nairne asked for further nominations, but none were made.

Mr. Nairne then presented the speaker of the evening, Mr. Clarence W. Farrier, Director of Research for Gunnison Homes, Inc., who gave a most interesting lecture on "Prefabricated Homes". This was followed by a lively and instructive discussion.

The meeting was adjourned with a rising vote of thanks to the speaker.

JOHN P. FERNANDEZ
Secretary-Treasurer

**Minutes of Special Meeting of the Board of Direction, January 3, 1947
(Held jointly with Annual Meeting Committee Personnel)**

The meeting was called to order by President Lassalle at 8:15, with the following Board members present: Messrs. Cucullu, Lehmann, Mayer,

McNiven, Nairne, Steinmayer, and Fernandez. Annual Meeting chairman and vice-chairmen attending were Messrs. Seago, Porter, Ross, Kammer, Nelson, Amoss, Janssen, Hardy, Bulliung, Ellis, Cressy. Pic Dufour also was present by invitation of Mr. Amoss.

Each committee presented an outline of its accomplishments. Mr. Nairne then described the Thursday night general interest program.

President Lassalle thanked the entire group for its splendid work in preparing for the annual meeting.

Mr. Lehmann announced that the engineers of Lake Charles are attempting to organize a section and that much ground work had been done.

Mr. Cressy asked what support from the Society might be given if the American Society of Heating and Ventilating Engineers should hold their national convention in New Orleans in 1948. No official expression was given, since it was agreed that the matter should be left to the discretion of the new Board of Direction.

There being no further business, the meeting adjourned.

JOHN P. FERNANDEZ

Secretary-Treasurer

Minutes of Meeting of the Louisiana Engineering Society, January 9, 1947

The meeting was called to order by President Lassalle in the Beauregard Room of the St. Charles Hotel. There were approximately 225 members and guests present. Reading of the minutes of the previous meeting was dispensed with.

President Lassalle introduced the chairmen and presidents of the local sections and chapters of the many engineering groups present. He also welcomed the distinguished guests, and introduced the key-note speaker, the Honorable Sam Houston Jones, former Governor of Louisiana, who gave a very clear and forceful address on the progress made in the State of Louisiana toward a balanced economy. Mr. Jones' address was received with a standing round of hearty applause.

Financial and membership reports for the year 1946 were presented by the Secretary-Treasurer.

The President's annual report reviewing the Society's activities for the year was presented by Dr. Lassalle.

Mr. W. Stone Leake read three resolutions, copies of which are attached to these minutes. A motion to accept these resolutions was made by Professor Steinmayer, seconded by Mr. James M. Todd, and passed unanimously.

President Lassalle announced that the Society's Junior Membership Award had been won by Chester G. Lob, who graduated from the Engineering School of Tulane University with highest honors.

Presentation of a certificate of Life Membership was made to Mr. A. H. Guillot.

Mr. Steinmayer, Chairman of the Nominating Committee, presented the Teller's Report, and the officers and directors for 1947 were escorted to the speakers' stand by the respective past presidents of the Society: Clayton L. Nairne, President, escorted by David W. Stewart; W. Stone Leake, First Vice-President, escorted by William H. Rhodes; H. L. Lehmann, Second Vice-President, escorted by Charles M. Kerr; John P. Fernandez, Secretary-Treasurer, escorted by Archie Lee Dunlap; Leo Jos. Lassalle, Director, escorted by James M. Robert; Lionel J. Cucullu, Director, escorted by James M. Todd; Frank W. Macdonald, Director, escorted by Frederick H. Fox; Harry P. Newton, Director, escorted by

Charles S. Williamson, Jr.; *Ernest L. Mire, Director, escorted by Frederick N. Billingsley.

Retiring President Lassalle then handed the gavel to President-elect Nairne, who gave a short acceptance speech.

Announcement was made of the remaining features of the annual meeting, and Mr. Billingsley moved that Dr. Lassalle and the 1946 Board of Direction be thanked for "a job well done". The motion carried unanimously and was followed by a motion that President Nairne name a committee to prepare a resolution thanking the Honorable Sam Houston Jones for his splendid talk.

There being no further business, the meeting adjourned.

JOHN P. FERNANDEZ

Secretary-Treasurer

January 9, 1947

WHEREAS the Board of Commissioners for the Port of New Orleans, through their Chief Engineer, Mr. John A. McNiven, have placed at the disposal of this Society the Dock Board Yacht "Good Neighbor" for an inspection trip of the port facilities, and

WHEREAS the use of the yacht "Good Neighbor" has afforded members and guests of the Society an opportunity to view the facilities of the Port of New Orleans, therefore

BE IT RESOLVED, that the Louisiana Engineering Society extend to the Board of Commissioners for the Port of New Orleans, and to Mr. McNiven, its thanks and sincere appreciation for this privilege.

BE IT FURTHER RESOLVED, that this resolution be incorporated in the minutes of the Society and that a copy be sent to Mr. R. L. Simpson, President of the Board of Commissioners for the Port of New Orleans.

W. STONE LEAKE, *Chairman*

Special Resolutions Committee

January 9, 1947

WHEREAS the St. Charles Hotel, through its manager, Mr. J. J. O'Leary, and his associates, have placed at the disposal of this Society its service and facilities for this meeting and throughout the year, and

WHEREAS these services and facilities have provided a gathering place for the Annual Meeting as well as for the regular monthly meetings of the Society throughout the year, therefore

BE IT RESOLVED that the Louisiana Engineering Society extend to the St. Charles Hotel, Mr. J. J. O'Leary and his associates their thanks and sincere appreciation for these services, and

BE IT FURTHER RESOLVED that a copy of this resolution be incorporated in the minutes of the Society and that a copy be sent to Mr. O'Leary.

W. STONE LEAKE, *Chairman*

Special Resolutions Committee

*Mr. Mire was unavoidably absent from the meeting.

January 9, 1947

WHEREAS, the Johns-Manville Corporation have kindly offered the facilities of their Marrero Plant for an inspection trip during this annual meeting, and

WHEREAS, this inspection trip has afforded members of the Society an opportunity to observe the construction and operation of this technical process, therefore

BE IT RESOLVED, that the Louisiana Engineering Society extend to the Johns-Manville Corporation its sincere thanks and appreciation for this courtesy and privilege, and

BE IT FURTHER RESOLVED, that this resolution be incorporated in the minutes of the Society and that a copy be sent to Mr. Arthur Seavey, local manager of the Johns-Manville Corporation, Marrero, Louisiana.

W. STONE LEAKE, *Chairman*
Special Resolutions Committee

A Resolution Conveying the Thanks of the Louisiana Engineering Society to the Honorable Sam Houston Jones for His address to this Body at Its Annual Meeting Held at the St. Charles Hotel, Thursday, January 9, 1947

WHEREAS on January 9, 1947 the Honorable Sam Houston Jones addressed the Twelfth Annual Meeting of the Louisiana Engineering Society on the progress made in the State of Louisiana toward a balanced economy, and

WHEREAS the speaker made it clear that the members of the Society can, in their dual capacities of citizens and engineers, do much to assist our State to attain its rightful position of eminence in industrial and agricultural pursuits and in domestic and foreign trade,

THEREFORE BE IT RESOLVED, that the Louisiana Engineering Society go on record as expressing its thanks to the Honorable Sam Houston Jones for his splendid and inspirational address, and furthermore, that this resolution be embodied in the minutes of the meeting, with a copy to be forwarded to the speaker as a testimonial of the appreciation of the Society.

LEO JOSEPH LASSALLE
FREDERICK N. BILLINGSLEY
DAVID W. STEWART
R. MALLARD SEAGO

A Resolutions Committee appointed by
the President

ANNUAL REPORTS
Membership Report for 1946

Members Elected	
New Members	60
Reinstated Members	13
Affiliate Members	3
Junior Members	14
Student Members	13
Total	<u>103</u>
Changes in Grade of Membership	
Junior Member to Member	1
Student Member to Junior Member	8
	<u>9</u>
Members Lost	
Resigned	12
Deceased	5
Dropped for Delinquent Dues	8
Total	<u>25</u>
Net Gain in Membership	78
Membership at Beginning of Year	<u>671</u>
Total Membership on December 31, 1946	<u>749</u>

Financial Report of the Secretary-Treasurer for 1946

Receipts, 1946		
Dues	\$4,416.13	
Advertising	732.84	
*Dividends and Interest	126.22	
Income from Joint Meetings	115.93	
Sale of Certificates	6.45	
Sale of Proceedings	4.00	
Total		<u>\$5,401.57</u>
Disbursements, 1946		
Cost of Proceedings	\$1,385.84	
Secretary-Treasurer's Salary	900.00	
Stationery, Printing and Postage	521.86	
Cost of Monthly Meetings	410.22	
Miscellaneous	334.41	
Rebate to Baton Rouge Section	313.00	
Annual Meeting Deficit—1946	287.50	
Annual Meeting 1947	93.10	
Golf Tournament Deficit	27.61	
Library Expense	48.00	
Floral Offerings	7.73	
Taxes	23.00	
Bank Charges	1.31	
Total		<u>\$4,353.58</u>
Net Operating Increase		<u>\$1,047.99</u>
Income from Frozen Assets		<u>310.16</u>
Increase in Tangible Assets		<u>\$1,358.15</u>

Statement of Assets, December 31, 1946

Cash, Whitney National Bank Cheeking Account		\$3,416.08
Columbia Bldg. & Loan Ass'n.	\$ 361.01	
Commonwealth Bldg. & Loan Ass'n.	305.50	
Greater N. O. Homestead Ass'n.	1,522.32	
Security Bldg. & Loan Ass'n.	500.00	
Sixth District Bldg. & Loan Ass'n.	500.00	
Union Homestead Association	500.00	
Series F, U. S. Bond 1942	776.00	
Series F, U. S. Bond 1943	767.00	
Series F, U. S. Bond 1945	745.00	
Series F, U. S. Bond 1946	740.00	
		6,716.83
Total Available Assets		\$10,132.91
Total Available Assts at beginning of Year		8,774.76
Increase during the Year		\$ 1,358.15

The statements just read will be published in the next issue of the Proceedings, where I hope you will analyze them closely so that you may realize what an exceptionally good year we have had from the financial viewpoint. Of course this did not "just happen"; it was due to the efforts of your officers, board, and committee members. In particular I should like to mention Professor Steinmayer and Mike Abraham, who not only made last year's meeting one of our best, but held down the deficit to the smallest amount in our history. Another person responsible for the healthy condition of our bank account is Jeff Collins, who has worked hard at getting new advertisers for the Proceedings and who has succeeded in doubling our income from that source. Of course there are many others whose efforts have contributed to our well-being, and as Treasurer of the Society I want to thank each and every one for his splendid support.

JOHN P. FERNANDEZ
Secretary-Treasurer

Annual Report of Retiring President Leo J. Lassalle of the Louisiana Engineering Society

Ladies and Gentlemen:

A year ago this Society did me the honor of electing me its President. As I did then, I want again to thank you.

It has been a very interesting and pleasant year. It has been a successful year for the Louisiana Engineering Society, thanks to the united efforts of every member who was assigned any task to perform, and to the cooperation of the various Engineering Societies.

Your officers have attended to their duties, and on time. The members have brought in new members and everyone has attended to their financial responsibilities.

So the Louisiana Engineering Society has the largest membership of its history—749. We have added 103 members during the year; and this gave us a net increase of 78 members. This was a good job; but there are a large number of potential members who can be brought into the Society if each member will devote himself during 1947 to the job of inviting each engineer that he knows to join our ranks.

We should organize sections in Lake Charles, Shreveport, Monroe, and Alexandria in 1947. Then we should add sections in Lafayette, Bogalusa,

and probably in other Louisiana cities. We shall not have many members outside of New Orleans and Baton Rouge and their environs unless we organize sections in the cities of the State. What has happened to the membership in and around Baton Rouge since the organization of the Baton Rouge Section shows this point very clearly.

Our financial condition is the best in its history. We have a balance of \$3,416.08 in cash, and \$6,716.83 in bonds and stocks. Details will be published in the next issue of your Proceedings of the Louisiana Engineering Society. I should add that this good financial condition is due in part to the fine management of the officers and committees who handled your 1946 Annual Meeting. Everything is higher this year, so the incoming officers will probably have a hard time maintaining the present surplus.

One of the pieces of unfinished business I am turning over to the new President is that of organizing and perfecting plans for getting the various Component Engineering Societies of Louisiana to present a sound, workable Engineering License Law to the next Legislature. This must be done during 1947 if it is to be ready for the 1948 meeting of the Legislature. Louisiana is almost the only state, and it is the only important state in the United States, that does not have a General Engineering License Law.

I cannot, at this time, go into the details of this subject, nor into its ramifications and implications. Many of you know all about this. So, I will simply say that, in my opinion, we shall and we should be criticized by our fellow citizens if we do not protect the people of the State who have to employ engineers, and also protect our own profession, by seeing to it that a sound General Engineering License Law is agreed upon by ourselves and then presented to and supported before our 1948 Legislature.

As you must know, unless we present a united front before the Legislature, we will not have such a law enacted.

And now let me close with thanks to all of our committees and members who have worked so untiring to make this 12th Annual meeting the huge success that it apparently will be.

Minutes of Joint Meeting—Baton Rouge Section of Louisiana Engineering Society and the Baton Rouge Industrial Forum

Time: 7:30 p. m., October 1, 1946.

Place: Auditorium of The Gulf States Utilities Company.

Mr. P. J. Guelfi, President of the Baton Rouge Section of the Louisiana Engineering Society, opened the meeting. There was no old or new business brought up for discussion. The reading of the minutes of the last meeting was dispensed with. President Guelfi then turned the meeting over to Mr. P. S. O'Brien, President of The Baton Rouge Industrial Forum. No old or new business was brought up for discussion.

Mr. O'Brien then asked that Mr. H. L. Lehmann introduce the speaker of the evening, explaining that it was through the efforts of Mr. Lehmann that this speaker had been secured for the occasion.

Mr. Lehmann introduced Mr. R. J. Ferree, Sales Manager of the National Lead Company who was to make the address and Mr. John Kelley of New Orleans, Representative of The National Lead Company who accompanied Mr. Ferree.

After a short talk, outlining briefly the history of lead, many of its uses and the reasons for its present shortage, Mr. Ferree presented a

sound picture entitled, "The Mining of Lead in South Eastern Missouri". This film was produced by the U. S. Bureau of Mines and covered thoroughly the development of lead mining in that area.

Following the showing of this film, Mr. Ferree gave a talk illustrated with picture slides, on the right and wrong way of approaching painting problems. Then followed a most interesting open discussion in which Mr. Ferree's years of experience was evidenced by his ready answers to all questions asked.

The meeting was adjourned and ice cream sandwiches and cookies served as refreshments.

Mr. Stirling of Gulf States Utilities Company, who operated the projector for the showing of the lead mining film, then showed two movie shorts, one entitled "The Gay Nineties" and the other "Songs of The West". These two singing pictures were not a part of the planned program but were very much enjoyed by those of us who remained after the refreshments were served.

JAMES J. SAURAGE
Secretary-Treasurer
Baton Rouge Section

Third Quarterly Meeting Baton Rouge Section Louisiana Engineering Society

Time: September 10, 1946—7:30 p. m.

Place: Louisiana Highway Testing Laboratory.

In the absence of President P. J. Guelfi, and 1st Vice President, Wm. Whipple—the meeting was called to order by 2nd Vice President, T. Ellis Peak.

There was no old or new business to come up for discussion. The reading of the minutes of last meeting was called for and by motion and vote dispensed with. The Treasurer's report was then read and following is a brief outline of the Section's financial status.

Balance on hand, Jan. 1, 1946	\$136.71
Monies received to date	497.75
Monies spent to date	442.26
Bal. on hand as of Sept. 10, 1946	192.20

Mr. H. L. Lehmann announced that the Industrial Forum, a Baton Rouge Organization of local industrial engineers, was contemplating a meeting in the near future—the latter part of September or first part of October, at which would be presented a film entitled "The Mining of Lead in Missouri". This film is to be presented through the courtesy of the National Lead Company whose representative would also lead in a discussion pertaining to lead and its uses. Mr. Lehmann also suggested there could be a joint meeting of the Baton Rouge Section of Louisiana Engineering Society and the Industrial Forum if the former would attend to the details of sending out the invitations and securing a place to meet.

Mr. C. E. Herrington of the Ross Meehan Foundries of Chattanooga, Tennessee was introduced and made a short talk on "Meehanite" castings after which a movie entitled "Meehanite" was shown. This was followed by a short discussion period.

Next was presented through the courtesy of Gulf States Utilities Company, represented by Mr. Austin Mary—a movie short entitled "The

Maintenance of High Voltage Transmission Lines''. This also was followed by a question and answer period.

Mr. Feltus B. Stirling operated the projector for the showing of both films.

Meeting was adjourned and refreshments were served.

JAMES J. SAURAGE
Secretary-Treasurer
Baton Rouge Section

**Minutes of Eighth Annual Meeting Baton Rouge Section of Louisiana
Engineering Society**

Date: December 10, 1946. Time: 7:30 p. m.

Place: The Venetian Room of L.S.U. Cafeteria.

Officers present: P. J. Guelfi, president; Wm. Whipple, 1st vice-president; T. Ellis Peak, 2nd vice-president; James J. Saurage, secretary-treasurer.

There were seventy-nine (79) members and guests present. A delicious supper was served at 7:30 after which President Guelfi opened the business meeting. First, he asked for and received reports from the Chairmen of the several committees, as follows:

Mr. T. E. Peak, Technical Paper Committee.

Mr. R. A. Mornhinveg, Entertainment and arrangements committee.

Mr. W. A. Wintz, Jr., Publicity committee.

Mr. Fred Hannaman, Chairman of the membership committee was absent.

President Guelfi then called for the reading of the minutes of the last meeting. It was moved and seconded that the reading of the minutes be dispensed with. The report of the Treasurer was then called for and it was learned that the expenditures for the year amounted to \$487.27, Collections: \$519.00, Balance as of December 1, 1945: \$136.71—leaving a balance as of December 1, 1946. of \$168.44.

Since the Chairman of the Membership Committee was absent, President Guelfi asked that the Secretary give a report on membership and it was reported that during the year 1946, twelve (12) new members were admitted and nine (9) old members were lost to the section through "deaths", "resignations" and "transfers", leaving a net gain of three (3) new members and a total of one hundred and twenty-two (122) members as of December 1, 1946. Besides these one hundred and twenty-two (122) members, there are fifteen (15) prospective members—a prospective member being one whose application for membership has been submitted but whose name has not been voted on as yet by letter ballot.

President Guelfi then made a short talk, thanking the members and officers for their cooperation during his term of office. He then called on Mr. J. T. O'Brien, Chairman of the Nominating Committee for his report. Mr. O'Brien, before giving his report—explained that the Nominating Committee had approached Mr. Wm. Whipple with the idea of submitting his name as their nominee for President but that Mr. Whipple had asked that they not consider him because it was his intention to retire if possible, sometimes during the coming year.

Mr. O'Brien then reported that the Nominating Committee composed of Mr. H. L. Lehmann, Mr. F. F. Pillet and himself, submitted the following nominations.

Mr. T. E. Peak, president; Mr. James J. Saurage, 1st vice-president; Mr. W. P. Wallace, 2nd vice-president; Mr. Austin J. Mary, secretary-treasurer.

President Guelfi then called for nominations from the floor. There were none. Those named by the Nominating Committee were then elected by acclamation.

Mr. Stone Leake of the Parent Society then announced that Mr. H. L. Lehmann had been nominated for 2nd vice-president in the Parent Organization.

Mr. O'Brien then announced that the section wished to present the retiring President, with a present as a token of appreciation for his work in the past year and that a Kay-Woodie Pipe had been ordered for the purpose but had not yet arrived so in its stead—he present Mr. Guelfi with an "I.O.U." The pipe is to be presented when it arrives.

President Guelfi then turned the meeting over to Mr. T. E. Peak who introduced the speaker of the evening, namely; Mr. A. F. Fritchie, General Superintendent in charge of all mechanical work at the Baton Rouge Plant of the Standard Oil Company of New Jersey, who gave a very interesting talk on "River Frontage Damages and Corrective Measures Undertaken". The talk was followed by a question and answer period after which the meeting was adjourned.

JAMES J. SAURAGE

Secretary-Treasurer

Baton Rouge Section

PROCEEDINGS OF THE LOUISIANA ENGINEERING SOCIETY

Vol. XXXIII

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No. 2

CONTENTS

EDITORIAL NOTES AND COMMENTS:

The Front Cover.....	71
Our Membership—Then and Now.....	71
New Members.....	71
Standing Committees.....	75
Letters to the Editor.....	75
Our Contact Representatives.....	75
Your Congressmen and Senators Want To Know.....	76
Obituary of Ralph Chambers.....	77

PAPERS AND DISCUSSIONS:

"Prefabricated Houses" by Clarence W. Farrier.....	78
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ENGINEERING BRIEFS.....	84
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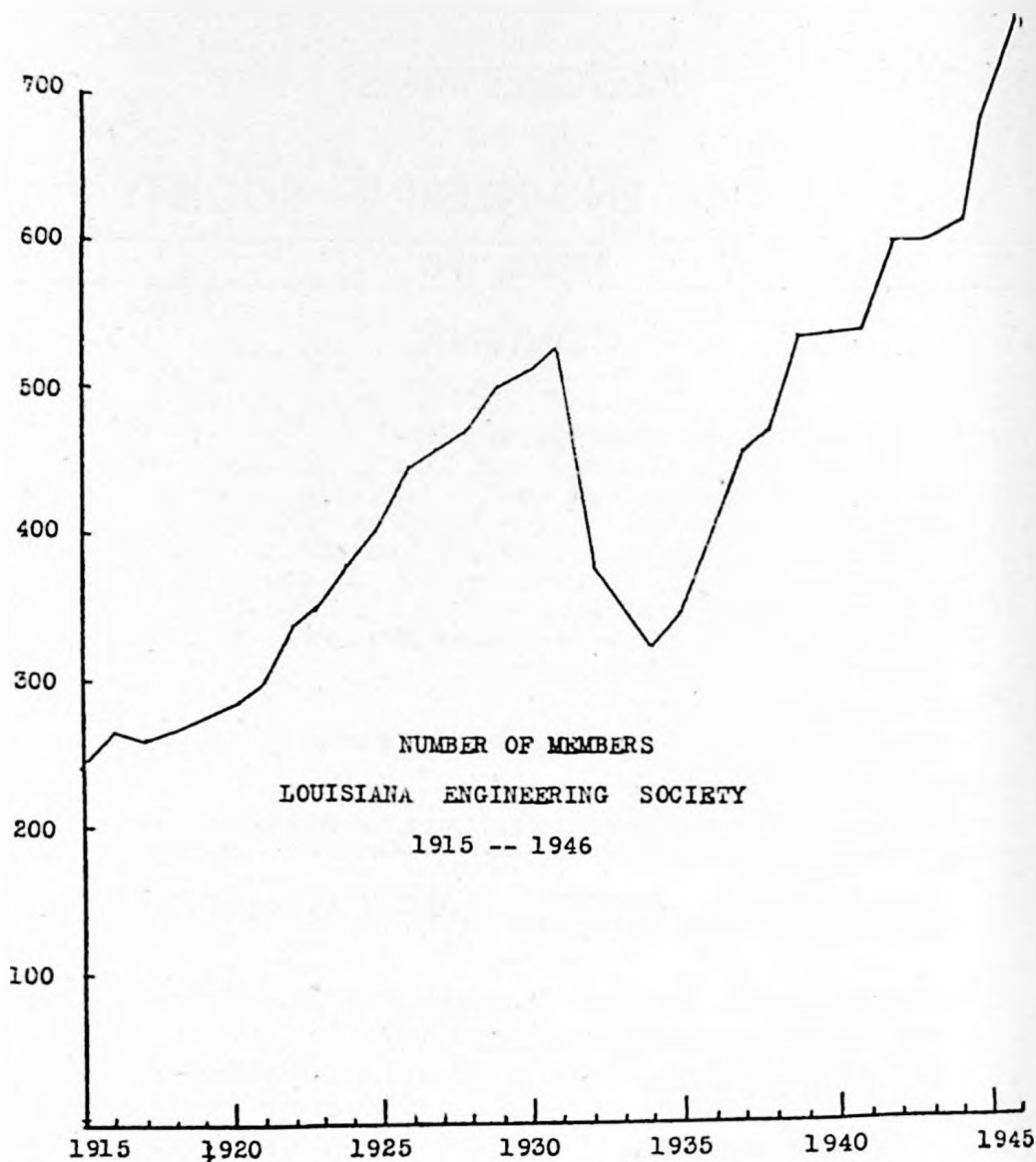
MINUTES OF THE MEETING AND BUSINESS OF THE SOCIETY.....	85
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EDITORIAL NOTES AND COMMENTS

The Front Cover. Pictured is the floating asphalt plant, having a capacity of 120 tons of hot mix per hour. The asphalt mat is re-enforced with steel cable, and by skillful coordination of workers and machines, is laid over the surface of the levee. In 1946, 780,000 square feet of under-water bank protection was provided, plus 18,887,500 above water protection. In addition 612,200 square feet of levee slopes were protected. Nine and one-half miles of river bank were protected in 1946. Photo was furnished by Corps of Engineers, New Orleans District.

Our Membership—Then and Now. The accompanying curve indicates the variation in our membership from 1915 to the present. The society has weathered two wars and the depression of the 30's. Due to the efforts of the membership committee, and individual members, the curve has a healthy upward inclination. The new members elected in February and listed elsewhere, will help maintain this upward trend.

New Members. Following are a list of names of members recently elected. We welcome these members into the organization,



and look forward to having them with us at our meetings, take part in the activities of the Society, and offer constructive criticism on Society's affairs.

OLLIE JAMES BAKER, Baton Rouge; age 35. Endorsed: L. J. Lassalle, F. J. Germano, W. P. Wallace. Univ. of Ill., B.S.Arch. Licensed Architect, Ill., 1941. Curtis Wright Aircraft Corp., planning engr., 1942-44. Small Homes Council, Univ. of Ill., architect, 1945-46. Director of Low Cost Housing Research Project, L.S.U., 1946-present.

HAROLD THOMAS BARR, Baton Rouge; age 47. Endorsed: W. H. Carter, W. P. Wallace, H. L. Lehmann. Univ. of Mo., B.S.Agric.Eng., 1923; Iowa State College, M.S.Agric.Eng., 1928. University of Ark., Instructor, Asst. Professor, 1924-29. La. State University, Associate Prof. of Research, Head of Dept. of Agric. Eng. Research, 1936-date.

ROY WILSON BEST, Lake Charles; age 35. Endorsed: S. D. Nolan, R. E. Burgess, C. B. Whyte. Kansas State College, B.S.M.E. 1933. Cities Service Oil Co., Refinery Engr., 1936-40; Supt. of Operations, 1940-42. Cities Service Refining Corp., Zone Engr., 1943-46; Mtce. and Const. Scheduling Engr., 1946-date. Member Sigma Tau.

- CLYDE E. BOLTON, Maplewood; age 39. Endorsed: R. E. Burgess, S. D. Nolan, F. T. Clarke. Nebraska Univ., B.Sc. Arch. Eng. 1931. Nebraska Highway Dept., 3 yrs. Nebraska Civil Eng. firm, 5 yrs. The Texas Co., 2 yrs. Kellogg Co., 1 yr. Cities Service Refinery, 2 yrs. In partnership with R. S. McCook, Jan. 1946-date.
- AUBREY G. CODE, New Orleans; age 36. Endorsed: J. C. Baehr, D. W. Godat, J. P. Fernandez. Tulane U., B.E., M&E., 1931; B.E. in C.E., 1932; Degree of C.E., 1934. U.S. Engr. Dept., 1935-42. U.S. Maritime Commission, Assoc. Naval Arch., 1942-45. U.S. Engr. Dept., Assoc. Engr. charge of structural steel subsection, 1945-46. Godat and Heft, Sr. Engr., 1946-date. Registered C.E., La.
- E. E. GUILLOT, JR., Lake Charles; age 44. Endorsed: F. H. Goodloe, H. L. Lehmann, T. T. Chenet. Louisiana Highway Dept., Sr. Instrumentman and Sr. Inspector, highway location and construction, 16 yrs. Resident Engr. on gravel and concrete paving projects, 4 yrs. Now employed as Project Engr. on Hydraulic Embankment Project at Lake Charles.
- THOMAS W. KIRBY, Lake Charles; age 29. Endorsed: R. E. Burgess, S. D. Nolan, F. T. Clarke. B.S. in Chem., Carnegie Inst. of Technology. Thompson and Co., Pittsburgh, selling, servicing industrial finishes, 1935-42. Gulf Research and Dev. Co., Testing and analyzing fuels, lubricants and special products, 1942-43. Cities Service Refining Corp., Laboratory Supervisor, 1943-present.
- L. S. KORNICKER, Lake Charles; age 27. Endorsed: R. E. Burgess, S. D. Nolan, F. T. Clarke. Univ. of Ala., B.S. in Chem., Metallurgy and Ceramics, 1941; B.S. in Ch.E., 1942. Hercules Powder Co., TNT Production Supervisor, 1942-44. Cities Service Refining Corp., Pilot Plant Supt., 1944-present.
- JACK E. LEMAY, Baton Rouge; age 28. Endorsed: L. J. Lassalle, A. W. Betz, P. S. O'Brien. Ala. Polytechnic Inst., B.M.E., 1941. Monsanto Chemical Co., Mtee. Engr., 1942-43; Sesearch Engr., 1944-45. National Carbon Co., Inc., Sales Engr., 1945-date.
- S. LOGAN McCONNELL, New Orleans; age 52. Endorsed: J. M. Todd, A. M. Fromherz, D. W. Godat, Tulane U., B.E., M & E., 1917. City of Picayune, Miss., Consulting Engr., 1939-42. Barnard, Godat and Heft, Chief Mech. Engr., 1942. Fromherz and Associates, Chief Mech. Engr., 1942-43. Todd-Johnson Dry Docks, Inc., Supervisor Mtee. and Repair wharves, dry docks, bldgs., plant eqpt., mach. tools., 1943. Municipal Power, Light & Water Purification Plant, Day Engr., 2 yrs. Res. Engr., A. & V. and V. S. & P. Railroads, 5 yrs. Licensed Professional Engr., Miss., and Surveyor, La.
- JOHN J. MUNDINGER, Baton Rouge; age 67. Endorsed: H. L. Lehmann, N. E. Lant, B. W. Pegues. La. State Univ., B.S. Eng. 1901. Board of State Engineers. S.P. and L&N Railroads, 1901-12. Interurban R.R., Mo., Chief Engr., location and construction, 1912-14. City Engineer, Baton Rouge, 1914-18. Private practice, 1918-21. Angola, La., levee system, 1921-24. La. Hwy. Comm., Asst. Hwy. Engr., 1924-28. E.B/R Parish, Parish Engr., 1928-33. Reconstruction of hdqtrs. for State Police Dept., 1938-39. Housing Survey, B.R. Housing Auth., 1940-41. Boundary Survey Engr., La. Dept. Hwys., 1941-present. Registered C.E. since 1908.
- STEVE A. NASCA, Baton Rouge; age 32. Endorsed: J. B. Carter, Louis Duclos, N. E. Lant, La. State Univ., B.S.E.E., 1937. Chainman, Rodman, Draftsman, La. Hwy. Comm., Miss. River Bridge at Baton Rouge, 1938-41. La. Dept. of Hwys., Jr. and Sr. Bridge Detailer, 1941-44; Bridge Designer, 1944-47. Registered C.E. 1946.
- WYLY D. NELSON, Lake Charles; age 40. Endorsed: R. E. Burgess, S. D. Nolan, C. B. Whyte. La. State Univ., Audubon Sugar School, B.S. 1921. Supt. Fabrication, Central Unidad, Unidad, Cuba, 1936-42. Supt. Fabrication, Oaklawn Sugar Factory, Franklin, La., 1937-41. Foreman Fabrication Dept., Matheison Alkalai Works, 1943. Cities Service Refinery, Sr. Inspector, Eng. Dept., 1944-date. Member Am. Society Sugar Cane Technologists.
- CECIL K. OAKES, Baton Rouge; age 40. Endorsed: B. W. Pegues, L. M. Odom, T. B. Smart. La. State Univ., BSCE 1931. U.S. Eng. Dept., New Orleans, Surveyman, Eng. Aide, Jr. Engr., 1933-40. The Panama Canal, Canal Zone, hydraulic studies and design, 1940-42. U.S. Eng. Dept., Wilmington, N. C., airfield and cantonment drainage, 1942-44. Miss. River Comm., Asst. Chief of Hydrology and Hydraulic Section, 1944-45. Dept. of Public Works, Chief of Hydraulic Section, 1946-date. Licensed C.E., La.
- ELMER W. RUHNOW, Lake Charles; age 33. Endorsed: R. E. Burgess, S. D. Nolan, C. B. Whyte. Univ. of Ill., BSCE 1935. Inspector, Jr. Engr., Chief Engr. on Construction Oil Refg. Units in Ill., Ind., N. Mex. and Texas, 1935-38. Asst. to Mgr. of Construction, Consolidated Refineries, Ltd., complete oil refining plant at Haifa, Palestine, 1938-40. M. W. Kellogg Co., N. Y., Design Engr., 1940-41. Constr. Supt., Dixie Ordnance Works, Sterlington, La., 1941-43. Asst Supt., Construction of Tutwiler Refinery for Cities Service Refg. Corp., 1943-44. General Supervising Engr., Tutwiler Refinery, 1944-present. Chairman Southwestern Ass'n. of Engineers.

GAYLE SCHNEIDAU, JR., New Orleans; age 30. Endorsed: J. M. Robert, J. M. Todd, A. L. Dunlap. Tulane University, B.M.E., 1939. La. Power and Light Co., Appraisal Engr., 1939-41. U.S. Navy, Eng. Officer aboard submarines, 1941-46. Schneidau Oil Burner, Vice-President, Mfg., Sales and Installation of Heating Equipment, 1946-date.

CLARENCE M. SOLBERG, Kentwood, La.; age 37. Endorsed: G. R. Hammett, A. J. Harris, C. M. Rogers. Univ. of Wis., Mining Eng., 1921. Worthington Pump and Mch. Corp., Sales Engr., 1921-29. North American Trading and Import Co., Plant Mgr., 1929-42. U.S. Army, Chief Production Expediter, 1943-45. Manufacturer's Rep., 1945-date.

RICHARD R. L. WARD, Lake Charles; age 44. Endorsed: R. E. Burgess, S. D. Nolan, F. T. Clarke. Univ. of Texas, School of Eng., class of 1923. 1 yr., Sou. Pac. Rwy., Houston Eng. Office 2 yrs. Port Arthur, Texas, public schools, Instructor Mech. Drawing. 17 1/2 yrs., The Texas Co., field, construction, est. and mtce. engr. Cities Service Rfg. Corp., Mtce. & Const. Engr., 3 yrs. Licensed Engr., Texas.

JOHN DICKINSON WYMAN, Lake Charles; age 43. Endorsed: R. E. Burgess, Sidney D. Nolan, F. T. Clarke. Texas A & M graduate, 1928. Southern Pacific R.R., Houston, Disbursement Accounting, 1928-30. Sinclair Rfg. Co., Asst. Chief Inspector, 1931-42. Abercrombie & Eastern States Refineries, Chief Inspector, 1943. Cities Service, Lake Charles, Chief Inspector, 1944-present.

WALTER CHARLES YOUNGS, Lake Charles; age 70. Endorsed: E. H. Goodloe, H. L. Lehmann, L. D. McCorquodale. Louisiana State University, C.E., 1899. 1900-08, railway location and construction in Missouri, Okla., Miss. & Texas. 1908-19, private practice in Jackson County, Texas. Texas Highway Dept., County Engr., 1919-25. La. Dept. of Highways, District Const. Engr., 1925-date. Member A.S.C.E.

For Affiliate Member

MARC MCKINLEY, Lake Charles; age 42. Endorsed: R. E. Burgess, S. D. Nolan, F. T. Clarke. Electrical and sales engineering, 9 yrs. field experience, 6 years sales, with Stone & Webster Eng. Corp., Phoenix Eng. Corp., M. W. Kellogg Co.

For Reinstatement to Membership

F. TACKETT CLARKE, Sulphur, La.; age 45. Endorsed: H. L. Lehmann, T. T. Chenet, E. H. Goodloe. Louisiana State University, C.E., 1927. McWilliams Dredging Co., Engineer, 1 year. La. Highway Commission, Res. Engr., Project Engr., 6 years. U.S. Coast & Geodetic Survey, 1 year. Presently Chief Civil Engineer, The Union Sulphur Co., Inc.

T. EDWARD ERNST, New Orleans; age 40. Endorsed: J. E. Pottharst, F. N. Billingsley, A. J. Naquin. Univ. of Ala., BSCE 1931. La. Hwy. Comm., Instrumentman, 1931-32. City of N. O., Utilities Engr., 1932-40. War Dept., Washington, Major, 1942-46. Utilities Consulting Engr., 1-1-47 to date. Licensed C.E. Associate Member, A.S.C.E.

For Junior Member

FRANK THEODORE CARROLL, JR., Baton Rouge; age 27. Endorsed: W. P. Wallace, H. W. Waterfall, Wm. Whipple. La. State University, B.S.M.E., 1943. U.S. Army, aeronautical engineer, 1943-46. La. State University, teacher of mechanical and aeronautical engineering, 1946-date.

RAYMOND D. CARROLL, Lake Charles; age 25. Endorsed: S. D. Nolan, R. E. Burgess, F. T. Clarke. St. Michael's College, Winooska Park, Vt., B.S. in Chem., 1942. U.S. Rubber Co., Williamsport, Pa., 1942-43. Cities Service Rfg. Co., Laboratory Supervisor, 1943-present. Member A.C.S., Petroleum Div.

RALPH E. COMPAGNO, New Orleans; age 21. Endorsed: Z. W. Bartlett, E. J. McNamara, J. P. Fernandez. Tulane University, B.E. in C.E., 1945. Freeport Sulphur Co., Civil Engr., 1946-date. Member A.S.C.E. Licensed Engineer, La.

A. E. HUTCHINSON, Baton Rouge; age 27. Endorsed: J. B. Carter, Louis Duclos, N. E. Lant. Louisiana State University, B.S.M.E., 1943. U.S. Army Engrs., Eng. Line Officer, 1943-44. U.S. Army Air Forces, Navigator & Radar Observer, 1944-46. La. Dept. of Highways, Bridge Detailer, 1946-47. Registered C.E., La.

PAUL M. LAGARDE, New Orleans; age 29. Endorsed: J. C. Baehr, E. L. Mire, J. P. Fernandez. The Citadel, Charleston, S. C., B.S.C.E. 1940. Marion Military Inst., Instructor Basic Eng. subjects, 1 year. U.S. Engineer Dept., Jr. Engr. (hydraulic), 1 yr. La. Highway Comm., Instrumentman, 6 mos. U.S. Army, specialized in radar, 4 years.

AUBON LESLIE MABRY, New Orleans; age 30. Endorsed: W. C. Byrne, J. S. Gentilich, J. P. Fernandez. Miss. State College, B.S.C.E. 1942. Corps of Engineers, U.S. Army, 2nd Lt., 14 mos. T.C.I., Birmingham, Ala., Student

Industrial Engr., 5 mos. V. J. Bedell Co, Instrumentman, 3 mos. Corps of Engrs., U.S. Army, Jr. Engineer, 6 mos. Now Instructor of Experimental Engineering, Tulane University.

For Student Member

MARSHALL M. CLOUD, Senior Mechanical Engineering Student, Tulane U.

H. DICK GOLDING, Senior Mechanical Engineering Student, L.S.U.

JOHN M. MORRISON, Junior Mechanical Engineering Student, L.S.U.

Standing Committees. With the ever increasing membership, the scope of activities of the Society is expanding. The carefully selected standing committees listed in this issue stand ready to serve the Society in their various capacities. Look them over; become better acquainted with the machinery in the Society which has been set up to handle special problems vital to the engineering profession.

Letters to the Editor. Many of our members, and most of the officers of the Society, feel that the Proceedings would do well to publish some personal notes each issue. Such items would be welcome, but the editor's experience of past receipts of such material has not been encouraging. Letters to the editor, for publication in the Proceedings would be welcomed also. One of the main objectives of our organization is the betterment of the engineering profession through the exchange of ideas.

The editor would also appreciate receiving personal news items for publication in the Proceedings. With a membership as large as ours, we should have an interesting and extensive "Personals" column. Please help!

Our Contact Representatives. One contact representative is designated for each congressional district. For the present administration, they are as follows:

Third District: Andre J. Dubus, Lafayette

Fourth District: A. F. Flournoy, Shreveport

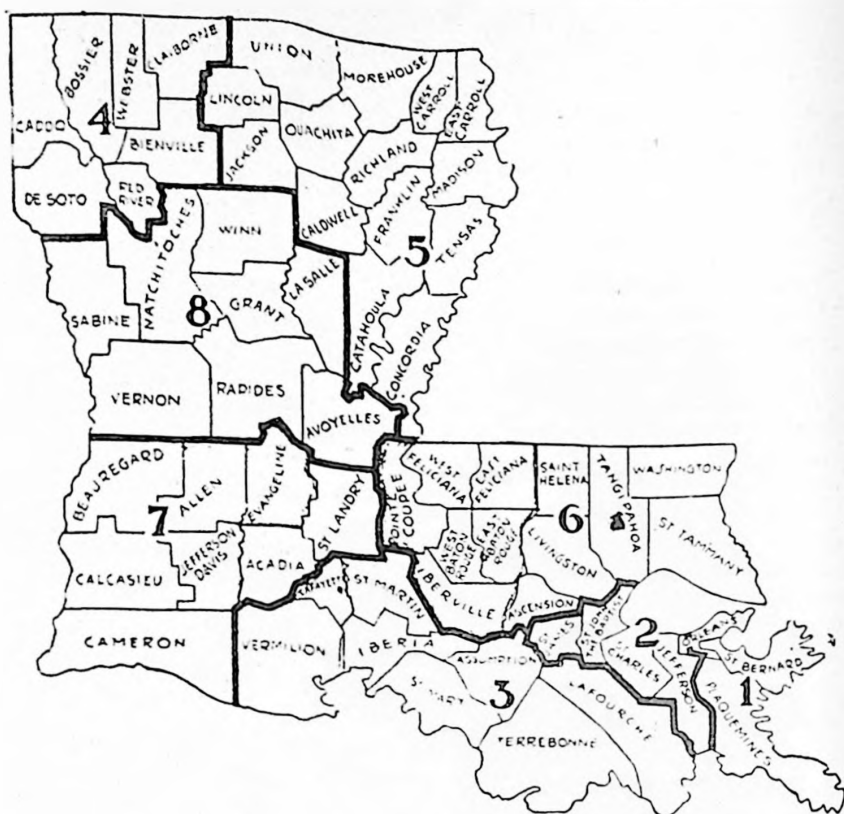
Fifth District: J. E. Jarman, Monroe

Sixth District: Leo M. Odom, Baton Rouge

Seventh District: E. H. Goodloe, Lake Charles

Eighth District: Charles A. Myers, Alexandria.

The purpose in establishing this designation was to have official representatives in the various parts of the state. The membership looks to these particular members for advice as to activities in their section which would be of particular interest to the Society, and to endeavor to interest eligible engineers in becoming members of the Louisiana Engineering Society.



Your Congressmen and Senators Want To Know. With the 80th Congress in session, many important bills are up for consideration in both the House and the Senate. Senators and representatives are anxious to hear from their constituents as to their views and suggestions on proposed legislation.

The accompanying map shows the congressional districts. Senators and congressmen are as follows:

Senators: John H. Overton; Allen J. Ellender. Mail address: Senate Office Bldg., Washington, D. C.

Representatives By Districts: 1. F. Edward Hebert; 2. Hale Boggs; 3. James Domengeaux; 4. Overton Brooks; 5. Otto E. Passman; 6. James H. Morrison; 7. Henry D. Larcade, Jr.; 8. A. Leonard Allen. Mail address: House of Representatives, Washington, D. C.

OBITUARY OF RALPH CHAMBERS

Ralph Chambers died at Baton Rouge on September 25, 1946 after a long illness.

Mr. Chambers was born in Baton Rouge, Louisiana, on July 5, 1878. He attended Chamberlain Hunt Academy at Port Gibson, Mississippi, after which he was matriculated from the Civil Engineering Course at Louisiana State University. After three years of college he volunteered for military service in the Spanish American War. He got as far as Miami, Florida, before it was discovered that he had not yet attained his majority.

After his discharge from the Army, Mr. Chambers worked for Mr. Reinier Swart, Sr., on sewer construction in Baton Rouge. From 1900 to 1903 he was a surveyor and inspector on levee construction in the New Orleans District for the U. S. Corps of Engineers, War Department. In 1904 and 1905 he worked with the Frisco Railroad on locations between Baton Rouge and Houston, Texas. Next he did field and office work for the Gulf Pipe Line Company. 1912-1914 saw him in Lake Charles with the U. S. Bureau of Public Roads. From 1915 to 1931 Mr. Chambers was engaged with the Engineering Department of the Standard Oil Company of Louisiana at the Refinery in Baton Rouge. During that period he became interested in subdivision work around Baton Rouge, and after leaving the Standard Oil Company he continued his private practice in Baton Rouge until 1935. In that year he took a position as senior estimator with the Works Progress Administration in Beaumont, Texas. From 1936 to 1942 Mr. Chambers was engaged in oil refinery construction work in various parts of the country for the Lummus Construction Company of New York City and E. B. Badger of Boston, Mass. In 1942 he returned to Baton Rouge and obtained employment in the Road Design Section of the Louisiana Department of Highways. In 1944 he was obliged to retire from all work on account of his health.

In 1903 Mr. Chambers married Jessie Mossop of Baton Rouge. She, their three children, Capt. J. M. Anthony of the W.A.C., Mrs. Robert Cantrell of Sherman, Conn., Mr. John Chambers of Boston, Mass., and six grandchildren survive him.

Mr. Chambers was a licensed Civil Engineer in Louisiana and Texas.

In his college days Mr. Chambers was a member of a student Glee Club. He had many interesting stories to tell about his experiences on concert tours about the South. He was never satisfied unless he had something at hand to do that seemed to him to be worthwhile. During his long illness he became interested in rehabilitating antique clocks. In the neighborhood of his home there are many old time pieces that he succeeded in putting back into active service.

Mr. Chambers was a congenial companion who loved company and had many interesting reminiscences to relate out of a rich and varied experience.

HARRY WAUGH
F. G. DOWNS

PAPERS AND DISCUSSIONS

PREFABRICATED HOUSES

By Clarence W. Farrier*

Prefabricated housing, which is the subject of this talk, is a term which has different meanings to different people. As a starting point for our discussion, I will first describe what Gunnison Homes, Inc. mean by this term. To us prefabrication means the process of producing homes for people by the modern techniques of mass production and mass distribution, which have been so successful in bringing other manufactured articles to our people at prices they can afford to pay. This is both our definition of the term and our goal.

A house can be prefabricated in a factory, or at the actual site, without using the techniques of mass production. But continually increased volume of production with continually lowered costs can be achieved only when mass production techniques are used. It is a matter of record that Foster Gunnison was the pioneer in the successful application of mass production methods to the prefabrication of homes.

After the first World War a great stream of new gadgets and equipment were produced and became a part of our daily lives. Automobiles, refrigerators, vacuum cleaners, washing machines, radios and the like, all came to us in an ever increasing volume through the techniques of mass production, and at ever decreasing costs, thereby raising our standards of living and although the labor hours per item were reduced, the wider distribution of the articles increased employment at higher wages.

Unfortunately, however, the building industry did not take advantage of the general shift to mass production and the costs of construction rose steadily.

During the second World War, the technology of mass production was advanced enormously, and along with a great increase in scientific research, has brought to us many new materials. However, these materials having been created to serve mass production methods, will to a large extent be unsuited to the handicraft methods of the home-building industry. Therefore, to reap the full advantage of the advances made in the production and use of new materials and methods, the industry must also turn to the use of mass production techniques.

In building conventionally constructed houses—lower costs are usually obtained by using cheaper materials or the reduction in the number of rooms or the size of rooms. Here lowered costs involve lowered quality. The reverse can be true in the mass production of homes. The objective in mass production is to speed up the

* Director of Research, for Gunnison Homes, Inc. Presented at the regular meeting of the Society on December 2, 1946.

flow of materials in process through the plant. This is best accomplished by the use of the very best materials. Therefore, in a truly mass produced home the use of quality material is an important factor in lowering costs.

It has taken a considerable number of words to define what we mean by prefabrication. I will now give you a description of our product and how it is produced. Prefabrication has not yet reached the point where there is a definite pattern which runs through the whole industry. Each plant uses a different scheme of assembly and produces its panels in different ways. The methods of distribution of the product to the consumer vary widely.

After describing our own product and operations as an example, I will give you a general idea of the various type of products which are produced by other prefabricators.

Gunnison Homes was established about ten years ago and has been going through its growing pains in a rented plant which was far from an ideal setting for its operations. Over the past year we have been constructing a new plant in New Albany, Indiana. This plant is the first of a number of plants which will be located at other points throughout the nation. In it, we are, of course, employing the latest mass production techniques. It is geared to turn out a complete home every 25 minutes. That may seem to be a very short time as compared with the months required to build a home by conventional methods. This time, however, will undoubtedly be cut and cut until we can approach the records of automobile assembly lines. An automobile comes off the production line every 50 seconds and surely the complicated job of assembling a completely equipped car is much more of a task than making a Gunnison Home.

In our plant we manufacture 45 panels. These panels are in the main approximately 4 feet wide and vary in length from eight to 14 feet. These panels are thus of a size and weight which permits easy handling when they are erected in the field.

These panels are all designed and assembled on the stressed skin principle which makes most effective use of the combined strengths of the materials used. This permits the panels to be much lighter than corresponding members used in conventionally built homes and yet be of equal or greater strength in carrying their stresses.

Each of these panels are precision built to standard dimensions so that they are interchangeable.

We sell eight basic homes. Each basic home comes in either a right or a left hand home, so we have sixteen basic home packages.

In addition to our basic homes, we manufacture optional packaged porches, arcades or breezeways, end wings and garages. These optional packages used in combination with our sixteen basic homes

makes it possible for our customers to choose from a large number of combinations of plan and form to meet their individual desires and needs.

Our homes are always furnished with the exterior in white but the roof covering and window blinds are furnished in a number of colors. There are also a number of variations which can be made in the architectural treatment.

With all of these variables, it is possible to build several million homes without having any a duplicate of the other. It certainly is not necessary for prefabricated homes to all look alike.

Gunnison Homes are distributed to our customers only through dealers. The success of a mass production plant is dependent upon a steady flow of orders from widely diversified dealers, therefore, Mr. Gunnison has developed a system of dealership which will eventually reach every qualified community of 9,000 or more inhabitants in the United States.

His plans call for regional production with 43 distribution zones and 150 districts.

Gunnison dealers are selected after a careful consideration of the market analysis of each community to be entered and a scrutinizing survey of applicants for the dealership by our Dealer's Franchise Committee. The men who are selected are then given some intensive training in the Gunnison Homes Institute. When they receive their first Gunnison Homes, a Field Instructor is sent out to familiarize them with erection methods and establish the required level of quality performance. The Dealers are, thereafter, continuously supervised by District Managers to make sure that all homes are properly erected.

The functions of a Gunnison dealer are more than that name usually implies. He, in addition to selling, provides complete mortgage financing service, prepares the site and foundations, erects the house completely finished, landscapes the property and delivers to the customer a house fully complete ready to move into. In addition, dealers provide continuous service in maintenance and repair at the customers option. Our dealers will even do the spring and fall housecleaning if desired.

The dealers duties in connection with mortgage financing are relatively simple because from the first our company has regarded its product as necessarily being collateral for mortgages and our homes will always be of the substantial and attractive type which will have the ready resale value so important to the mortgage lender.

All sales are made through our local dealers—he is the one to contact. He will help in the selection of the size of home and the optional feature best suited to a family's requirements and pocket book.

Our homes are at present built almost entirely of wood. Many other materials, both old and new, will soon become available in sufficient quantities to meet our production needs. We have established research laboratories and are studying and testing these materials. Those which prove to be more advantageous than those we use at present will be incorporated into our homes but only after they have been tested and found to give equal or better performance for our customers.

Let us now discuss briefly the background behind prefabrication together with some of the other types of prefabrication systems and plans of distribution.

Prefabrication of homes is not new. Parts of homes such as windows, doors, frames, cabinets and the like have been prefabricated for hundreds of years. The first prefabrication plant in this country was established about 1892 and has been in continuous operation. The homes and building it produced have been erected in all parts of the world. It did not, however, attempt to apply mass production methods and its product was consequently expensive and served only a very specialized market.

During World War I, many buildings were partially prefabricated and the advantage of this method was made apparent. During the period before World War I and between the wars a number of precut homes were developed and marketed. The limited economies of this method, however, narrowed its general adoption.

Before and during World War II many prefabrication companies have started up. Many failed but about fifty were in a position to start production in the post war market. Since the present emphasis on prefabrication a large number of prefab companies have announced their intention of manufacturing homes by many systems and of many different materials. There are at present about six hundred plants which are in various stages of organization. Some of them will survive, others will fail. It will probably follow the pattern of other new industries. In the development of the automobile industry, each 50 companies which started up in the production of automobiles—one survived. Prefabrication of homes is, however, on its way.

In general, prefabrication systems fall into four types—the completely prefabricated house which is entirely assembled in the plant and moved to the site in toto, the sectional house which is erected in the plant in slices which are connected together at the site but are completely erected as far as each slice is concerned, the sectional panel type under which large panels making a section of the walls, floors or roof are fabricated in the plant and assembled into a house on the site and the modular panel type in which the panels are in the main built of uniform width so that they can be standardized in plant production yet fit together to make up many combinations of house arrangement.

At the present time no one is using the system of completely prefabricating the house in a plant and hauling it to the site. This system was used, however, by one company about 15 years ago.

The sectional house system was used by the T. V. A. in providing some of the houses used for its construction workers. This type of house was used successfully at both Oak Ridge, Tennessee and Hanford, Washington, two of the atomic bomb plants. In all of these instances, it was necessary to cut the site labor to a minimum to the exclusion of all other considerations.

The modular panel type and the sectional panel type are those most commonly used because of the easier transportation problem. Each has its advantages. The sectional panels are larger which simplifies the production problem somewhat but are heavier and more difficult to handle in field erection. The sectional panel almost necessitates the erection of identical homes.

The modular panel means more pieces to be handled but they are much more easily handled and they provide much more flexibility as to the layout and design of the home.

Those prefabricators who are now in production are using wood framing with coverings of wood, plywood or composition materials. Many are planning to use metals for framing and covering but due to the shortages of metals it will be some time before they will get under production.

One of the great difficulties in buildings homes out of materials which have not been previously used in homes is that there is no quick way of testing their performance. Any new model should be at least tested over a complete year under service conditions before it is sold. Experience gained in the use of materials in other types of buildings cannot be safely transposed into performance in housing as the operation of normal family life creates atmospheric conditions in homes which are quite different than those in most other types of buildings.

The moisture content of the air in the home due to cooking, washing and bathing is very high and can create conditions which cause the rapid deterioration of the materials which make up the house.

A building was erected during the War at Pennsylvania State College which is called a climatometer. In it, temperatures can be created from minus 50°F. to plus 150° F. with any degree of humidity. This building is being used by the National Housing Agency for quick tests of new forms of construction. It is not, however, possible to make complete tests in this building involving all of the conditions which may be encountered in a house built in the open air and occupied by a family.

As more and more research information becomes available, however, the prefabrication industry can use new material with more

confidence and more rapid progress can be made toward better and less expensive homes.

The question is probably on your lips—is there going to be a market for the prefabricated housing which can be built by mass production methods? It is easily recognized that there is a housing shortage at present. In this shortage going to be quickly made up or is the market for new housing going to be sustained?

Data presented by the analysts of the Twentieth Century fund points out that since 1913 we have produced fewer new urban homes than our cities and towns have acquired new families. This, in effect, means that we have built no homes to replace those which have been wearing out over a period of 33 years, and homes do wear out. The 1940 census indicates that the average life of a home has been 55 years. Much of the housing existing in 1913 was even then old housing. It is estimated that 400,000 homes wear out every year and should either be rebuilt or removed.

The Bureau of the Census estimated that some time to come the net increase in the number of new families in urban areas will be 500,000 per annum. This indicates that there will be a continuing need for additional new homes of 900,000 per annum even after the present shortage is made up. Twenty thousand homes are destroyed every year by fire and other catastrophe.

The shortage in housing which has been accumulating over the past thirty years amounts to about 12,000,000 homes. Seven million of the existing homes were adjudged substandard under the criteria established under the 1940 census. They are still occupied because of the acute shortage of housing.

It is not necessary for everyone to live in a new house. We have in the past relied upon the supply of secondhand housing to house most of our people, but enough new housing must be produced so as to make the supply of used housing adequate in number to properly house the countries population.

Prefabrication by mass production methods is the hope of the country in solving its housing problem. By producing housing at lower cost relationship to incomes, it widens the market so that more new homes can be produced and sold. If costs can be lowered even 20% below the cost relationship of conventional construction, twice as many people can buy new housing. Cost reductions of 20% are easily attained. Under reductions of forty percent, the market is broadened to four times the normal market for conventionally built housing.

The market for prefabricated mass produced housing looks very good both in the immediate future and as a continuing condition. It is limited only by the ability of prefabricators to apply the techniques of mass production and mass distribution to this product and thus bring about decreased cost relationship to average family incomes.

ENGINEERING BRIEFS

Electric Boat. A recent development in small boats electrically operated consists of a direct current motor and squirrel cake motor mounted on the propellor shaft. When the boat is operating, the direct current motor is supplied by battery. At a shore station, the three phase motor drives the direct current motor as a generator, charging the batteries. Excellent performance has resulted because of vibration free operation and simple method of control.

Folding Door. A new development in household equipment is a pleated fabric door, folding in accordinian pleats. For apartments and small homes such a door has endless possibilities of providing extra private spaces, such as additional sleeping quarters.

Compact Compressor. A refrigeration compressor has recently been developed for domestic applications such as home refrigerators and small air conditioning units. The assembly is of the hermetically sealed type, and is about the size of a quart milk bottle.

Engineering Societies. In connection with discussions of that important subject, a unified engineering society, the engineer is confronted with the many societies, each with a different name, each with a particular field, but each with a single purpose, the advancement of engineers and engineering. Mr. C. E. Davies, Executive Secretary of the A. S. M. E. in a recent meeting of the International Technical Congress, presented some interesting figures on engineering societies in the United States. Reprinted below is a table from his address as printed in the February 1947 issue of "Mechanical Engineering."

SOME ENGINEERING ORGANIZATIONS IN THE UNITED STATES

Date organized	Name	Number of members
1848	Boston Society of Civil Engineers	695
1852	American Society of Civil Engineers	21475
1857	American Institute of Architects	3100
1869	Western Society of Engineers	1362
1871	American Institute of Mining and Metallurgical Engineers	13427
1876	American Chemical Society	42600
1880	The American Society of Mechanical Engineers	21063
1881	American Water Works Association	6063
1884	American Institute of Electrical Engineers	25829
1883	American Mathematical Society	2314
1891	American Railway Bridge and Building Association	547
1893	Society for the Promotion of Engineering Education	4111
	(Recently, 1946, changed to American Society for Engineering Education)	
1893	Society of Naval Architects and Marine Engineers	4317

1894	American Society of Heating and Ventilating Engineers	4916
1894	American Public Works Association	1287
1896	American Foundrymen's Association	8900
1898	American Society for Testing Materials	5798
1899	American Railway Engineering Association	2267
1899	American Physical Society	3800
1904	Society of Automotive Engineers	14714
1904	American Society of Refrigerating Engineers	4500
1906	Illuminating Engineering Society	4947
1907	American Society of Agricultural Engineers	1557
1908	American Institute of Chemical Engineers	6300
1910	American Institute of Consulting Engineers	151
1912	Taylor Society (In 1936 became a part of the Society for the Advancement of Management)	
1912	The Institute of Radio Engineers	18000
1913	American Management Association	10000
1915	American Association of Engineers	5030
1916	Society of Motion Picture Engineers	2259
1917	Society of Industrial Engineers (In 1936 became a part of the Society for the Advancement of Management)	
1919	American Welding Society	7308
1920	American Society for Metals	19628
1921	American Society of Safety Engineers	5300
1932	American Society of Tool Engineers	18287
1932	Institute of Aeronautical Sciences, Inc.	6483
1934	National Society of Professional Engineers	13000
1934	American Society of Photogrammetry	1100
1936	Society for the Advancement of Management	5023
1938	Institute of Ceramic Engineers	389
1942	Society for Experimental Stress Analysis	1100

The Engineer's Part In Aid To Turkey and Greece: Half of \$400 million to Greece, Turkey, for use in Highways, Railways, Sanitation—New York, March 26—Half of the proposed 400 million dollar loan President Truman asks for Greece and Turkey will go for highways, railways and sanitation, says Engineering News-Record.

Thus, engineers and construction men would occupy prominent roles in this new foreign policy. With the objective of raising living standards by means of this loan, "men serving in the capacity of civilian engineers must watch and guide where possible, the development of the Policy in Greece and Turkey," the publication states.

MINUTES OF MEETINGS AND BUSINESS OF THE SOCIETY

Minutes of Joint Meeting of the Louisiana Engineering Society and the New Orleans Section, A. S. M. E., held February 10, 1947.

The meeting was called to order by President Nairne with approximately 125 members and guests present. Reading of minutes of the preceding meeting was dispensed with. Acknowledgment was made of letters of thanks for the resolutions passed at the December meeting. President Nairne announced meetings of the A. I. E. E., American Chemical Society, and the Edison

Centennial Celebration to which members of the Louisiana Engineering Society were cordially invited. The President then reviewed the history of the Tidewater Canal, read a resolution passed unanimously by the Society at its meeting of August 9, 1943, and quoted by-law No. 12 of the constitution.

Mr. M. C. Abraham moved that Provision No. 2 of By-law No. 12 be dispensed with in this instance. The motion was seconded by Mr. Sydney Ellis and passed unanimously. Mr. R. M. Seago then moved "to authorize the Professional, Civic and Industrial Affairs Committee to further study the project of a tidewater ship channel from the Gulf of Mexico to the New Orleans area, in order that the favorable resolution unanimously passed by the Society August 9, 1943, may be augmented by testimony of the Society's representatives at a hearing to be held in March, 1947 before representatives of the United States Corps of Engineers. This motion was seconded by Mr. William Hardy and carried.

President Nairne then announced the contents of a telegram received from Mr. Edgar B. Stern, Chairman, Joint Citizens' Advisory Committee, concerning the Terminal Station and Grade Crossing project. Mr. L. V. Cressy then moved that provision No. 2 of By-law No. 12 be waived in this instance. The motion was seconded by Mr. J. M. LeDoux and passed unanimously.

Mr. E. A. McLellan inquired whether the Society had a committee qualified to handle the matter and if so, proposed that the chairman of the committee represent the Society at the hearing. Mr. Steinmayer, Chairman of the Professional, Civic and Industrial Affairs Committee, stated that, although this matter should come under the jurisdiction of his committee, there were many engineers in the Society who have worked on the project who would be better qualified to represent the Society at the hearing. Mr. Chris Nielsen suggested that, since so many plans of controversial nature had been proposed, engineers who had worked on the project already had established views on the subject and therefore might not be able to give an unbiased recommendation. Mr. LeDoux then proposed that a committee of members who had not been involved in the problem be named.

Mr. Levy stated that this matter was one of vital importance to the engineering profession and that a more active interest in civic affairs should be taken by the Society. After some discussion along these lines, Mr. Aaron Abramson moved that, due to lack of time and the controversial nature of the problem, the Louisiana Engineering Society take no stand in the issue but urge its members to express their individual views. The motion was seconded by Mr. Nielsen but failed to pass.

Mr. LeDoux then moved that the Committee on Professional, Civic and Industrial Affairs represent the Society at this hearing, together with members of the Society who had worked on the project acting in an advisory capacity. The motion was seconded by Mr. Cressy and passed. President Nairne then appointed Messrs. Godat, Heft, McNiven, Mire, Willoz and Marks as advisors to the Professional, Civic and Industrial Affairs Committee in this matter.

President Nairne introduced several distinguished guests of the Society, and the meeting then was turned over to Mr. E. A. McLellan, Chairman of the New Orleans Section, A. S. M. E., who introduced the speaker, Mr. William J. Davidson, administrative Engineer for the Technical Center of General Motors Corporation in Detroit, who gave a most instructive and entertaining talk on "New Trends in Automotive Engineering", after which a lively discussion period followed. The meeting then was returned to President Nairne, and closed with a hearty round of appreciative applause for the speaker.

JOHN P. FERNANDEZ,
Secretary-Treasurer

PROCEEDINGS OF THE LOUISIANA ENGINEERING SOCIETY

VOL. XXXIII

JUNE, 1947

NO. 3

CONTENTS

EDITORIAL NOTES AND COMMENTS:

The Front Cover.....	87
The Annual Outing.....	87
The Industrial South?.....	87
Louisiana Council of Engineers and the Licensing Law.....	88
Women's Auxiliary to the Baton Rouge Section.....	90
Obituary of Robert Turnbull Burwell.....	90
Obituary of Harry W. Waterfall.....	91

PAPERS AND DISCUSSIONS:

"Centrifugal Boiler Feed Pump Application Problems" by I. J. Karassik.....	93
---	----

ENGINEERING BRIEFS.....	108
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MINUTES OF THE MEETINGS AND BUSINESS OF THE SOCIETY.....	109
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EDITORIAL NOTES AND COMMENTS

The Front Cover. The Lone Star Cement plant is situated in New Orleans, on the edge of the industrial canal. Raw materials are brought in by barge from Alabama. The kilns are fired with natural gas. One of the particularly interesting facts about this plant is its outstanding safety record.

The Annual Outing. July 17 is the date set for the Annual Golf Tournament and Smoker of the Society. Horse shoe pitching will also be available for the members and guests. The affair is always a pleasant one, particularly as many out-of-town members are present. Allen Betz is chairman and he promises prizes and vitamins in bottles.

The Industrial South? Many newspapers and magazine stories feature the present industrial developments in the south. It is unfortunate that each June many of our southern trained engineering graduates seek jobs with northern concerns. Our section loses on two counts: First, we do not receive the engineering talent of these young men; secondly, the south suffers additional loss in that it has paid for their education.

Many southern industries are slow to realize their need for professional engineering assistance. If industry here is to progress and compete with other sections, young professional engineers will be needed, preferably southerners.

Louisiana Council of Engineers and the Licensing Law. The minutes of a recent meeting of the Council follow. It is important that every engineer review these, learning of the plans for a broader licensing law for our state.

MINUTES OF THE MEETING OF THE LOUISIANA COUNCIL
OF ENGINEERS HELD IN NEW ORLEANS
ON SATURDAY, APRIL 26, 1947

The meeting was called to order by President Nairne, with the following present: Messrs. M. C. Abrahm, F. Tackett Clarke, Charles Keller, Jr., C. Glenn Cappel, Frank E. Johnson, Jr., Raymond Frischertz, G. Elmer May, Charles M. Kerr, Richard R. L. Ward, J. T. O'Brien, J. J. Saurage, E. A. Landry, H. L. Lehmann, and John P. Fernandez.

President Nairne expressed his appreciation for the excellent attendance, especially of those from out of town, and then explained that the Louisiana Council of Engineers is composed of the presidents or chairmen of all engineering groups in Louisiana, with the president of Louisiana Engineering Society as presiding officer of the council and the secretary of L.E.S. acting in that capacity. He then gave a brief history of the attempts made by the Louisiana Engineering Society to secure the enactment of a general engineering license law by the state legislature, and requested each of those present to express his views and those of the organization he represented.

Mr. M. C. Abrahm stated that he represented the American Society of Mechanical Engineers and that he believed his organization was 100% behind the general engineering license law. It was his opinion that the Louisiana Engineering Society should sponsor it with the support of A.S.M.E.

Mr. F. Tackett Clarke stated that he and Mr. Ward represented the Southwestern Associations of Engineers and that his organization would like to have a license law of some kind, and already had drafted such a bill which might be used as a beginning from which to work. He added that whatever form the final bill might take, his group desired one which would be enforced, and stated that he believed the Louisiana Engineering Society should sponsor it.

Mr. Charles Keller, Jr. representing the Society of American Military Engineers, stated that the meeting had been called before he had an opportunity to contact his board, but that he felt the S.A.M.E. would be neutral in the matter. His personal opinion was that the clause concerning contractors should be very carefully handled.

Mr. C. Glenn Cappel, American Society of Civil Engineers, then stated that he believed there was no conflict with the contractors, pointing out that supervision of construction does not constitute engineering practice. Then, as chairman of the Legislative Committee of the A.S.C.E., he stated that his committee had held a meeting in which it was decided that their society would favor a general law for engineers but that in the drafting of such a law the rights of those practicing under the present Civil Engineering Law should be guaranteed. His committee believes that the council should select a committee of eleven members, representing the various engineering branches, and from all parts of the state, and that a sub-committee of five, the actual working committee, be appointed to draft the act. The larger committee would then submit it to the Louisiana Council of Engineers, who should sponsor the bill.

Mr. Clarke then stated that he thought it would be a good idea to have the Council sponsor the bill rather than the Louisiana Engineering Society.

Mr. Frank E. Johnson, Jr., of the American Institute of Electrical Engineers, stated that his organization has canvassed its membership in 1933 concerning a general engineering license law, and at that time they were in favor of such a law, and though no recent survey had been made, he believed his group would still favor it.

Mr. Raymond Frischertz, representing the Illuminating Engineers Society, stated that he was not authorized to speak for his society, but that he was present to obtain information and report upon it.

Mr. G. Elmer May, of the American Society of Heating and Ventilating Engineers, stated that he was in approximately the same position as Mr.

Frischertz; that his group had not considered the matter and therefore he was not prepared to state his position.

Mr. Charles M. Kerr, representing both the Louisiana Engineering Society, as Chairman of its Legislative Committee, and the Louisiana Institute of Civil Engineers, as presiding officer, stated that the latter organization was wholeheartedly in favor of a general engineering law. He added, however, that this group was quite concerned of its rights under the existing law and denitely opposed to the reopening of the "grandfather clause" for land surveyors and civil engineers.

Mr. Richard R. L. Ward, of the Southwestern Association of Engineers, stated that his society's opinions had been expressed by Mr. Clarke, but added that the personnel of many industrial plants in Southwest Louisiana were securing licenses from other states.

Mr. J. T. O'Brien, representing the Baton Rouge Section of Louisiana Engineering Society, said he believed that his group is in favor of a license law, but he also felt that they did not know exactly what a general engineering license law represents and would like to have this clarified. He added that they feared such an act might become a political football.

Mr. J. J. Saurage, also representing the Baton Rouge of the Louisiana Engineering Society, concurred in Mr. O'Brien's statement.

Mr. E. A. Landry, representing the Highway Engineers, stated that he was not present in an official capacity. His organization realized that sooner or later a general engineering law would be passed and that they would not oppose its passage but, to quote a previous speaker, would "fight for their rights". He added that he thought the Louisiana Council of Engineers was an excellent means of exchanging ideas between various engineering groups, and wanted it understood the highway engineers did not want the "grandfather clause" reopened for civil engineers but wished for the same qualification requirements for highway engineers as for any other branch of engineering. He pointed out that the average experience of highway engineers is seventeen years of service and that these men wanted protection.

Mr. H. L. Lehmann, representing the Louisiana Engineering Society and the Highway Engineers, and speaking for the latter, said that his group would favor a general engineering law, giving views similar to Mr. Landry's. He pointed out that highway engineering is no more a sub-division of civil engineering than Heating and Ventilating engineering is of mechanical engineering, or illuminating is of electrical, and stated that he believed his group wanted no conflict with other societies.

Discussion followed in which it was pointed out that a person licensed in one of the major divisions could practice in the sub-divisions of that branch of engineering, but one licensed in a sub-division only would be entitled to practice solely in that sub-division.

Discussion of the apprentice clause was entered into between Messrs. Clarke and Cappel, Mr. Clarke being in favor of the insertion of such a clause and Mr. Cappel finally stating that he was neutral.

The question of what constituted an "approved engineering curriculum in a school or college approved by the Board as of satisfactory standing" was brought up and it was understood that the list of schools prepared by the Engineering Council for professional Development would probably be used as a guide.

Mr. Clarke pointed out that a bill by Senator J. E. Ball of Minnesota provided that a professional engineer performing professional work would be excluded from joining a union. He added that, if the engineering profession is not careful, many of its younger members will be forced to join a union, and for this reason he is in favor if an all-inclusive engineers' license law.

Mr. Cappel than moved that the Louisiana Council of Engineers appoint a committee of engineers from the entire state, composed of all branches of engineering, and a sub-committee including a representative of the four founder societies and the Louisiana Institute of Civil Engineers, the latter to be a working committee to draft the proposed licensing law and then submit it to the larger committee, which in turn would present it to the Council. He added that both committees should consist of an odd number of personnel. The motion was seconded and passed, and President Nairne appointed Mr. Charles M. Kerr, as representative of the Louisiana Institute of Civil Engineers and Surveyors, as Chairman Pro-tempore, Mr. E. A. Landry of the Highway Engineers, Mr. F. T. Clarke, Southwestern Association of Engineers, Mr. Frank E. Johnson, American Institute of Electrical Engineers, Mr. E. A. McLellan (or a substitute appointed by him), American Society of Mechanical Engineers, Mr. Leo M. Odom, American Society of Civil Engineers, and Mr. J. J. Ganucheau, American Institute of Chemical Engineers. Mr. Kerr then announced that the first meeting of the sub-committee would be held on Saturday, May 10 at 3 p. m., and that notices would be forwarded.

Mr. Clarke then asked to be permitted to call a meeting of the heads of various engineering societies in Southwest Louisiana to obtain the feeling in that locality towards an engineering license law, and he was encouraged to do so.

Mr. Keller stated that it would be advantageous for the parish, levee district and municipality engineers to be kept informed and canvassed for their opinions in order to help the passage of the law.

President Nairne then thanked all present for attending and urged them to attend the next meeting of the Council, which would be called in approximately two months.

There being no further business, the meeting adjourned

JOHN P. FERNANDEZ,
Secretary

Woman's Auxiliary to the Baton Rouge Section. In April a charter was granted for the formation of the auxiliary. At a meeting of April 7, in Baton Rouge, the following officers were elected: Mrs. Leo M. Odom, president; Mrs. J. Clifton Hill, first vice-president; Mrs. B. W. Pegues, second vice-president; Mrs. George de la Matyr, third vice-president; Mrs. Norman E. Lant, honorary president; Mrs. B. W. Wood, recording secretary; Mrs. Charles Phillips, corresponding secretary; Mrs. F. F. Pillet, financial secretary, and Mrs. George Cline, treasurer. With the rapidly increasing membership of the Baton Rouge Section, this added activity is in keeping with the section's progress.

OBITUARY OF

ROBERT TURNBULL BURWELL

The death, on January 21st, 1947, of Robert Turnbull Burwell, Manager of the New Orleans Department of the Hartford Steam Boiler Inspection and Insurance Company, brought to an end the long and distinguished career of one who had devoted his life and study to the interests of engineering, particularly the insurance engineering field.

Mr. Burwell was born April 15, 1867, in Charlotte, N. C. He received his early education at Frey and Thorson school for boys; he later attended Bingham Military School at Melvane, N. C.; later he entered the University of North Carolina and was graduated from that school in 1887. After working for about a year in Raleigh, N. C., he enrolled at Cornell University and was graduated from that school in 1891 with a degree in Mechanical Engineering.

In 1892 Mr. Burwell moved to New Orleans, where he was connected with the Louisiana Experimental Station, under Dr. William Stubbs. The Louisiana Experimental Station at that time specialized in the study of sugar making and Mr. Burwell, while connected with the station, wrote a treatise on that subject. This paper was widely

published and read throughout the United States and was translated into foreign languages for foreign country study.

On March 1, 1897, Mr. Burwell joined the Hartford Steam Boiler Inspection and Insurance Company as an Inspector, in what was then the Gulf Department, the headquarter of which was located in New Orleans. He was promoted to the position of Chief Inspector of the Gulf Dept., in June, 1902 and when the Company established its New Orleans branch office in July, 1919, he was made manager of the department, which position he held until his death this year.

Mr. Burwell was an active member of St. Andrew's Episcopal Church, New Orleans, and was treasurer of the church for over 15 years.

In addition to being a life member of the Louisiana Engineering Society, he was a member of the ASME. He also belonged to the Masonic Order. While attending the University of North Carolina, he became a member of Upsilon chapter of Kappa Alpha Order, social fraternity.

It is fitting and proper that the Louisiana Engineering Society should pay tribute to our late fellow member, Mr. Robert Turnbull Burwell, by adopting resolution, attesting that:

Therefore, be it resolved that the Louisiana Engineering Society adopt a resolution embodying the facts as expressed above and

BE IT FURTHER RESOLVED that these resolutions be spread upon the minutes of the Society and published in the Proceedings, also that copies be sent to Mr. Burwell's two surviving sons and members of his immediate family.

Respectfully submitted,
(Signed)

A. R. KEILER

B. S. NELSON

D. W. STEWART

New Orleans, La.
April 10, 1947

OBITUARY

OF

HARRY W. WATERFALL

The death on March 26, 1947, of Harry W. Waterfall, Head of the Department of Mechanical Engineering at Louisiana State University, after an illness of several

months, was felt as a distinct loss by his associates and friends in the Louisiana Engineering Society.

Professor Waterfall was born in Boston, Massachusetts, on June 6, 1887. He received his S.B. in 1911 from the Massachusetts Institute of Technology. During his long career in the field of engineering he held various positions of trust and responsibility in industry and as a member of the teaching staff of several universities. His experience in the field of education included positions as assistant in mechanical engineering at M.I.T., instructor and assistant professor at the University of Illinois, associate professor at John Hopkins University, special lecturer at N. Y., assistant, associate and full professor and head of department of Mechanical Engineering at L. S. U.

In industry, Professor Waterfall served as assistant engineer of the William Cramp & Sons Shipbuilding Company of Philadelphia, Chief Engineer for the Angus Company, Ltd. of Calcutta, and as executive and mechanical engineer of the Kwong Yoen Company of New York City.

He was a member of the American Society for Mechanical Engineers, the American Society for Engineering Education, Louisiana Engineering Society, Sigma Xi, and Tau Beta Pi.

He is survived by his widow, Marie Sinclair Waterfall.

Among his professional associates, Professor Waterfall was known as an engineer of wide experience and of exceptional ability. In his field, he was an outstanding scholar. His many friends and acquaintances knew him as a man of high integrity and greatly valued their association with him.

BE IT RESOLVED, That in behalf of the entire membership of the Louisiana Engineering Society this memorial be adopted in tribute to the memory of our late friend and colleague, Harry W. Waterfall.

BE IT FURTHER RESOLVED, That this memorial be spread upon the minutes of the Louisiana Engineering Society and that a copy be sent to his family with an expression of our sympathy and heartfelt condolence.

L. J. LASSALLE

F. F. PILLET

WILLIAM WHIPPLE,

Chairman

Baton Rouge, La.

April 17, 1947

PAPERS AND DISCUSSIONS

CENTRIFUGAL BOILER FEED PUMP APPLICATION PROBLEMS

By I. J. Karassik*

A little over a month ago, there took place in New York City, the annual meeting of the ASME. As usual, a large number of technical papers were presented on a variety of subjects. The significant part of the program, however, was the fact that out of some 175 papers presented, twenty-one dealt with gas turbines or with jet-propulsion engines and allied fields of power generation. There were, it is true, no papers presented on the utilization of atomic energy for power generation, but this was merely an oversight, to be corrected, I am sure, in 1947. Thus, it is with a certain feeling of humility that I approach my subject, which is allied to the old fashioned steam power generation cycle. And yet, I feel that the time to scrap our existing steam power plants has not yet arrived, that for many years to come, we will still build steam turbines, boilers and condensers and that 20 and even 40 years hence engineers such as you and I will meet to discuss problems arising in the application of steam power plant auxiliaries such as the centrifugal boiler feed pump.

In order to understand the problems which may arise in the application of centrifugal boiler feeding equipment, it is necessary to consider the system into which this equipment is to be incorporated. It is not my intention, of course, to present a detailed analysis of all boiler feed cycles, simply because such an analysis would prove to be extremely lengthy. Depending upon the size of the power plant installation, on the operating pressure and temperature of the main turbine, on various local conditions such as availability of condenser circulating water and even on the personal preferences of the designing engineers, the boiler feed cycle may assume a thousand and one variations. Yet, it is possible to present a picture which, except for some variations and refinements, represents the cycle encountered in over 90% of all power plants. Such a cycle is illustrated schematically in Fig. 1. It comprises a boiler, a condensing turbine, a condenser, a condensate pump, a direct contact heater wherein the feedwater is heated with steam bled from an intermediate stage of the main turbine, a boiler feed pump and a boiler. A common refinement consists of the addition of closed heaters both ahead of the direct contact heater

* Application Engineer, Worthington Pump and Machinery Corp. Delivered at the Annual Meeting, January 10, 1947.

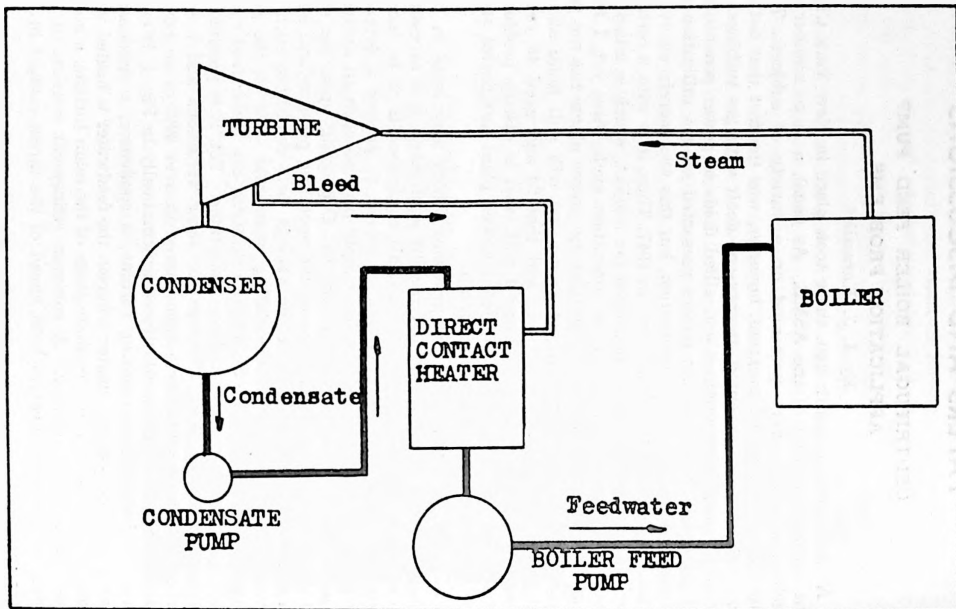


Figure 1

and following the boiler feed pump, steam being supplied from additional turbine bleed points, as in Fig. 2. Infrequently, closed heaters are used throughout to the exclusion of direct contact heaters. Even less frequently, more than one direct contact heater is used. However, disregarding these variations and refinements, it becomes apparent that a boiler feed pump handles feedwater at elevated temperatures and that in over 90% of the cases, this feedwater is at or near its boiling point at the suction of the pump.

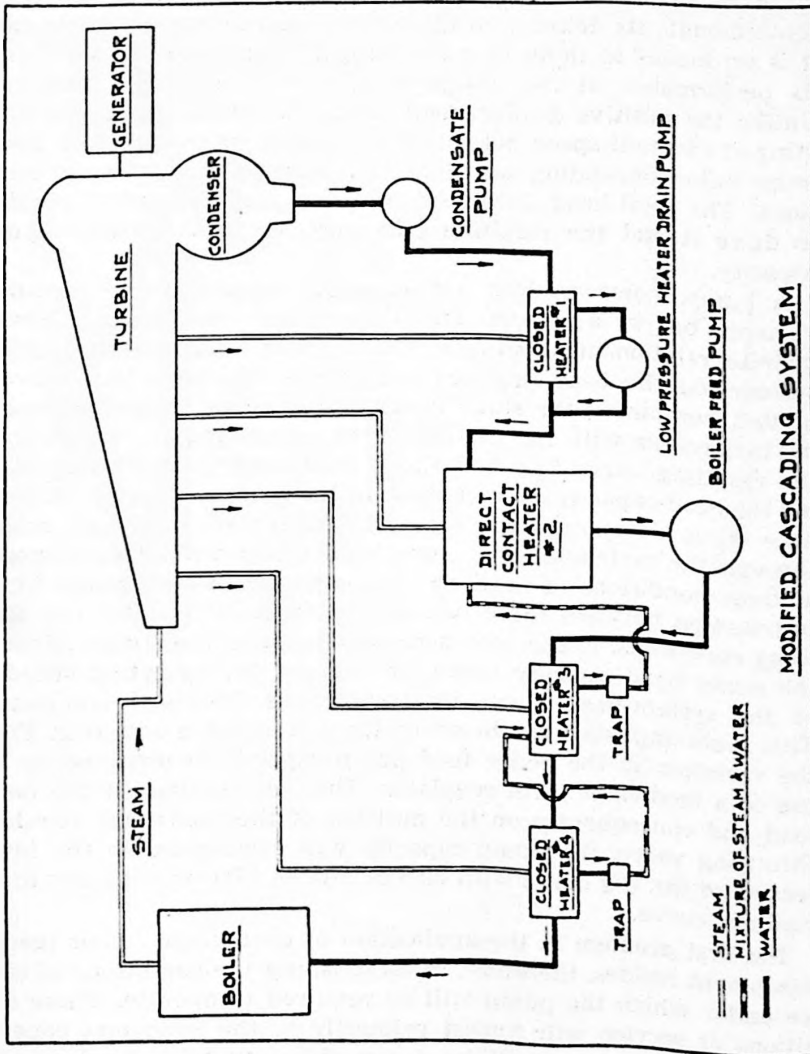


Figure 2

The function of the boiler feed pump, then, is to deliver the feedwater from this direct contact heater into the boiler having added to it the pressure energy required to overcome the boiler pressure and the frictional losses in the intervening system. Further, it is the function of the boiler feed pump to deliver this feedwater in such quantities as to always maintain the required level in the boiler, regardless of any variations which may occur in the power plant load and, therefore, in the demand of steam.

Let us see, then, in what manner does the boiler feed pump accommodate its delivery to these variations in the boiler demand. It is erroneous to think of a centrifugal pump merely in terms of its performance at the design conditions of capacity and head. Unlike the positive displacement pump, a centrifugal pump operating at constant speed delivers any capacity from zero to a maximum value depending on pump size, design and suction conditions. The total head developed by the pump, the power required to drive it and the resulting efficiency all vary with the pump capacity.

A pump, however does not generally operate in a laboratory vacuum, but in a system, and this system has likewise certain definite relationships between the capacity flowing through the system and the head required to produce this flow. If a curve is plotted, combining the static heads and pressure differences existing in a system with the frictional losses occurring at various flows, the resulting curve is called the system-head curve. Superimposing the head-capacity characteristic of the pump on such a performance curve determines the capacity which the pump will deliver through the system since a centrifugal pump will always operate at those conditions of head and capacity which correspond to the intersection between these two curves. In order to alter the operating conditions, it becomes necessary to alter the shape either of the pump head-capacity curve by varying the operating speed or of the system-head curve by varying its frictional component. This is accomplished by throttling through a valve and as in Fig. 3 the variation in the boiler feed pump capacity is obtained by the use of a feedwater level regulator. Thus, depending on the boiler load and consequently on the position of the feedwater regulator throttling valve, the pump capacity will correspond to the intersection of the HQ curve with curves (A) to (D) or with any intermediate curve.

The first problem in the application of centrifugal boiler feeding equipment resides, therefore, in establishing the conditions of service under which the pump will be required to operate. These conditions of service will consist primarily of the head and capacity for which the pump will be designed, so that its head-capacity characteristic may intersect the prevailing system-head curve at

a suitable location. Other conditions of service with which we must concern ourselves will deal with the existing suction conditions as well as with feedwater temperatures and analysis. The latter two will determine to a great extent the materials from which the boiler feed pump should be constructed.

BOILER FEED PUMP CAPACITY

First in the order of the conditions of service to be determined comes the total capacity to be handled by the boiler feed pumps. This portion of the task is relatively easy, since the maximum steaming rate of the boiler or boilers to be served can be obtained from the manufacturing concern which has or will supply the boilers. Once this information is available, it remains to decide

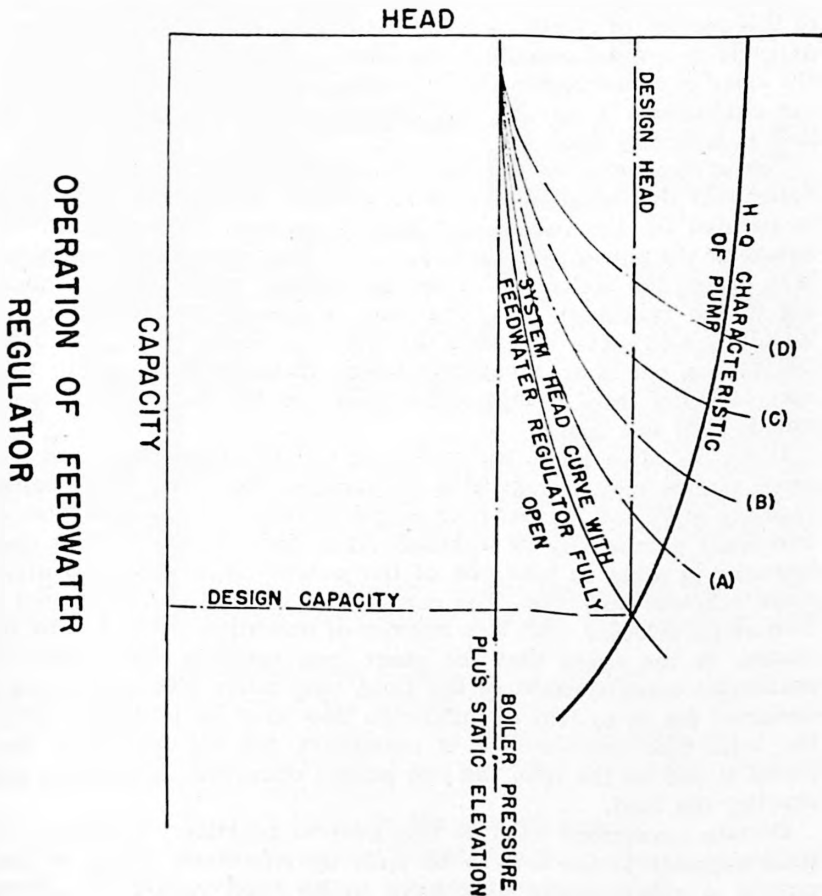


Figure 3

the margin of safety which will be provided in the pump capacity. This margin is intended to compensate for two separate operational factors. In the first place, the boiler may be called upon to deliver its maximum load while the boiler level is low and the boiler feed pump should be able to supply this maximum demand and, at the same time, have some reserve capacity to restore the boiler level to normal. In addition, it is necessary to take into consideration the fact that internal parts of the boiler feed pumps will be subject to wear, increasing the internal leakage past clearance joints and decreasing the net effective capacity of the pumps. Such wear is normal and provided for by the use of renewable parts such as wearing rings, interstage bushings, etc., which can be replaced at a nominal expense after a reasonable length of service.

While it is impractical to establish definite rules for the selection of this margin of safety over the maximum steaming rate, since it depends to a great extent on the human element and varies with the relative conservatism of the engineer selecting the boiler feeding equipment, it can be said that a margin of between 10 and 20% is generally used.

The choice between the use of a single boiler feed pump per boiler and the installation of several boiler feed pumps operating in parallel for the full boiler demand is often influenced by the nature of the power plant load. In a base load station, the tendency is to design the boiler feed pump for the full capacity corresponding to the maximum steaming rate. A typical boiler feed pump installation to serve a 440,000 lbs. per hour boiler is designed for 500,000 lbs. per hour, a capacity which includes a margin to take care of boiler level swings and a provision for wear. A duplicate unit is used as a spare.

If, on the other hand, the load is of a fluctuating nature, two or more pumps may be operated in parallel. Here the total design capacity of 500,000 lbs. per hour is split between two pumps. One or two spare pumps may be installed. At periods of light load it then becomes possible to take one of the pumps off the line, to allow more efficient operation. The capacity of the individual pumps is frequently selected with this manner of operating in view. For instance, in the event that the plant load remains under 65% of maximum capacity most of the time, two boiler feed pumps each designed for 65 to 70% of maximum flow may be installed. When the total flow exceeds 65% of maximum, the second boiler feed pump is put on the line, the two pumps operating in parallel and sharing the load.

Certain exceptions exist to this general practice: (1) When the total capacity is too low to be split up effectively between two pumps, a single pump may have to be used regardless of the nature of the load.

(2) When the maximum capacity is too great to permit the use of the most efficient pump, the capacity may be split up between two or more pumps.

(3) When the efficiency of operation is inconsequential, as for instance when the boiler feed pumps are turbine driven and use is made for the exhaust steam for process work or for feed heating, first cost will generally determine the number of boiler feed pumps to be used.

(4) To insure reliable operation under all conditions, it is the practice in some power stations to use two boiler feed pumps per boiler, each pump being designed for the total maximum flow. These pumps are operated in parallel at all times, even at partial loads.

The advantage to be gained from this last arrangement is that should one of the pumps need to be taken off the line, the remaining unit can carry full load by itself. There is, however, a very definite disadvantage to this scheme in that it involves the constant operation of the boiler feed pumps under 50% of their actual design capacities. Such operation tends to shorten the overall life of the pump in addition to reducing the operating efficiency of the unit.

SUCTION CONDITIONS

In any centrifugal pump, there is a definite friction and velocity head loss which takes place before the liquid enters the impeller vanes to a degree sufficient for it to receive energy from the pump. Thus, there must be made available a certain amount of energy at the pump suction over and above the vapor pressure of the liquid pumped in order to avoid vaporization, flashing and cavitation in the pump impeller. This margin over the vapor pressure is the required NPSH or net positive suction head. The required NPSH for a given pump, operating at a given speed, is a function of the pump capacity, varying approximately as the square of the capacity.

The available NPSH of a system, on the other hand, is the difference between the suction pressure and the vapor pressure and can be expressed as:

$$\text{Available NPSH} = (P_1 - P_v) + (S - h_f)$$

where: P_1 = Pressure in the suction vessel

P_v = Vapor pressure at the pumping temperature

S = Static elevation from suction vessel water level to pump centerline

h_f = Friction losses in the suction piping.

Then if H_s is the required NPSH for the boiler feed pump, proper operation of the pump will only be insured if:

$(P_1 - P_v) + (S - h_f)$ is greater than or equal to H_s

Inasmuch as in a direct contact heater, the pressure P_1 is substantially equivalent to the vapor pressure P_v , the only available NPSH is represented by the difference between the static head S and the friction losses h_f .

In some cases, the installation may include a booster feed pump which is selected to operate under the available suction conditions and which delivers the feedwater under moderate pressure to the suction of the main feed pump. In such an arrangement, the available NPSH of the booster pump is calculated in the same manner as shown above, while the available NPSH at the suction of the main feed pump becomes.

$$(P_2 - P_v)$$

A modification of this arrangement may include a closed heater between the booster and the main feed pump. It then becomes necessary to use the vapor pressure corresponding to the maximum temperature of the feedwater delivered through this heater in the formula given the available NPSH at the main feed pump.

One cannot overemphasize the importance of securing satisfactory suction conditions for the proper operation of boiler feed pumps. The most important factor for such operation is that sufficient submergence be provided over the suction of the pump in order to prevent even partial cavitation and local flashing in the vanes of the first stage impeller. Insufficient suction heads are not conducive to the selection of a good, substantial and economical pumping unit.

By virtue of its definition, the required NPSH for a given pump and a given capacity is independent of the operating temperature. At the same time, however, this temperature should be taken into consideration when establishing the recommended submergence from a direct contact heater to the boiler feed pump. It is suggested that a margin of safety be added to the normal required NPSH when the boiler feed pump handles feedwater at temperatures over 250 to 300°F. This margin of safety is intended to compensate in part for pressure and temperature fluctuations experienced in the heater, fluctuations which are generally more marked at the higher operating pressures and temperatures. While a mathematical formula cannot be given for the margin to be included, it is possible to guide oneself by the empirical data given in the Standards of the Hydraulic Institute.

DISCHARGE PRESSURE

In order to determine the discharge pressure for which the boiler feed pumps are to be designed, it is necessary to obtain the sum of the maximum boiler pressure and of all the frictional and control losses which occur between the boiler feed pump discharge nozzle

and the boiler inlet. The calculations of the frictional losses must, of course, be based upon the maximum capacity previously determined.

The following represents a typical calculation of the required discharge pressure for a boiler feed pump designed for 500,000 lbs. per hour and required to feed a 950 psi boiler.

Maximum drum pressure based on all safety valves blowing	1030 psi ga.
Economizer pressure drop at maximum capacity	58 psi
Static head converted into psi at average pumping temperature	24 psi
Feedwater regulator pressure drop at maximum capacity	40 psi
Pressure drop through flowmeter at maximum capacity	3 psi
Friction losses through piping and valves at maximum capacity	42 psi
Friction loss through closed heater at maximum capacity	38 psi
Excess pressure regulator pressure drop at Maximum capacity	25 psi
Total	1260 psi ga.
Safety margin	40 psi

Design discharge pressure 1300 psi ga.

In this particular case, the discharge pressure corresponds to about 126% of the maximum boiler pressure. In general, it can be said that the required discharge pressure will vary from about 115 to as high as 130% of the maximum boiler pressure, depending upon the complexity of the cycle and, therefore on the extent of the component frictional losses. While it is probably possible to make preliminary calculations based on average percentage step-ups, it is recommended that actual calculations be carried out based on data available with regards to the specific installation in question. This suggestion is based on the fact that if the design pressure is selected on the low side, the boiler feed pump will not be capable to operate at the full design capacity and therefore the margin of safety selected for the capacity will never be realized. On the other hand, if the discharge pressure is overestimated, there will be a doubling up of safety margins, one in capacity and the second in pressure, with the attendant reduction in economy.

TOTAL HEAD OR NET PRESSURE

Depending on whether it be expressed in terms of feet head or in pressure, the work to be done by the boiler feed pump will be

its total head or the net pressure generated. By definition, the net pressure which must be generated is the difference between the required discharge pressure and the available total suction (not the available NPSH), both of these pressures being referred to a common datum line. Thus,

$$\text{Net pressure (in psi)} = \text{Discharge pressure (in psi ga.)} - \text{Total Suction pressure (in psi ga.)}$$

At the same time, it must be considered that a centrifugal pump with a given impeller diameter and operating at a given speed generates a total head expressed in feet of the liquid pumped entirely independent of the specific gravity of the liquid. Therefore, prior to the selection of the pump, it is necessary to convert the required net pressure into a total head expressed in feet of water at the pumping temperature:

$$\text{Total head in feet} = \frac{\text{Net pressure in psi} \times 2.31}{\text{Specific gravity}}$$

In the majority of cases, the pressure in the direct contact heater at the boiler feed pump suction is either pegged at a constant value or varies with the load in a predetermined manner. It is highly important therefore that when preparing specifications for a boiler feed pump, all possible variations in suction conditions and temperatures be given to the pump designer so that he may properly calculate the required total head.

BOILER FEED PUMP CHARACTERISTIC CURVES

We have seen earlier that for each centrifugal pump there is a definite relation between capacity, head and power input at a given speed of rotation and that a change in any one variable affects the others in a definite manner. This relationship constitutes a pump's performance characteristics. The accepted practice in representing these characteristics is to plot the total head in feet, the horsepower input and the efficiency in percent as ordinates against the pump capacity in gallons per minute at a given constant speed.

At constant speed, the capacity of a centrifugal pump varies with the head, the capacity increasing as the head decreases. The actual slope of the head-capacity curve from no flow conditions to 100% capacity depends primarily upon the type of the pump, in other words upon the design specific speed. While this slope can be varied somewhat by the choice of certain design factors, only minor variations are permissible without seriously affecting the pump efficiency.

In the range of specific speeds normally encountered in multistage boiler feed pumps, the rise of head from the point of best

efficiency to shut-off will run from 10 to 25%. Further, the shape of the head-capacity curve for these pumps is such that the drop in head is very slow at low capacities, accelerating as the flow increases.

It is true that, in the case of boiler feed pumps operated at constant speed, the difference in pressure between the pump head-capacity curve and the system-head curve must be throttled by the boiler level feedwater regulator. Thus, the higher the rise of head towards shutoff, the more pressure must be throttled off and, theoretically, wasted. Also, with a higher rise, the pressure to which the piping will be subjected is greater. However, it is not advisable to seek too low a rise, as an impeller design which gives a very low rise to shut-off may easily result in an unstable head-capacity curve, difficult to use for parallel operation.

At the same time, it is necessary to consider that the fact that a pump has a steep curve and a high percentage of rise towards shut-off does not necessarily prove that this pump is suitable for parallel operation. There are two basic types of characteristic curves, namely the stable and the unstable type, as illustrated in Fig. 4. Pump A has a stable, steady rising head-capacity curve, characterized by the fact that it is continually rising from full load to zero delivery and that at no capacity does the total head exceed the head generated at shut-off. If, on the other hand, the constant speed head-capacity curve has a droop between full load and shut-off, as in the case of pump B, the curve becomes unstable as it can deliver two different capacities at the same pressure.

When several boiler feed pumps are operated in parallel, it is essential that their head-capacity curves be stable. In the contrary case, the total flow may become unevenly divided between the several pumps and one or more pumps may actually cease to deliver after a change in the total required capacity at light flows.

PROTECTION OF FEED PUMPS AGAINST OVERHEATING AT LIGHT FLOWS

This question of operation at light flows introduces a very important problem which must be dealt with at the time of the installation of boiler feed pumps if they are not to be subjected to the danger of overheating and seizing. It must be noted that the difference between horsepower input to a centrifugal boiler feed pump and the net water horsepower represents the power losses within the pump itself, all this power loss being ultimately transformed into heat and transferred to the liquid passing through the pump.

The actual amount of temperature rise at any given operating condition can be determined by multiplying the horsepower loss by

2545 (BTU equivalent of one horsepower hour) and dividing the total heat by the corresponding flow in lbs. per hour:

$$\text{Temperature rise in } ^\circ\text{F} = \frac{(\text{BHP} - \text{WHP}) \times 2545}{\text{Capacity in lbs. per hour}}$$

Capacity in lbs. per hour

This formula can be further simplified and transformed to:

$$\text{Temperature rise in } ^\circ\text{F} = \frac{\text{Head in feet} (1 - 1)}{778 \quad e}$$

In order to illustrate in a concrete example the variation of the temperature rise in a boiler feed pump at various flows, Fig. 5 shows the performance characteristics of a pump including a temperature rise curve. Obviously, the losses at reduced capacity are greater than at full flow and as the total flow which can absorb the

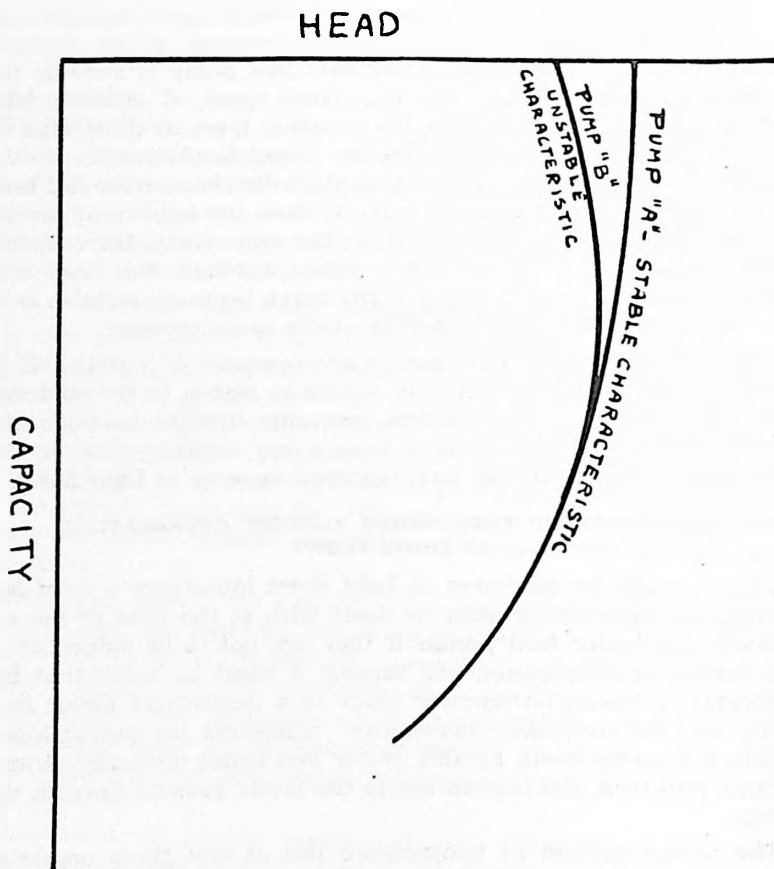


Figure 4

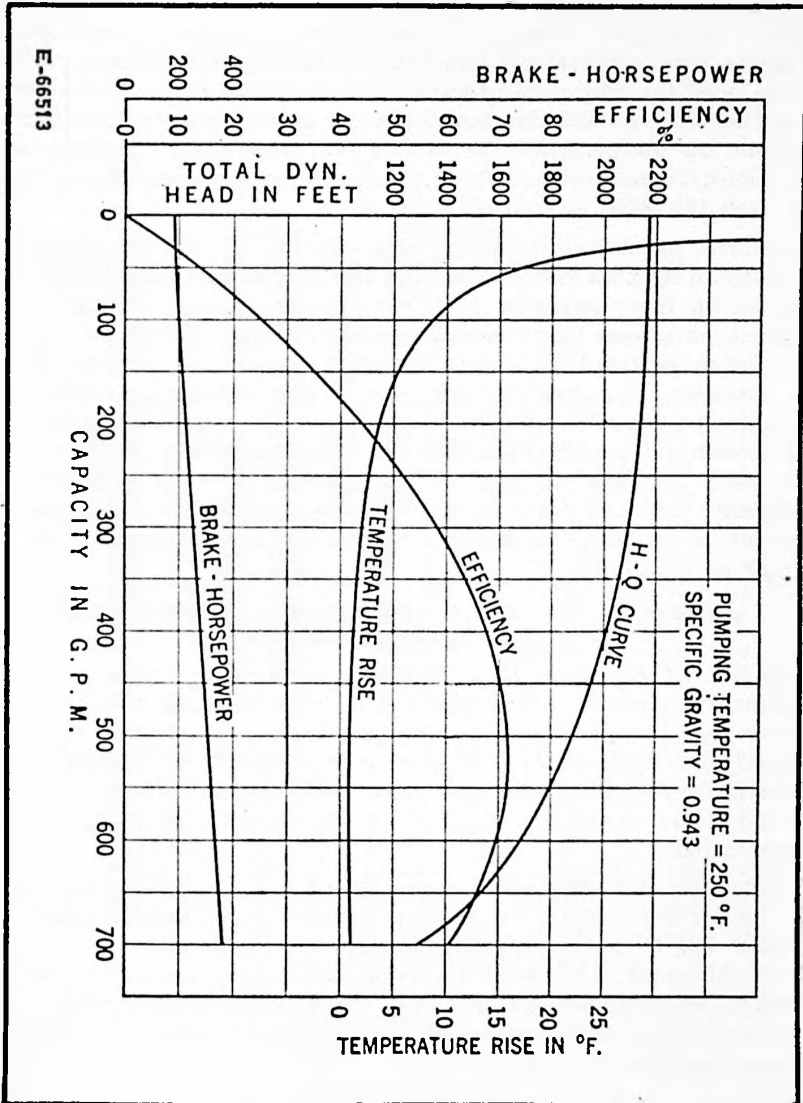


Figure 5

heat generated is low, the temperature rise increases very rapidly with a decrease in flow.

Since boiler feed pumps are generally called upon to operate in a very wide load range, it is necessary to provide some means whereas the temperature rise will never reach excessive values. It has been the empirical practice of pump designers to recommend that this temperature rise never exceed 15°F. As a rule of thumb, to limit the temperature rise to 15°F, it is necessary to maintain a minimum capacity through the pump of approximately 30 gpm for each 100 BHP at shut-off.

In order to provide for such minimum flow, it becomes necessary to install a by-pass in the discharge line from the boiler feed pump, located on the pump side of the discharge gate and check valve. If the pump takes its suction from a direct contact heater, the by-pass leads back to this heater. A throttling orifice is located in the by-pass line, the physical dimensions of this orifice being selected to provide the required minimum flow under the prevailing differential pressure. Control valves for the by-pass line may be controlled manually or automatically, depending on the preference of the designing engineers, although it should be stated that automatic control is presently becoming very popular, especially in the larger power plants

EFFECTS OF FEEDWATER TEMPERATURE AND ANALYSIS ON MATERIAL SELECTION

So far, we have concerned ourselves principally with those conditions of service which affect the hydraulic characteristics of boiler feed pumps. Feedwater temperature and analysis, however, should also be considered as part of the boiler feed pump conditions of service, although their effect is felt mainly in the selection of the proper materials from which the boiler feed pump will be constructed.

Until recently, very little attention was being paid to this phase of the problem, partly because operating temperatures seldom exceeded 220°F, partly because feed-waters used were less active from the point of view of corrosion and partly because there existed a lesser choice of materials than is the case today. The standard boiler feed pump had a cast iron or cast steel casing and bronze internal fittings.

Today, both the temperature and the pH of the feedwater are carefully analyzed before the decision can be reached whether to use more or less standard materials or whether stainless steels are indicated if not for the entire pump, at least for the fittings. In this connection, it is necessary to remember that the pH of feedwater is definitely affected by the temperature and therefore, since the

pH value is measured cold, it is necessary to correct it for the actual operating temperature.

It is not practical to present here a complete discussion of the problem of corrosion-erosion and of the present status of its solution. It will therefore suffice to present a tabulation which might be used as a guide in the selection of the proper materials. It goes without saying that investigation of this problem continues at all times and that the recommendations submitted below are subject to some modifications as additional experience is accumulated.

Casing	Internal Fittings	Maximum Temperature	Use
1. Cast iron	Bronze	250°F	pH neutral to 8.5 unless water is known to have corrosive action.
2. Cast iron	13% chrome stainless steel	350°F	Any pH, unless water is known to have excessive corrosive action.
3. Carbon steel	Bronze	250°F	Seldom used for boiler feed service today and only where water is definitely known not to be corrosive.
4. Carbon steel	13% chrome stainless steel	400°F	pH above 8.5, unless water is known to have corrosive action.
5. 5% or 13% chrome steel	13% chrome stainless steel	Any temperature normally encountered	Any pH and where water is corrosive or previous trouble reported.

The recommendation to limit the use of bronze fittings to 250°F and below is based principally on the great difference in the coefficient of thermal expansion between bronze and ferrous metals.

ENGINEERING BRIEFS

Concrete Railroad Ties. Due to scarcity of timber, it is proposed to substitute concrete ties on British Railways, as renewals.

Air Treatment for Pharmaceutical Plant. A recently opened plant contains some unusual features in air conditioning. Every effort has been made to provide dust free air. To this end both filters and electrostatic precipitators are used. Germicidal lamps lend additional protection in reducing bacteria counts.

New Tunnel. The Union Pacific Railway will shortly start work on a tunnel having a length of 6,700 feet. This tunnel will parallel one which was built 46 years ago.

Supersonic Flight Center in England. Construction has started on a flight research project costing eighty million dollars. Four wind tunnels will be available, with speeds up to 1500 miles per hour. One tunnel, measuring thirteen by thirteen feet, will require a 120,000 horsepower motor.

Low Cost Concrete Homes. Tuskegee Institute has started a project to interest negro farmers in replacing their inadequate wooden homes by buildings constructed of low-cost concrete block. Native supplies, such as river sand and gravel are mixed with cement in a ratio of six to one. The simplest equipment is used, and the cost is within the reach of the average farmer.

Blocks are 3 inches thick, and measure 8 by 16 inches and 8 by 8 inches. Double wall construction is used, with an air space of 2 inches between.

Electric Brakes for Railroads. A recent development is the electro-pneumatic brake. The action of this brake is controlled by a speed governed generator, attached to one of the axles of each car. At high car speeds, the pressure on the brake shoe is high; as the speed decreases, the applied pressure also decreases. The claim is made that in addition to greater passenger comfort, there is also a saving in time. One road claims a saving of two hours in the schedule of a 2,200-mile run.

Moisture in Refrigerants. A small amount of moisture in a refrigerator is likely to cause trouble by formation of ice at the expansion valve. A new method of determining the moisture content of the Freons has been devised. The principle is based upon the absorption of infra-red rays by water, and the non-absorption by Freons. The device will detect as little moisture as one part per million in the refrigerant. The determination requires about five minutes compared with four hours for the former and less accurate method.

MINUTES OF MEETING AND BUSINESS OF THE SOCIETY

Minutes of Meeting of the Board of Direction, January 7, 1947

The meeting was called to order by President Nairne, with Messrs. Cucullu, Lassalle, Lehmann, Macdonald, Mire and Fernandez present. Minutes of the regular meeting of December 9 and of the special meeting of January 3 were accepted as read.

The Secretary reported that all applicants listed in the December membership ballot had been elected, and that the total attendance at the annual meeting of the Society was 505.

A report from the Chairman of the Employment Committee, Mr. E. L. Fithian, was read and accepted.

Resignations of the following members were accepted with regret:

John W. Germond, Walter A. Marcotte, F. M. Stevenson, Harry M. Trett.

A resolution of thanks to Hon. Sam H. Jones for his key-note address at the annual meeting was read by the Secretary. Letters acknowledging receipt of this resolution by Mr. Jones, and receipt of a resolution thanking the Johns-Manville Corporation for their courtesies extended the Society during the annual meeting, signed by Mr. Arthur Seaver, Plant Manager, were read.

A letter from Mr. Hubert A. Flanakin concerning representation of the engineering profession on the Board of Supervisors of Louisiana State University was read. It was moved and passed that Mr. Lionel J. Cucullu be appointed chairman of a committee of his own choice to study and recommend suitable action in the matter.

President Nairne reported that he had represented the Society at a luncheon given by the sponsors of the Alexander Tidewater Seaway.

Messrs. Harry Waugh, Chairman, and Fletcher G. Downs were appointed to prepare an obituary for the late Ralph Chambers of Baton Rouge.

Mr. Arthur R. Keiler was appointed to head a committee of his own choice to prepare an obituary for the late Robert T. Burwell.

It was moved and passed unanimously that Mr. Arthur M. Hill be appointed editor of the Proceedings for the year 1947, and the Secretary was instructed to express to Mr. Hill the Board's gratitude for his splendid work during the past year.

It was moved and passed that the President and the Secretary-Treasurer sign all checks and have access to the Society's safety deposit box at the Whitney National Bank.

The Secretary was instructed to have the Society's accounts audited for 1946.

All those who served as State Contact Representatives during 1946 were reappointed for the current year, and appointments of Standing Committee chairmen and vice-chairmen were made as follows:

Committee: Membership "A", John V. Dugan, Jr., chairman; J. M. LeDoux, vice-chairman; Technical Papers, Charles P. Knost, chairman, J. S. Janssen, vice-chairman; Professional, Civic and Industrial Affairs, R. A. Steinmayer, chairman; Leo M. Odom, vice-chairman; Employment, R. P. Bassich, chairman; E. L. Fithian, vice-chairman; Publications, J. H. Collins, Sr., chairman; C. A. Ives, Jr., vice-chairman; Entertainment and Outings, Allen W. Betz, chairman; R. M. Seago, vice-chairman; Student and Junior Activities, M. G. Zervigon, chairman; F. J. Germano, vice-chairman; Publicity, Ivan H. Purinton, chairman; L. V. Cressy, vice-chairman; Legislation, Charles M. Kerr, chairman.

Appointments to the Membership Qualifications Committee also were made, and the following new standing committees were formed:

Committee for the Review of the Constitution and By-Laws, K. P. Kammer, chairman; F. N. Billingsley, vice-chairman; Housing Committee, David W. Stewart, chairman.

Discussion took place concerning the Council of Louisiana Engineers, and it was suggested that President Nairne call at least one meeting of this body during the year.

The matter of monthly meeting attendance also was discussed, and it was decided that the February meeting notice be sent in the form of a letter instead of the usual post-card.

There being no further business, the meeting adjourned.

JOHN P. FERNANDEZ,
Secretary-Treasurer

Minutes of Special Meeting of the Board of Direction, February 10, 1947

The meeting was called to order by President Nairne, with Messrs. Cucullu, Mire, Newton and Fernandez present. Mr. Steinmayer, chairman of the Professional, Civic and Industrial Affairs Committee, also was present by invitation.

President Nairne gave a brief outline of the progress being made on the New Orleans Tidewater Canal, announcing that a special hearing would be

called by General Crawford sometime in March, and that five generals would judge the feasibility of such a canal from the viewpoint of the U. S. Engineer Department.

Colonel Newton then motioned to authorize the Professional, Civic and Industrial Affairs Committee to further study the project of a tidewater ship channel from the Gulf of Mexico to the New Orleans area, in order that the favorable resolution unanimously passed by the Society on August 9, 1943 may be augmented by testimony of the Society's representatives at a hearing to be held in March, 1947 before representatives of the United States Corps of Engineers. The motion was seconded by Mr. Mire and passed.

A telegram from Edgar B. Stern, chairman, Joint Citizens' Advisory Committees, was read, in which the Society was urged to endorse the proposed Union Terminal and Grade Separation Plan at the Commission Council's special meeting to be held on February 12. It was decided that, since time for dealing with the matter was so short, the telegram should be read to members of the Society at its February meeting with an explanation of the alternatives which may be followed.

There being no further business, the meeting adjourned

JOHN P. FERNANDEZ,
Secretary-Treasurer

Minutes of Meeting of the Louisiana Engineering Society, March 10, 1947

The meeting was called to order by President Nairne, with approximately 90 members and guests present. Reading of the minutes of the preceding meeting was dispensed with.

President Nairne called on Messrs. Collins, Dugan, McLean and Zervigon, standing committee chairmen, each of whom gave a brief report on the activities of his committee.

The Secretary read an Obituary of the late Robert W. Chambers, prepared by Messrs. Fletcher G. Downs and Harry Waugh, following which a moment of silence was observed in memory of the deceased.

A brief address was made by Dr. James E. Burks, Jr., on the subject of "Cancer Protection".

President Nairne then introduced the main speaker of the evening, Mr. William E. Wunderlich, head of the Marine Growth Control Section of the New Orleans District, Corps of U. S. Engineers, who gave a most interesting illustrated lecture on "The Water Hyacinth in Louisiana", following which the meeting adjourned with a rising vote of thanks to the speaker.

JOHN P. FERNANDEZ,
Secretary-Treasurer

Minutes of Meeting of the Louisiana Engineering Society, April 14, 1947

The meeting was called to order by President Nairne, with approximately 85 members and guests present. Reading of minutes of the preceding meeting was dispensed with.

Mr. David W. Stewart, Chairman of the Housing Committee, gave an outline of the plans of his committee.

Mr. Nairne announced that a group of Lake Charles members of the Society appear to be working on the formation of a local section in that locality, and probably this would be effected in the near future.

An obituary of the late Robert T. Burwell was read by Mr. Arthur R. Keiler, following which a moment of silence was observed in memory of the deceased member.

Mr. L. J. Cucullu announced that the American Society of Mechanical Engineers would hold a hearing on the Boiler Code in Houston, Texas.

Mr. W. Stone Leake then introduced the speaker, Mr. Gerald G. Rhodes, Principal Electrical Engineer of New Orleans Public Service Inc., who gave a most interesting address on "Electric Power Interconnections and Distribution". The lecture was followed by a lively discussion, and the meeting adjourned with a rising vote of thanks to the speaker.

JOHN P. FERNANDEZ,
Secretary-Treasurer

Minutes of Meeting of the Board of Direction, April 14, 1947

The meeting was called to order by President Nairne in a private dining room at Arnaud's Restaurant. Messrs. Cucullu, Lassalle, Leake, Lehmann, Macdonald and Fernandez were present. Minutes of the regular meeting of January 27 and of the special meeting of February 10 were read and accepted.

President Nairne announced that a meeting of the Louisiana Council of Engineers would be held on April 26 for the purpose of discussing the feasibility of drafting a general license law for engineers.

The President also reported upon the activities of the Professional, Civic and Industrial Affairs Committee and read resolutions which were presented at the hearings on the Terminal Station and Grade Separation Project and the Tidewater Ship Channel Project. In connection with the latter, a letter from Mr. Lester F. Alexander, president of the New Orleans Tidewater Development Association, was read, in which he thanked the Society for its interest in furthering the project.

The Secretary reported that all applicants whose names appeared in the February ballot were elected to membership.

The Treasurer's quarterly report was submitted and accepted.

A resolution prepared by the special committee appointed to draft same was submitted by Mr. Cucullu, chairman, and accepted with the recommendation that it be put to a vote at the next meeting of the Society.

A letter from Mr. H. J. Malochee was read.

A committee composed of Messrs. William Whipple, chairman, Leo Jos. Lassalle, and Frederick F. Pillet, was appointed to prepare the obituary of the late Harry W. Waterfall.

The resignation of Mr. Martin S. Baer was accepted with regret, and the following members were dropped for non-payment of dues and because of unknown address:

Fred A. Billhardt, Howard E. Edmondson, Lloyd P. Fadrique, J. I. Hebert, John T. Knight, Jr., M. C. Carrigan, Irwin M. Lais, John A. Riley.

It was moved and passed that the Louisiana Engineering Society share a telephone with the Louisiana State Board of Engineering Examiners.

It was moved and passed that the Secretary-Treasurer's salary be increased to \$100 per month, beginning April 1, 1947.

An invitation to exchange guest privileges with the Engineers' Club of St. Joseph Valley, South Bend, Indiana, was read and the Secretary was authorized to accept same.

There being no further business, the meeting adjourned.

JOHN P. FERNANDEZ,
Secretary-Treasurer

Minutes of Meeting, Baton Rouge Section, Louisiana Engineering Society

Date: April 17, 1947. Time: 7:30 p. m. Place: Eagle's Club.

Officers present: Mr. T. E. Peak, president; Mr. W. P. Wallace, 2nd vice-president; Mr. James J. Saurage, 1st vice-president; and Mr. A. J. Mary, secretary-treasurer.

There were 29 members and guests present. President Peak called for the reading of the minutes. It was moved and seconded that the reading of the minutes be dispensed with.

Mr. Peak read a letter sent him by Mr. Nairne concerning the appointment of a Legislation Committee to help Mr. Charles M. Kerr, who is the Chairman in the drafting of a licensing bill to be presented to the legislature next year. He also read a letter to Mr. Nairne by Mr. F. T. Clarke, an engineer with the Union Sulphur Incorporated. These letters are attached to these minutes. Mr. Peak appointed the following men to assist Mr. Kerr in drafting this licensing bill: Mr. John H. Bateman, Mr. H. L. Lehmann, and Mr. A. F. Fritchie. These engineers will be informed of their appointment by letter.

An obituary was prepared in memorial of the late Harry W. Waterfall, who was head of the department of mechanical engineering at L.S.U. This obituary was read, adopted and passed by the Baton Rouge Chapter of Louisiana Engineering Society during this meeting. A copy will be sent to Mrs. Harry W. Waterfall.

There being no further business, the meeting was turned over to Dr. Wallace, who introduced Mr. W. B. Singleton of the Harlaw-Bartholomew Assoc., who gave us a talk entitled "City Parish Plan for Metropolitan Baton Rouge". A lively discussion followed this talk and indicated a great deal of interest in the subject presented. Mr. Singleton indicated that the plans he presented anticipated a population growth for Metropolitan Baton Rouge to 158,000 by the year 1970 and that the plans of his company were such as to adequately take care of this growth. He further stated that the plans for highways and sewerage disposal were largely necessary at present and would take care adequately of the growth they were anticipating.

Following his talk, a color film entitled "Beautiful America" was shown depicting the natural resources of our country.

There being no further business, the meeting was closed and refreshments in the form of beer and sandwiches were enjoyed by all attending.

AUSTIN J. MARY,
Secretary-Treasurer,
Baton Rouge Section L.E.S.

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PROCEEDINGS OF THE LOUISIANA ENGINEERING SOCIETY

VOL. XXXIII

AUGUST, 1947

NO. 4

CONTENTS

EDITORIAL NOTES AND COMMENTS:

Our Front Cover	113
The Governor's Highway Safety Conference	113
Annual Outing and Golf Tournament	113
The Licensing Law	115
New Members	115
Our Past Presidents	118

PAPERS AND DISCUSSIONS:

"The Water Hyacinth in Louisiana" by William E. Wunderlich	119
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ENGINEERING BRIEFS

125

MINUTES OF THE MEETINGS AND BUSINESS OF THE SOCIETY

126

AUDITOR'S REPORT FOR 1946

127

EDITORIAL NOTES AND COMMENTS

Our Front Cover. Pictured on this issue is the Dredge Caribbean of the McWilliams Dredging Co. The dredge was constructed in New Orleans by the Avondale Marine Ways. A 5,000 h.p. turbine handles the main suction pump. Quarters are provided for a crew of seventy-five men.

The Governor's Highway Safety Conference. During the Month of August a meeting will be held in Baton Rouge on highway safety. The purpose is to solicit the public's interest in reducing the death rate in traffic of 100 persons per day, with many more suffering loss of sight, limbs, or some other permanent disability.

Each of us can help by observing traffic laws. The vast majority of accidents, fatal and otherwise, involve some traffic violation. It is a privilege to drive a car, a social responsibility to see that the ton and a half of steel does not change from a vehicle for pleasure to an instrument of death. Be considerate, don't pass on curves, drive at a safe speed, help save a life, maybe your own!

Annual Outing and Golf Tournament. Under the guidance of Allen Betz as General Chairman, David Moodie as Golf Chairman, and Mallard Seago as Chairman of Prizes, our annual outing was a grand affair. One hundred and seventy-eight attended the dinner and floor show.

Ole K. Olsen provided vitamins (in a keg) for members playing horseshoes and golf, during the afternoon.

A list of prizes, their donors and winners is given. The Society appreciates the generosity of the firms and individuals who contribute so much to the success of our outing.

Prize	Donated By	Won By
PRESIDENT'S FLIGHT		
Silver vegetable dish	Clayton L. Nairne	R. A. Steinmayer
GUESTS—LOW NET		
1. Silver sandwich tray	R. P. Farnsworth Co.	B. C. Crowley
2. Ronson lighter	Mexico Refractories Co.	G. A. Winn
3. Electric clock	Paul F. Jahncke	D. W. Leas
4. Silver cigarette urn	Pittsburgh Testing Lab.	C. N. Finley
5. Silver sandwich tray	General Electric Co.	J. F. Holmes
MEMBERS—LOW NET		
1. Silver tray	W. Horace Williams Co.	C. M. Rogers
2. Silver vegetable dish	E. L. Fithian and R. P. Baccich	S. K. Manson
3. Silver salad bowl	American Creosote Works	R. P. Lockett, Jr.
4. Silver water pitcher	Asbestone Corporation	Allen W. Betz
4. Silver bread tray	Dixie Machine, Welding and Metal Works	W. L. Argus
6. Silver fruit bowl	A. M. Lockett Co. Ltd.	H. P. Newton
7. Silver vegetable dish	Gulf Engineering Co.	J. V. Dugan, Jr.
8. Silver steak set	Allis Chalmers Mfg. Co.	R. A. Steinmayer
9. Silver meat platter	Frank P. Fischer Eng. Co.	R. P. Lockett, Sr.
10. Silver gravy boat	Orleans Materials and Equipment Co.	G. W. Hill
11. Ronson table lighter	Boh Bros. Construction Co.	H. M. Blain
12. Parker 51 desk set	James M. Todd	James M. Todd
13. Auto. Electric iron	John H. Carter Co.	O. V. LeBlanc
14. Silver fruit bowl	Maritime Electric Co.	Irvin Hanson
15. Silver card tray	Herbert M. Shilstone	F. B. Blackstone
16. Silver vegetable dish	R. E. Gosa	C. M. Solberg
17. Silver nut dish	C. Glen Cappel	R. H. Earl
18. Silver celery dish	Geo. J. Glover Constr. Co.	Sydney Ellis, Jr.
19. Silver sandwich tray	J. K. Woolf	Jules Lorio
20. Ronson Lighter	Lone Star Cement Corp.	J. B. Henderson
MEMBERS—LOW GROSS		
1. Silver fruit bowl	Boland Machine and Mfg. Co. Inc.	R. J. Drueding
2. Cuban golf jacket	Wellingtex Corp.	Geo. W. Hill
3. Silver sandwich tray	Westinghouse Electric Co.	J. J. Saurage
4. Pair sun glasses	Freeport Sulphur Co.	J. M. Todd
HORSESHOES—SINGLES		
1. Silver sandwich tray	N. O. Public Service Inc.	F. M. Taylor
2. Silver candlesticks	Taylor-Seidenbach Co.	Paul LaGarde
3. Ronson lighter	Frerichs Lumber Co.	J. F. Vogt
4. \$5.00 merchandise order	Labiche's	H. A. Fischer
HORSESHOES—DOUBLES		
1. Silver vegetable dish	Allan J. Harris Co.	A. H. Jensen
1. Silver vegetable dish	Murray-Baker-Frederick Co.	J. F. Vogt
2. Parker pencil	John Riess	C. A. Burton
2. Parker pencil	A. B. Paterson	A. A. Schaeffer
ATTENDANCE—GUESTS		
1. Silver vegetable dish	Dixie Mill Supply Co.	E. J. Hoerner
2. Ronson lighter	N. O. Cement Products Co.	E. A. Schlesinger
3. Parker pencil	Harry W. Fletcher	S. M. Rosamond
4. Silver sandwich tray	Shell Oil Co.	W. J. Trammel
5. Silver card tray	United Gas Co.	A. M. Keppler
ATTENDANCE—MEMBERS		
1. 24" Reed unit fan	Reed Unit Fans	Charles M. Kerr
2. Portable radio	Equitable Equipment Co.	G. F. Shelly
3. Ronson table lighter	Eagle Asbestos and Packing Co.	A. H. Jensen
4. Parker 51 pen	La. Power and Light Co.	D. W. Stewart
5. Auto. electric iron	DoAll Southwest Co.	J. J. Bulliung

Prize	Donated By	Won By
6. Parker 51 pen	Joseph F. Dohan	Aaron Abramson
7. Silver fruit bowl	Flintkote Co.	A. W. Durning
8. Silver sandwich tray	Charles P. Knost	T. H. Zumwalt
9. Ronson lighter	Patrick H. Dillon	F. C. Fromherz
10. Bathroom scales	Crane Company	A. M. Fromherz
11. Electric clock	Southern States Equip. Co.	R. P. Baccich
12. Silver sandwich tray	Jones and Laughlin Steel Corp.	M. C. Abraham
13. Ronson lighter	Chase Brass and Copper Co.	O. V. LeBlanc
14. Electric clock	Anchor Packing Co.	A. L. Dunlap
15. Silver bon bon dish	Ole K. Olsen	R. J. Dreuding
16. Silver sugar and cream	Harry W. Fletcher	H. M. Blain
17. Silver bread tray	McLellan A-C Supply Co.	
18. Tool chest	Stauss and Hass	F. M. Taylor
19. Electric clock	Harbison-Wilker Refractories Co.	H. J. Lane, Jr.

The Licensing Law. A sub-committee of the Louisiana Council of Engineers has drafted a licensing law which will be submitted for approval to the various interested organizations. At a meeting of the board of L.E.S. (100% attendance) the proposed law was reviewed. The matter will be placed before our membership at a later date.

New Members. The following list of new members indicates that membership curve is still rising. Look these names over and become acquainted with your new fellow members.

For Member

- H. BEN BATCHELOR**, Ruston; age 46. Endorsed: R. T. Sessums, L. J. Lassalle, W. P. Wallace. La. Polytechnic Institute, B.S.Eng. 1922; Univ. of Oklahoma, M.S., Petroleum Eng. Construction and development engr., petroleum industry, 1932-40. John Brown University, Head Mech. Eng. Dept., 1940-46. La. Polytechnic Inst., Teacher of Mech. Eng., 1946-47. Member A.S.M.E.
- THOMAS J. BRYSON, JR.**, New Orleans; age 40. Endorsed: J. A. Holland, J. K. Mayer, J. P. Fernandez. Tulane University, M & E, 1930. La. Highway Commission, road construction, 5 yrs. Special Eng. Division on Third Locks Project, Panama Canal Zone, 2 yrs. R. P. Farnsworth & Co., Inc., Engineer, 4 yrs.
- DAVID H. BROWN**, Baton Rouge; age 30. Endorsed: F. S. Houghton, C. J. Phillips, W. P. Wallace. Cornell University, M.E. Standard Oil Co. of N. J., Engineer, 9 years.
- ERNEST COULOHERAS**, New Orleans; age 40. Endorsed: R. J. Dreuding J. P. Fernandez, Carroll L. Wood, Jr. Tulane University, B.E.C.E. 1930. Orleans Levee Board, Asst. Engr., 1930-33. C.W.A., Construction Engineer, 1933-34. Conservation Dept., Geological Survey Section, 1935-36. Orleans Levee Bd., Office Engr., 1936-41. U.S. Navy, Civil Eng. Corps., Lt. Comdr., 1941-46. Orleans Levee Bd., Asst. Chief Engr., 1946-47.
- EDWARD E. EVANS**, Baton Rouge; age 26. Endorsed: L. J. Lassalle, W. P. Wallace, W. A. Wintz, Jr. La. Polytechnic Inst., B.S.C.E., 1943. U.S. Army Alaskan Dept., Staff Engr. in charge Military Construction, Post Engr., 1943-46. La. State University, Instructor in Civil Eng., 1947-date. Member American Concrete Institute, Society of American Military Engineers.
- J. D. FLEMING, JR.**, Baton Rouge; age 41. Endorsed: A. H. Demers, J. R. Murphy, R. J. Robertson. I.C.S. course, Steam & Electrical Eng., Scranton, Pa. Began work in power plant, 1923. Baton Rouge Electric Co., Watch Engr. charge of operation, 1926-30. Gulf States Utilities Co., La. Station, Watch Engr. in responsible charge of operation, 1930-42; Station Engineer in charge of operation of La. Station Power Plant, 1942-present.
- WILLIAM HANSON FRENCH**, Port Sulphur; age 29. Endorsed: Z. W. Bartlett, R. H. Earl, E. J. McNamara. Rice Institute, 1 yr. Texas University, 2 yrs. Eby Engineering Co., Tyler, Tex., surveyor and draftsman, 2 yrs. Freeport Sulphur Co., Civil Engr. in charge of various construction work 5 yrs.; since 11-1-46, responsible for all field engineering in connection with sulphur mining and Port Sulphur townsite operation and expansion.
- CHARLES H. HUNDEMER**, Bogalusa; age 32. Endorsed: M. R. Guell, B. B. Pierce, L. J. Lassalle. Louisiana State University, B.S.M.E., 1937. Gaylord Container Corp., Mechanical Engineer, 1937 to date.

- ALLEN H. JENSEN**, New Orleans; age 31. Endorsed: C. L. Nairne, R. M. Seago, D. W. Stewart. Georgia Tech, B.S.M.E., 1937. Babcock & Wilcox, Apprentice, Engr., 1937-39. Peabody Coal Co., Combustion Engr., 1939-41. U.S. Navy, Ensign to Commander, Command Engineering & Salvage, 1941-46. New Orleans Public Service Inc., Mechanical Engineer, 1946-date. Member Tau Beta Pi, A.S.M.E. Registered Professional Mech. Engr., State of Illinois.
- WILLIAM J. JOHNSON, JR.**, Opelousas; age 38. Endorsed: P. P. Angier, R. T. Brooks, H. L. Lehmann. U.S. Engineer Dept., 2nd N.O. Dist., Concrete & Earthwork Inspector and Chief of Survey Party on land and flood control surveys, 1929-32; Resident Inspector and Res. Engr. on levee construction, drainage and navigation canals, reinforced concrete drainage structures, high level crossings over Morganza floodway, and airport construction, 1933-46. Lr. Dept. of Highways, 5th District, Lafayette, Project Engineer, 1947-date.
- HOUSTON LESTER**, Baton Rouge; age 43. Endorsed: C. E. Abrahamson, Louis Duclos, A. J. Mary, J. E. Quarles. 27 yrs in general engineering and construction field, planning, inspection, supervision construction and field eng., preparing eng. reports and contracts. Began work at early age in design dept. of shop and foundry, thence to field layout, erection and installation supervision of structural units and mech. equipment, on design and construction of bridge structures, water and sewer systems, storm drainage and street paving, water pumping stations and reservoirs, chemical plants, steam power plants, refinery units, gas and oil transmission and distribution systems. A number of years successful employment with national firms doing major engineering and construction work. Registered and licensed by Mississippi State Bd. of Eng. Examiners.
- ROBERT PAINE LOCKETT, JR.**, New Orleans; age 31. Endorsed: F. B. Blackstone, G. R. Hammett, D. W. Stewart. Tulane University, B.E., M & E, 1937. Babcock & Wilcox Co., Student Engr., Sales Engr., 1937-40. Babcock & Wilcox Representative with Stearns-Roger Mfg. Co., Denver, Colo., 1940-43. U.S. Navy Chief Engineer DD 657 and APA-18, 1943-46. A. M. Lockett & Co., Sales Engineer, 1946-date.
- WILLIAM D. MAITLAND**, New Orleans; age 60. Endorsed: A. E. Champeau, G. H. Menefee, G. H. Tunner. High school education completed in 1902. Subsequently until 1919, engaged in manufacture, operation and maintenance of boilers, engines and other mechanical equipment. Since 1919 employed by Travelers Ins. Companies of Hartford, as a boiler and machinery inspector and safety engineer, at present Resident Engineer in charge of such operations in La. and Miss. Member Nat'l. Society Safety Engineers, Delta Society Safety Engineers. Hold certificate of competency as boiler inspector with Nat'l. Board of Boiler and Pressure Vessel Inspectors, states of Ohio, Louisiana, Indiana, and City of New Orleans.
- E. D. MATTIX**, Lake Charles; age 36. Endorsed: R. E. Burgess, S. D. Nolan, F. T. Clarke, E. H. Ruhnaw. Ohio State University, Chem. Eng. Degree. Cities Service Refining Corp., Instrument Eng., 3 yrs. M. W. Kellogg Co., N. Y., Refinery Eng. and Operation, 3 yrs. Alco Products, N. Y., Refinery Eng. and Operation, 2½ yrs. Phillips-Spartan Refinery, Sabine Valley Gasoline Plant, 3 yrs. Pure Oil Co., Operation and Steam Eng., 3 yrs.
- CHARLES J. MAYEUX, JR.**, Bogalusa; age 32. Endorsed: M. R. Guell, B. B. Pierce, L. J. Lassalle. La. State University, B.S.C.E. 1937. Gaylord Container Corp., Engineer, 1937-date. Registered La. State Board Eng. Examiners since 1940.
- GEORGE B. McGUIRE**, Baton Rouge; age 35. Endorsed: A. F. Fritchie, F. A. Hannaman, Jr., T. E. Peak. Rutgers University, B.S.C.E. 1935. United Shipbuilders Co., S.I., N. Y., 1935-37. Standard Oil Development Co., 1937-date; 5 yrs. mechanical and process design, 5 yrs. field eng.
- JAMES M. McQUEEN, JR.**, Baton Rouge; age 39. Endorsed: F. A. Hannaman, Jr., H. L. Lehmann, T. E. Peak. George Washington University, B.S. Eng., 1932; C.E., 1946. Surveying and other sub-professional work, 1924-28. South Bay Consolidated Water Co., Supt. of construction, 1928-29. Hunkin Conkey Construction Co., Civil Engr., 1930. Various Government Agencies in engineering capacities, 1931-36. U.S. Resettlement Admin., Res. Engr. Inspector, 1936-37. Standard Oil Co. of La., Engineer, 1937-40. U.S. Marine Corps Reserve, Major, Engineer Specialist, 1940-45 Standard Oil Co. of N. J., La. Div., Regional Engineer, 1946-date.
- CHARLES S. PUGSLEY, JR.**, Baton Rouge; age 32. Endorsed: J. T. O'Brien, T. E. Peak, R.W. Williams. University of Texas, B.S.M.E., 1937. Standard Oil Co. of N. J., 1937 to date; present position, Asst Head Equipment Inspection Dept. Member A.S.M.E.
- JAMES T. RANGELEY**, New Orleans; age 37. Endorsed: Tom C. David, Chas. A. Myers, H. J. Patterson. U.S. Engineer Dist., N. O., Surveyman, 1931-36. La. Highway Commission, Bridge Dept., Instrumentman, 1936-39. Benham Eng. Co., Camp Polk, Field Engr., 1940-41. T.V.A., Douglas & Cherokee Dams, Associate Engr., 1941-43. U.S. Navy Seabees, 1944-45. Ebasco Services, Inc.,

Office Engr., construction of N.O.P.S.I. Industrial Canal Steam Electric Station, 1946-date

CHARLES ESPY REED, New Orleans; age 31. Endorsed: Sydney Ellis, Jr., L. J. Lassalle, James M. Todd. Louisiana State University, B.S.E.E., 1939. Lyman C. Reed, Inc., Sales Engineer, 1940-date. Vice-President, Reed Unit Fans, Inc. U.S. Navy, 1943-46, "Sonar" Field Engineer for Electronic Field Service group.

J. ROBERT ROMBACH, JR., New Orleans; age 30. Endorsed: B. H. Bell, K. P. Kammer, C. L. Nairne. Tulane University, B.S.E.E., 1938. New Orleans Public Service Inc., Student Engr., Asst Engr., Rate Engr., 1938-41. U.S. Navy, Radar Installation & Maintenance, Ensign to Lt. Cmdr., 1941-46. N. O. Public Service Inc., Electrical Engineer, 1946-date.

WESLEY H. SOWERS, New Orleans; age 41. Endorsed: J. V. Dugan, Jr., B. P. Babin, J. H. Collins, Sr. Purdue University, B.S.; M.S., major Chemistry, minor Chem. Eng., 1926-27; DePaul University, J.D. degree, 1942. Shell Oil Co., Chemist, 1927-29. National Lead Co., Sales Eng., 1930-32. Pure Oil Co., Marcus Hook Refinery, Chief Terminologist, 1933-38; Refinery Operating Div., 1939-42. Bay Chemical Co., Secretary, 1943-47. Myles Salt Co., Asst. to President, 1947.

FRANK H. WALK, Baton Rouge; age 27. Endorsed: F. J. Germano, L. J. Lassalle, W. P. Wallace Louisiana State University, B.S.M.E., 1942. U.S. Army Corp of Engineers, commissioned officer, 1942-46. Dunham-Wilson Mfg. Co., Mechanical Engineer, 1946-date.

EDWIN RANDOLPH WILKINSON, Baton Rouge; age 35. Endorsed: H. L. Lehman, J. T. O'Brien, T. E. Peak. Louisiana State University, B.S.E.E., 1932, M.S.E.E., 1934. Employed by Standard Oil Co. of N.J., La. Div., Baton Rouge Refinery, since 1934, as Asst. Head, Head of Inspection Dept., Head Ins. Dept., Head Mech. Eng. Dept. Member Tau Beta Phi, Phi Kappa Phi, American Petroleum Institute.

EDWIN R. WOODMAN Shreveport; age 40. Technically trained at Ft. Belvoir Engineer School. With La. Dept. of Highways since 1924, presently as Senior Project Engineer in responsible charge.

For Affiliate Member

M. H. CARAWAY, New Orleans; age 47. Endorsed: H. F. Favret, William Hardy, John Riess. Crisp Construction Co., Aaron, O., estimating and tabulating, 1920-23. Fuller & Co., Los Angeles, estimating and Asst. Supt., 1923-25. Benson Co., Birmingham, Ala., Supt., 1925-28. General Building Contractor, Birmingham, 1928-42. Petton, Higson & Hancock, Mobile, Supt., 1942-43. W. F. Jackson Co. Quantity Survey Bureau, N. O., 1943-46. M. H. Caraway Co., Quantity Survey Bureau, 1946-date.

For Reinstatement to Membership

FRED R. ADAMS, Baton Rouge; age 48. Endorsed: G. T. DeLaMatyr, M. H. Ellis-salde, A. J. Mary. Mississippi A & M College, BSEE, 1922. Southern Bell Tel. & Tel. Co., Field man, Engineer, Dist. Engineer, 1922-42. U.S. Army Signal Corps, C.O. of Signal Depot in E.T.O., 1942-45. Southern Bell Tel. & Tel. Co., District Engineer, 1945-date.

FRED H. FENN, Baton Rouge; age 41. Endorsed: L. J. Lassalle, L. M. Odom, C. A. Myers. Louisiana State University, C.E., 1928, E.E., 1930, Master's Degree, C.E., 1932. Instructor, College of Engineering, L.S.U., 1932 to date, except for period of service with the U.S. Armed Forces.

DeWITT L. MORRIS, Port Sulphur; age 31. Endorsed: F. B. Blackstone, E. H. Flewellen, E. J. McNamara. Tulane University, B.E. in M.E., 1937. Freeport Sulphur Co., 7 yrs: Mech. end, drafting and design, 3 yrs.; Eng. supervision, 2 yrs.; Shop supervisor, 1 yr. U.S. Navy Ship Repair Training Officer responsible for training all types of craftsmen.

For Transfer from Junior to Full Member

W. HORACE WILLIAMS, JR. New Orleans; age 31. Has been a Junior Member since 1943. Tulane University, Civil Engineering, three years. With W. Horace Williams Company since 1938. Performed miscellaneous survey work, layout, prepared estimates and supervised construction. At present is a member of the firm, holds the position of engineer and is responsible for the planning and execution of various projects under the construction of W. Horace Williams Co.

For Junior Member

JULIUS B. ARBOUR, Baton Rouge; age 25. Endorsed: F. S. Houghton, C. J. Phillips, W. P. Wallace. La. State University, B.S.M.E., 1943. Engineering Officer, Naval Air Corps, 2½ yrs. Standard Oil Co. of N. J., La. Div., Mechanical Engineer 1946-date.

- MARCUS G. COMUNTZIS, New Orleans; age 25. Endorsed: A. L. Dunlap, J. K. Mayer, O. W. Stephenson, Jr. West Virginia University, B.S.M.E., 1942. U.S. Army Corps of Engineers 1942-46. Tulane University, Mechanical Engineering Instructor, 1946-present
- WILLIFORD P. EVANS, Baton Rouge; (JUNIOR MEMBERSHIP AWARD WINNER; engineering graduate with highest scholastic average at Louisiana State University. B.S. in C.E., 1947).
- E. REID POWELL, New Orleans; age 27. Endorsed: J. C. Bachr, J. S. Gentillich, R. M. Shaw. La. State University, graduate in Petroleum Engineering. U.S. Army Corps of Engineers, Aviation Eng. Battalion, construction, maintenance and repair of airfields for fighter and bomber planes, 5 yrs. U.S. Engineer Dist., Hydraulic Section, conducting and supervising hydraulic and hydrological investigations, 1 yr.
- HAROLD ALVIN ROSEN, New Orleans; (JUNIOR MEMBERSHIP AWARD WINNER; engineering graduate with highest scholastic average at Tulane University. B.S.E.E., 1947).
- ALBERT L. SOULE III, New Orleans; age 25. Endorsed: B. H. Bell, K. P. Kammer, D. Stewart. Tulane University, B.E. in E.E., 1943. New Orleans Public Service Inc. Nov. 1945 to-date.
- ROBERT JOHN SWAYNE, JR., Port Sulphur; age 23. Endorsed: A. M. Hill, J. K. Mayer, J. P. Fernandez. Tulane University, B.E. in M.E., 1945. U.S. Navy Officer, deck and engineering status by commission in line of command, construction and repair, 1944-46. Freeport Sulphur Co., Mechanical Engineer, design and maintenance work, 1946-date.

For Transfer from Student to Junior Member

- ROBERT D. ALLEN, graduate Tulane University, Mechanical Engineering Degree.
- MARSHALL M. CLOUD, graduate Tulane University, Mechanical Engineering Degree.
- WILLIAM M. FORTENBERRY, graduate Louisiana State University, Mech. Eng. Degree.
- JAMES L. FRIER, JR., graduate Louisiana State University, Mech. Eng. Degree.
- IRWIN ISAACSON JR., graduate Tulane University, Mechanical Engineering Degree.
- E. O. Lakin, graduate Louisiana State University, Mechanical Engineering Degree.
- RAYMOND J. MEYER, graduate Louisiana State University, Mechanical Eng. Degree.
- THOMAS F. RUFFIN, graduate Louisiana State University, Mechanical Eng. Degree.
- JACOB B. SWANSON, JR., graduate Louisiana State University, Mech. Eng. Degree.
- CHRISTIAN M. VOELKEL, JR., graduate Tulane University, Mech. Eng. Degree.

For Student Member

- FARRELL W. ADAMS, Senior Mechanical Engineering Student, Louisiana State University.
- AL BALTAZAR, Senior Mechanical Engineering Student, Louisiana State Univ.
- DONALD D. FULLMER, Senior Mechanical Engineering Student, Louisiana State University.
- GEORGE T. HOBGOOD, Senior Mechanical Engineering Student, Louisiana State University.
- ROBERT B. LAUTNER, Senior Mechanical Engineering Student, Louisiana State University.
- SALVADOR MAFFEI, Senior Mechanical Engineering Student, Louisiana State University.
- WESLEY B. ROOT, JR., Senior Mechanical Engineering Student, La. State University.
- JOSEPH MERRILL SCHEYD, Senior Mechanical Engineering Student, La. State University.
- FREDERICK W. WEISSBORN, JR., Junior Mechanical Engineering Student, Tulane University.

Our Past Presidents. Some of the past presidents noted at some of our recent meetings are: Henry J. Malochee, Ole K. Olsen, James M. Robert, Frederick H. Fox, F. N. Billingsly, A. L. Dunlap, Allen S. Hackett, William H. Rhodes, David W. Stewart, C. Glenn Cappel, Karl P. Kammer, Charles M. Kerr, Reinhard A. Steinmayer, Leo J. Lassalle.

PAPERS AND DISCUSSIONS

THE WATER HYACINTH IN LOUISIANA *

The Water Hyacinth (*Piaropus Crassipes* or *Eichornia Crassipes*) is a free-floating bulbous plant with dark green leaves setting a background for a beautiful lavender spike of flowers. It is reportedly a native of Asia Minor and Persia that found its way into western Europe in the sixteenth century. It was first introduced into the United States as a horticultural exhibit from Venezuela at the Cotton Exposition held in New Orleans in 1884 and has since spread across the southern United States from the Atlantic to the Pacific. It grows easily and profusely in that part of the country roughly bounded by the Gulf of Mexico and a line drawn through Savannah, Ga. on the east and Los Angeles, Calif. on the west. There are many known instances where the plant has been found in small quantities north of this imaginary line.

So prolific was the growth of these plants that there was no hesitancy in giving samples to the many visitors who requested them at the Cotton Exposition. Many of these plants were placed in private fish ponds and streams running through estates for the purpose of lending beauty to the local streams and it was not long before they found their way into the main streams and Louisiana had a real Hyacinth problem. According to the stories of old-timers, the Hyacinth found its way into Florida shortly after its introduction into Louisiana (probably a souvenir from the Exposition) and was first noted in a pond at Palatka, Fla. Shortly after, say some of the older residents, and plant was placed in the St. Johns River at Jacksonville and shortly thereafter Florida had its own Hyacinth problem. Since then it has been carried far and wide by tourists who admire the delicate color of its flowers, or are intrigued by its free floating characteristics. It is also a good seller at flower shops and seed shops throughout the United States where the seedling plants bring good prices. Efforts to stop the spread of the beautiful pest have failed thus far and the Hyacinth continues to find its way to new growing places each year.

The Hyacinth grows both from shoots which extend from the crown of the mother plant to form new plans where they touch the water and from seed contained in a seed-pod at the base of each blossom. It has been estimated that a single average plant can produce 10,000 seed in the course of a season and early tests seed may lie dormant for a period of five years and this alone poses quite a problem in any plan for complete eradication. Allowed

* Address delivered by Mr. William E. Wunderlich, Head, Marine Growth Control Section, U. S. Engineer Dept. at New Orleans, before a meeting of the Louisiana Engineering Society held March 10, 1947.

to grow undisturbed, the Hyacinth will double in area each month indicated that approximately 5% of this number could be expected to grow into new plants. It is generally conceded that the during the growing season. The greatest growth is noted between May and September, while the rate of growth is slowed during the cold months. Contrary to popular opinion, only a very small percentage of Hyacinths are killed during the cold of the winter months in the deep South. Originally not found very far north of Baton Rouge, La., the Hyacinth has apparently become accustomed to the cold weather and is now found growing in great profusion in streams in the north portion of the State near Bastrop and it has recently been reported as growing in southern Arkansas. The plant is slowly creeping northward, and, if not controlled in its present area of infestation, may also become a serious menace in other portions of the United States. Hyacinths have been reported as growing in Panama, the Phillipines, some islands in the Pacific, and more recently, in streams of Australia.

Naturally a fresh water plant, the Hyacinth is affected quickly when placed in salt water. However, it would seem that the plant is developing a certain amount of resistance to the salt and grows quite well in the brackish waters of Lake Pontchartrain, bayous near the mouth of the Mississippi River, and in those streams south of the Intracoastal Waterway in the vicinity of the Wax Lake Outlet. Tests made in the early 30's indicate that it required about 15% sea water to affect the Water Hyacinth. Where the streams are alternately fresh and salt, as in the case of many waterways in Louisiana, there appears to be little or no effect on the size or rate of growth of the Hyacinth.

By 1897 the situation in Louisiana had become so bad that Congress was called upon for assistance and shortly thereafter the United States Engineers were assigned the work of removing the water Hyacinth from the navigable waterways of the State insofar as it hindered navigation. The scope of operations was later increased to include the waterways of all the states bordering on the Gulf of Mexico and the continuing fight to control the growth and spread of the vegetation has been under way ever since.

A crusher plant was built and operated in Louisiana from 1900 to 1902 when chemical treatment was introduced and became the accepted method of attack for the next 35 years. An arsenic compound was used during this time, but because of the very definite limitations placed upon it by the local weather and climatic conditions, it was never a satisfactory means of controlling the vegetation. The method was abandoned in 1937 for many reasons, but chiefly because it could only be used during a portion of the year, was dangerous to the people who handled it, killed cattle and

crops, and fell short of being what was desired for the adequate control of the plant. Its use as a killing agent had never been quite satisfactory and its continued use for so long a period was probably due to the fact that it was the best of many chemical preparations tried and was comparatively economical insofar as the results obtained were concerned.

The Engineer Department has continued to search for a satisfactory chemical to be used in conjunction with its machines to control the vegetation and expedite the work by permitting the spraying of the inshore fringes instead of handling these hard-to-reach places by machinery. All during the year 1946 the United States Engineers have been conducting comprehensive studies and testing of newer chemicals released for public use since the close of hostilities abroad. Some progress has been made in this work and it is hoped that the results of the investigations will lead to the ultimate discovery of a chemical which will meet all the requirements of the work. When such a chemical is finally discovered, the United States Engineers are prepared to utilize it to the fullest to round out their already effective means of mechanical destruction.

The belief that fire will kill everything has lead to numerous experiments since 1897 in its use for destroying the vegetation, but the results have always been the same. The burned over vegetation is the first to sprout in the following season and is usually from 6 to 12 inches taller than the surrounding unburned plans at the end of the year. If you want a bigger and better crop next year, burn the tops off.

The United States Engineers have cooperated with many interested parties in an endeavor to find some commercial use for the water Hyacinth. However, the fact that the plant is approximately 95% water makes it economically impracticable to process the plant, especially when the end products can be obtained more cheaply from other readily available sources. The search for a profitable commercial use of the vegetation will continue in the hope that one may be finally found and a portion of the crop, at least, can be turned into an asset for the State instead of a liability, as at present.

The destruction by mechanical means was undertaken in 1937 and has advanced rapidly since then, until today it is a highly developed, very efficient and effective means of destroying the aquatic vegetation found in the waterways of Louisiana. The methods used have been tested and constantly improved through several years of service, and the number of miles of waterways cleaned each year depends only on the amount of money made available for the work. During the war years, enforced economies

resulted in a sharp curtailment of hyacinth removal operations and even the 1947 fiscal year allotment for the work was such as to require operating on a greatly reduced scale with the limited amount of work confined to those main waterways having the greatest usage. As a result of these reduced operations during the past few years, the area infested has increased and will remain so until operations can be resumed on an adequate basis.

Experience has demonstrated that no one type of machine is entirely satisfactory for operation under all of the conditions encountered in the State and the United States Engineers charged with the problem have developed several unique pieces of equipment for the mechanical destruction of the water hyacinth. First and largest of these is the mechanical destruction plant KENNY which destroys the vegetation by crushing it. This large, self-propelled, Diesel-electric plant (the only one of its kind in the world) consists of a conveyor mounted over the bow of a steel hull and with its lower end submerged to lift a mat of vegetation as it advances into a hyacinth choked stream. The vegetation thus picked up is deposited in a hopper from which it is fed between two rollers operating under 40,000 pounds pressure. The refuse is dropped onto a cross conveyor under the rollers and is carried over the side of the hull and back into the water in the form of a sludge. The crushed vegetation sinks rapidly to the bottom of the stream, where decomposition and final distintegration takes place. Operating at full capacity, the KENNY is capable of destroying 1,000,000 square yards of vegetation in a single month. The KENNY is used for heavy duty service in breaking dense hyacinth jams and for operation in large bodies of water where conditions do not permit deposit of the vegetation ashore.

Where stream conditions permit, the vegetation is removed by mechanical elevating conveyors which lift the growth from the water and deposit ashore to die from lack of moisture. The machines are smaller and lighter than the KENNY so that they can be used in some of the shallow waterways of the State. A front-pickup conveyor 15 feet wide is mounted on the bow of a steel hull and provides a means of lifting the vegetation from the water. The discharge from this conveyor drops onto a second conveyor mounted across the deck, with one end extending about 15 feet over the side of the hull, and is carried ashore to be piled in windrows as the machine moves along. The machines are effective when operating in narrow streams having relatively few bank obstructions.

A second version of the side discharge conveyor is used where there are numerous trees and other obstructions along the banks which would hamper the operation of the standard machine. In

this machine, the vegetation is deposited on a high-speed cross conveyor and is catapulted approximately 20 feet inshore. This machine is most effective when operated in Hyacinths but will probably be replaced by more efficient machinery for handling all types of vegetation or converted to a newer type of destruction device now under development. As in the case of the original small fixed conveyor, it is expected that the present larger mobile models of the conveyors will become outmoded and will be replaced with newer types of machines when conditions permit the construction of these machines.

Developed by civilian engineers of the Marine Growth Control Section of the New Orleans Engineer District, headed by Mr. William E. Wunderlich, Engineer, at night after regular working hours and on days off, the latest mechanical device to be put into service by the United States Engineers in the waterways of Louisiana promises to be the most sensational to be employed to date. This machine has been especially adapted to meet the needs of clearing the waterways of the Hyacinth and Alligator Weed quickly and economically. It consists mainly of a series of cutter blades revolving in a vertical plane and arranged on a specially designed hull to permit them to be set at any desired depth in the water. Revolving at several hundred revolutions per minute, the cutters tear, shred and bruise the floating vegetation without the necessity of first lifting it, moving it, or disturbing it in any way from its natural growing conditions. The machine resembles somewhat a large sea-going lawn mower nearly 20 feet wide, except that the destructive effect on the vegetation is terrific and far exceeds that which would normally result from the use of a conventional lawnmower. The upper sections of the vegetation are torn from the body of the plant and cut into small pieces. The heavier portions of the growth and the roots are cut, torn and bruised by the action of the cutters and rapidly sink to the bottom of the waterway in a damaged condition where decay soon completes their destruction. The lighter upper sections of the vegetation may remain afloat for a short time, but they also sink to the bottom in a short time to decay and disintegrate. Even in the floating condition immediately after passing through the cutters, the vegetation is so effectively cut and separated that it forms no barrier to the immediate use of the waterway by even small low-powered boats. A combination of cutter shapes and spacing, permits the selection of that type best suited to the needs at hand. The machine may be set for quickly opening a passage through a growth of vegetation where it is desired to effect the clearing of the waterway by permitting the vegetation to drift out with the flow of the stream, or it may be adjusted to a finer cut when it become necessary to destroy all of

the vegetation in place in a stream where the drifting of treated vegetation is not desirable. The amount of re-sprouting from the cut over sections of the vegetation can be controlled at will by the setting of the cutters or the selection of the type to be used under the specific conditions encountered.

Built from standard parts and driven by stock model automotive engines, these Aquatic Vegetation Destroyers are handled by a crew of only two men and are capable of destroying approximately 10,000 sq. yds. of vegetation per hour under normal conditions. Their most desirable features are the simplicity of design and the speed with which they can cut a passage through a vegetation-choked stream leaving open water behind for the immediate passage of boats.

This latest machine is still in the development stages, but has already reached that point where months of the most severe tests under actual working conditions in the field have shown that it far exceeds what was originally expected of such a machine. The operating costs are approximately only one-tenth of those of the most efficient of the other types of mechanical destruction in use and are even less than the costs of destruction by chemicals as of this date.

To utilize this machine to the fullest, it is equipped with the necessary connections and spray nozzles mounted on the side cutter frames to permit the application of chemicals on the inshore fringes of vegetation growing in the shallow water or on the bank as the destroyer makes its last cut along the stream. The actual placing of this feature of operation into effect now awaits the development of a chemical suitable for the needs.

The United States Engineers have expended over \$2,000,000 to June 30, 1946 on the removal of this menace to navigable streams in the State of Louisiana. Congress appropriated \$189,000 for the fiscal year 1947 to carry on this work.

Colonel L. B. Gallagher, District Engineer, New Orleans U. S. Engineer Office, stated that present plans to destroy aquatic vegetation in the navigable streams of the State quickly and effectively and to control its growth and spread in the areas of infestation combine the use of the tested and effective mechanical means of destruction with the use of suitable chemicals applied by the latest and most effective means. This plan of operation insures the rapid opening of the waterways by the accepted mechanical means of destruction and control of the vegetation in the fringes along the banks and in the areas of infestation where it is difficult or not economical to use machinery as a sole means of control. The end results to be expected will be complete and adequate control of the aquatic vegetation within the limit of the funds made available by Congress for such work.

ENGINEERING BRIEFS

Aluminum Ships. Plans are being made to construct two ocean going vessels of aluminum. About eleven years ago, a test aluminum hull was constructed, and the effect of sea water, storms and marine growths have been carefully noted. Based on the results of this test, the Aluminum Company of America has plans for the two ships.

Parking and traffic. The Boston, Mass., planning and zoning board has prepared an ordinance requiring owners of all new construction to provide facilities for automobile parking for occupants of their buildings as a step toward alleviation of traffic congestion.

Immediate start of construction of traffic circles and improvements in traffic routing for the purpose of eliminating bottlenecks and pedestrian hazards in the city has been ordered. Work will be begun at once on changes in congested spots in Boston's Fenway district at a cost of \$300,000. Studies for relief of the city's worst traffic snarls in 10 other locations have been ordered.

Indianapolis, Ind., traffic experts have reported progress in plans to create one-way traffic streets through congested sections. Tentative plans include establishment of two 1-way belt systems. These are planned to operate on a 24-hour basis. The system is expected to relieve traffic congestion during rush hours and help to alleviate the parking problem.

Ultimately one-way traffic will be established on several major arteries during rush hours, doubling present street capacities. The plan is expected to be placed in operation by October 15, under the direction and planning of Maxwell Halsey, Michigan traffic expert.

At Danville, Ill., 150 parking meters are being installed on a 6-month trial basis. Many other cities have found them profitable and have continued them year after year.—from Engineering-News Record.

Model town to be sold. The model town of Norris, Tenn., named for the late U. S. Senator George W. Norris, will be sold at public auction in a year or so, the Tennessee Valley Authority said last week.

The town was built by TVA in 1933-35 to house workers on the Norris Dam.

Norris has 336 family dwellings, a dormitory, an administration building, school, postoffice, fire department and other facilities.—from Engineering-News Record.

MINUTES OF MEETING AND BUSINESS OF THE SOCIETY

Minutes of Meeting of the Louisiana Engineering Society, May 12, 1947

The meeting was called to order by President Nairne, with approximately 85 members and guests present. Reading of the minutes of the preceding meeting was dispensed with.

President Nairne reviewed the activities of the Committee on Professional, Civic and Industrial Affairs, and announced that a meeting of the Louisiana Council of Engineers had been held on April 26, the minutes of which would be published in the next issue of the Proceedings. Mr. C. P. Knost inquired whether the Petroleum Engineers would be invited to participate in the Council, and he was assured that they would be.

Announcement was made of the Annual Outing and Golf Tournament, to be held on July 17 at the Colonial Country Club.

Mr. John V. Dugan, Jr., Chairman of the Membership Committee, gave a brief outline of his committee's activities and asked for the names of prospective members.

Dr. Leo Jos. Lassalle, read an obituary of the late Harry W. Waterfall, which was followed by a moment of silence in memory of the deceased member.

Mr. Cucullu read a resolution (copy of which is attached to these minutes), concerning representation of the Engineering Profession on the Board of Louisiana State University, and moved that the resolution be adopted. The motion was seconded by Mr. Dunlap.

Mr. Cappel suggested that the word "professional" be inserted before the word "engineer" in the resolution, to which there was no objection. Mr. Klorer inquired whether the Louisiana Engineering Society would furnish a list of engineers from which names could be chosen, and the Chair assured him that the Society would be happy to cooperate with the Governor in supplying such a list, but that it was not considered appropriate that this fact should appear in the resolution.

Mr. James M. Robert moved that the resolution be adopted with the correction suggested by Mr. Cappel. The motion was seconded by Mr. Mire and carried.

Dr. Lassalle then introduced the first speaker of the evening, Mr. David R. Kent, a Senior Mechanical Engineering Student of Louisiana State University, who spoke on "Jet Propulsion". Following Mr. Kent's lecture, Dean James M. Robert introduced the Tulane University speaker, Mr. C. A. Peyronin, Jr., a Senior Mechanical Engineering Student, whose address was entitled "The V-2 Rocket". Both subjects were very well presented and a lively discussion followed.

The President then thanked the two speakers for their excellent papers and the meeting adjourned with a rising vote of appreciation from the audience.

JOHN P. FERNANDEZ,
Secretary-Treasurer

RESOLUTION

WHEREAS: The profession of Engineering has clearly demonstrated its importance to the nation in time of war and is destined to exert a growing sphere of influence in the peacetime economy of the nation and of our own sovereign State of Louisiana; and

WHEREAS: Louisiana State University and Agricultural and Mechanical College is by title dedicated to education in the mechanical arts; and

WHEREAS: The College of Engineering at Louisiana State University does and always has comprised a large percentage of the entire student body of that great institution; and

WHEREAS: The profession of Engineering is not presently represented on the Board of Supervisors of Louisiana State University, nor has it been represented for the past 15 years; now, therefore

WE, the 800 members of the Louisiana Engineering Society, representing the profession of Engineering in our State, do hereby petition the Honorable Governor of this State to fill the next vacancy or vacancies which occur on the Board of Supervisors of Louisiana State University by appointment from among the many qualified professional engineers in Louisiana.

Respectfully submitted to His Excellency, the Honorable James H. Davis, Governor of the State of Louisiana, this 2th day of May, 1947.

**Minutes of Meeting of the Board of Direction Held at Arnaud's Restaurant,
May 12, 1947**

The meeting was called to order by President Nairne, with Messrs. Cucullu, Lassalle, Leake, Lehmann, Mire, Newton and Fernandez present. Minutes of the preceding meeting were accepted as read.

President Nairne reported upon the activities of the Louisiana Council of Engineers, and a lively discussion followed.

The Treasurer announced that the Annual Meeting held in January 1947, with an attendance of 505, had incurred a deficit of \$527.59.

The resignations of Messrs. John C. Baine, Jr., J. T. Bullen and R. M. Craig were accepted with regret. The Secretary was instructed to advise Mr. Bullen that his name would be carried on the Society's mailing list.

The following were dropped for non-payment of dues:

John C. Bendler, Francis C. Boyle, Fernando Estopinal, Jr., Marvin I. Hebert, Ernest J. James, Leo Sims Lenoir, Russell G. Patterson, Wilday Tudury, Jules A. Villemont.

It was announced that the Annual Outing and Golf Tournament would be held on Thursday, July 17 at the Colonial Country Club.

A communication from Mr. Austin J. Mary, Secretary-Treasurer of the Baton Rouge Section, regarding the date of the joint meeting with that group was read, and it was decided that June 7 would be recommended for the meeting.

There being no further business, the meeting adjourned.

JOHN P. FERNANDEZ,
Secretary-Treasurer

AUDITOR'S REPORT

June 16, 1947

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, 1946 and submit the following.

Balance Sheet, December 31, 1946 and 1946 And Comparison
(Cash receipts and disbursements basis) (Exhibit A)

Statement of Income And Surplus For The Years Ended
December 31, 1946 and 1945 And Comparison (Cash
receipts and disbursements basis) (Exhibit B)

The cash on deposit at December 31, 1946 in the regular checking account was confirmed by certification obtained from the depository.

The U. S. Savings bonds and certificates evidencing shares of stock in the various homesteads were inspected by me on May 15, 1947 in the Society's bank box and the amounts to the credit of the Society in the various homesteads were further verified by certifications obtained from those institutions.

During 1946 liquidating dividends from banks and homesteads in liquidation were received as follows:

Standard Homestead Association in Liquidation	\$ 22.50
Interstate Trust and Banking Co. in Liquidation	287.66
Total	<u>\$310.16</u>

With the receipt of \$22.50 from Standard Homestead Association in Liquidation, which was the final liquidating dividend, the Society sustained a loss of \$172.50, or 34½% of the original frozen balance. Of this loss, \$171.50 was charged against the reserve set up and the remainder was charged to surplus.

In my opinion, the accompanying balance sheet and statement of income and surplus fairly present, respectively, your financial condition at December 31, 1946 and 1945, and the results of your operations for the years ended those dates.

Yours truly,

CARLOS J. GRIMADER

FINANCIAL REPORT LOUISIANA ENGINEERING SOCIETY

EXHIBIT A

Balance Sheet, December 31, 1946 and 1945 and Comparison (Cash Receipts and Disbursements Basis)

	—December 31—		INCREASE
	1946	1945	(DECREASE)
ASSETS			
CASH IN BANK			
Checking account	\$ 3,416.08	\$2,870.90	\$ 545.18
Total cash in bank	\$ 3,416.08	\$2,870.90	\$ 545.18
UNITED STATES SAVINGS BONDS,			
SERIES F			
(maturity value—1946, \$4,000.00; 1945,			
\$3,000.00)—redemption value	\$ 3,028.00	\$2,254.00	\$ 774.00
INVESTMENTS—HOMESTEADS:			
Columbia Homestead Association	\$ 361.01	\$ 359.52	\$ 1.49
Commonwealth Homestead Association	305.50	305.36	.14
Greater New Orleans Homestead Association	1,522.32	1,484.98	37.34
Security Building and Loan Association	500.00	500.00	
Sixth District Building and Loan Association	500.00	500.00	
Union Savings and Loan Association	500.00	500.00	
Total investments—homesteads	\$ 3,688.83	\$3,649.86	\$ 38.97
PROPERTY—Furniture, Fixtures, Equipment			
and bokes—nominal value	\$ 1.00	\$ 1.00	
FUNDS ON DEPOSIT WITH BANKS AND			
IN LIQUIDATION:			
Interstate Trust and Banking Co. in			
Liquidation (less reserve for loss 1946,			
\$670.26; 1945, \$957.92)	\$ 1.00	\$ 1.00	
Standard Homestead Association in Liquidation (less reserve for loss—\$194.00)		1.00	(1.00)
Total frozen funds less reserve for loss	1.00	\$ 2.00	(\$ 1.00)
TOTAL ASSETS	\$10,134.91	\$8,777.76	\$1,357.15
LIABILITIES			
SURPLUS (Per Exhibit B)	\$10,134.91	\$8,777.76	\$1,357.15

EXHIBIT B.

Statement of Income and Surplus (On Cash Receipts and Disbursements Basis) for the Year Ended December 31, 1946 and 1945, and Comparison

	—Year Ended— —December 31—		INCREASE (DECREASE)
	1946	1945	
INCOME:			
Dues collected	\$ 4,416.13	\$3,720.62	\$ 695.51
Advertising revenue	732.84	589.52	143.32
Income from investments and savings account	126.22	116.98	9.24
Net profit—sale of certificates, buttons, etc. Sale of proceedings and miscellaneous in- come	6.45	6.30	.15
	4.00	11.20	(7.20)
Total income	\$ 5,285.64	\$4,444.62	\$ 841.02
EXPENSES:			
Salary—secretary-treasurer	\$ 900.00	\$ 900.00	
Cost of publishing proceedings	1,385.84	1,524.15	(138.31)
Cost of annual meeting (1946, \$1,469.00 less receipts of \$1,181.50; 1945, \$1,468.00 less \$128.00 paid in previous year and less receipts of \$990.00)	287.50	350.00	(62.50)
Expenses paid in advance—succeeding year's annual meeting	93.10		93.10
Cost of annual golf tournament (1946, \$923.61 less receipts of \$896.00; 1945, \$908.47 less receipts of \$809.00)	27.61	99.47	(71.86)
Refreshments at meetings (1946, \$410.22 less pro rata receipts from joint meetings held, \$115.93; 1945, \$347.45 less pro rata held, \$119.39)	294.29	228.06	66.23
Printing, stationery and postage	521.86	431.66	90.20
Payments to Baton Rouge Section	313.00	266.50	46.50
Presents to retiring officers	43.55	79.50	(35.95)
Library expense—porter	48.00	52.00	(4.00)
Social security tax	23.00	30.00	(7.00)
Auditing	60.00	100.00	(40.00)
General expenses	239.90	170.68	69.22
Total expenses	\$ 4,237.65	\$4,232.02	\$ 5.63
NET INCOME FROM OPERATIONS	\$ 1,047.99	\$ 212.60	\$ 835.39
SURPLUS CREDITS:			
Reduction of reserve for loss due to re- ceipt of liquidating dividends from banks and homesteads in liquidation	310.16	661.62	(351.46)
GROSS SURPLUS FOR THE YEAR	\$ 1,358.15	\$ 874.22	\$ 483.93
SURPLUS CHARGES:			
Excess of loss of frozen funds over re- serve set up—liquidation completed: Standard Homestead in Liquidation	1.00		1.00
Columbia Building and Loan Association in Liquidation		1.00	(1.00)
SURPLUS FOR THE YEAR	\$ 1,357.15	\$ 873.22	\$ 483.93
SURPLUS AT BEGINNING OF YEAR	8,777.76	7,904.54	873.22
SURPLUS AT THE END OF YEAR	\$10,134.91	\$8,777.76	\$1,357.15

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PROCEEDINGS

OF THE

LOUISIANA ENGINEERING SOCIETY

VOL. XXXIII

OCTOBER, 1947

NO. 5

CONTENTS

EDITORIAL NOTES AND COMMENT:

The Annual Meeting	131
Personals	131
Our Front Cover	132
New Members	132

PAPERS AND DISCUSSIONS:

"Co-ordinated Regional Power System Operation" by William T. Hess	136
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ENGINEERING BRIEFS	141
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MINUTES OF THE MEETINGS AND BUSINESS OF THE SOCIETY	143
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EDITORIAL NOTES AND COMMENTS

The Annual Meeting. January 8, 9, 10 are the dates set for the 1948 Annual Meeting of the Society. The General Chairman is Professor John K. Mayer, College of Engineering, Tulane University. Mr. Jeff H. Collins, of New Orleans Public Service is Vice-General Chairman. Both men are well qualified to plan this important event for the Society. Various sub-committees will be appointed to assist; this information will be published in the next issue, together with a program. One of the new features to be tried this year is a luncheon on Friday, January 9.

Personals. Two of our members have recently contributed to magazines. Arthur J. Naquin, Safety Counsellor of New Orleans Public Service writes "Train 'Em for Transit" in the July issue of "Public Safety". Stanley B. Nelson, Chief Engineer of A. M. Lockett Co. Ltd., has an article entitled "Gas and Diesel Engines for Rice Irrigation" in the July issue of "Diesel Progress."

Through the efforts of Mr. Jeff Collins, of the Publications Committee several new ads appear in this issue of the Proceedings. Mr. Collins, with his committee has indeed been active. The ads aid considerably toward defraying the cost of the Proceedings.

The financial report of the chairmen of the golf tournament held in July shows a deficit of less than three dollars. This deficit has sometimes run over one hundred dollars. Charging a higher rate for the meal, and some differential between members and

132 *Proceedings of the Louisiana Engineering Society*

non-members made this possible. Much credit is due chairmen Betz, Moodie and Seago for a splendid affair.

The firm of Paul and Beekman, 18th and Courtland Sts., Philadelphia are anxious to contact sales representatives in the New Orleans area who are interested in metal stampings, plating and polishing, radio chassis, etc.

Our Front Cover. The Permanente Metals Corporation plant at Baton Rouge, La. covers a 318-acre tract on the banks of the Mississippi River next to the Eastern approach of the bridge across that river. It is comprised of 34 buildings where alumina is produced to the extent of nearly a half billion pounds a year and ultimate goal is an output of a billion pounds. There are approximately 400 employees. All bauxite ore used at the plant comes from two sources in South America and is shipped to Baton Rouge by barge after unloading from steamer at New Orleans. The plant is now building a million dollar wharf at Baton Rouge which will permit steamship unloading direct from South America. The plant was started on St. Patrick's Day in 1943 and operated until July 22, 1944. It was then idle until Permanente leased it with option to buy from the WAA in fall of 1946 and in November, 1946 production was resumed.

New Members. Again we welcome a number of new members into the Society. We look forward to their participation in the meetings and affairs of the Society.

For Member

V. HUBERT BROGDON, JR., Port Sulphur; age 33. Endorsed: F. B. Blackstone, C. M. Cockrell, W. S. Neslon. Rice Institute, B. S. M. E., 1934. Freeport Sulphur Co., 1934-date, presently as Technical Asst. to General Supt., Grande Ecaille.

CHARLES M. BULL, New Orleans; age 48. Endorsed: V. J. Bedell, G. L. Breece, G. F. Williamson. Attended Ga. School of Technology, 1920. Studied structural engineering thru Univ. of Wisconsin Extension Division. Prior to 1921, surveys. 1921-29, construction. 1929-46, Chief Engineer, steel fabrication. 1946-date, shipbuilding. Present position, Asst. General Mgr., Avondale Marine Ways, Inc., Westwego, La. Registered Engr., Tennessee. Member A.S.C.E.

WILLIAM M. DAVIS, Maplewood; age 41. Endorsed: R. E. Burgess, E. D. Mattix, S. D. Nolan. Cumberland College of Ky., Univ. of Ky., 3 yrs. civil eng. Ky. Dept. of H'ways, H'way Engr., 1938-42. Hart, Freeland & Roberts, Richmond, Ky., Asst. to Div. Engr. charge roads, r.r. and bridge design, construction Army Ordnance Depot, 1942. M. W. Kellogg Co., Butadiene Plant, Lake Charles, charge office work and vessel and structural steel erection, 1943-44; Toluene Plant, 1945. Cities Service Rfg. Co., Sr. Gen. Engr. responsible charge Gen. Eng. Dept. Butadiene Plant, 1945-date.

JERRY L. DICKSON, New Orleans; age 31. Endorsed: V. J. Bedell, C. A. Burton, R. L. Nall. Louisiana State University, B. S. Ch. E., 1939. The Flintkote Co., 1939-date, now as Liquid Products Mill Supt. Member Tau Beta Pi.

THOMAS F. DONLON, Baton Rouge; age 37. Endorsed: E. A. Landry, H. L. Lehmann, J. J. Saurage. Missouri School of Mines & Metallurgy, B. S. C. E., 1931. Louisiana State University, graduate study in C. E. (night classes), 1937-40. Brady Concrete Corp., N. Y., Field Engineer, 1931-32. Central Islip State Hospital, N. Y., 1932-33. U. S. Coast & Geodetic Survey, Recorder and Draftsman, 1933-35. La. Dept. of Highways, Sr. Draftsman, Road Design, 1935-41. U. S. N. R., Civil Engr. Corps., Active Duty, Lt. Cmdr., 1941-45. La. Metal Culvert Co., Baton Rouge, Partner, 1945-date. Licensed C. E., State of La. Associate Member, A. S. C. E. Member S. A. M. E.

GEORGE H. DUDLEY, New Orleans; age 50. Endorsed: F. C. Carey, Rudolf Hertzberg, Martin Carbonell. Vanderbilt University, 3½ yrs. engineering course. Tennessee Power Co., Resident Engr. on three major hydro-electric and steam generating plants, 7 years. Alabama Power Co., Res. Engr., Tallahassee hydro project, 2 yrs. U. S. Engr. Dist., Chief of Surveys, Office Engr., and presently in charge of design and planning all levee, revetment and dredging for New Orleans District, 1930 to date.

CHARLES W. EDWARDS, New Orleans; age 57. Endorsed: A. M. Fromherz, L. K. Good, Claiborne Perrilliat. Canadian Pacific R.R., Chief of Party, 1910-11. Sherburne & Edwards, Architects & Engineers, Partner, 1912-16. Evans Eng. Co., Supt.-Engr., 1917-18. Rangeley Construction Co., Gen. Supt., construction of Miller Field for War Dept., 1919-20. Campbell & Edwards, Partner, Gen. Contractors commercial buildings, 1921-30. Marc Edilitz & Son, N.Y., Supt. Construction, 1931-35. James Stewart & Co., N.Y., Supt. of Const. and Eng., 1936-40. S&W Construction Co., Memphis, Gen. Supt. and Chief Engr., 1940-41. War Dept., Principal Engr. P-6, 1941-42. Benham Eng. Co., Chief Engr., 1942-43. Federal Public Housing Authority, Project Engineer for Area, 1943-date. Licensed, N.Y. State. Member A. S. T. M., S. A. M. E., N. Y. Professional Eng. Society.

WILLIAM C. ELLIS, New Orleans, age 30. Endorsed: B. H. Grehan, J. M. Todd, Sydney Ellis. Tulane University, B.E. in E.E., 1938. N.O. Public Service Inc., Salvage Engineer, 1938-40. U. S. Navy, Engineering Specialty Officer in Ship Construction and Repair, 1941-45. Walter Barnes Electric Co., Electric contracting, engineering, estimating and construction, 1946-date. Previously affiliated with A. I. E. E. and A. S. M. E.

GEORGE HOWARD HILL, Lake Charles; age 44. Endorsed: R. W. Best, R. E. Burgess, E. W. Ruhnaw. Alabama Polytechnic Institute, B.S.E.E. Birmingham Electric Co., Student Engr. War Dept., Maxwell Field, Ala., Operating Engineer. General Electric Co., Dallas, Tex., Engineer. Cities Service Refg. Corp., Lake Charles, Engineer.

HERMAN H. MANNER, JR., Baton Rouge; age 33. Endorsed: N. S. Catchings, E. B. Rice, J. J. Saurage, R. M. Shaw. Univ. of Texas, Bachelor in Architecture. Registered Architect, Texas. Texomatic Tool Co., Chief Engr. North American Aviation, Dallas, Industrial Engineer, Alaska Naval Bases, Siems Drake Puget Sound, Seattle, Designing Engr.

EDWARD F. OAKLEY, DeRidder; age 38. Endorsed: E. H. Goodloe, H. L. Lehmann, B. H. Wade. Louisiana Highway Commission, 1929-40. Calmes Construction Co., 1940-41, Supt. on Highway Construction. La. Dept. of Highways, Feb. 1941 to present; Resident Engineer (Highway Engineer 3).

RALPH A. RUSCA, New Orleans; age 35. Endorsed: C. A. Burton, W. F. Guilbeau, H. P. Newton. Northwestern State College, Natchitoches, La., A.B. degree in physics and mathematics. Tulane University, graduate work, Jan.-June, 1935 and Aug. Dec., 1942. La. State High Schools, Teacher of Science, 1933-36. Supervisor Social Welfare, Federal Govt. U.S. Dept. of Agriculture, Cotton Ginning Lab., Stoneville, Miss. and Southern Regional Research Lab., New Orleans, mechanical, electronic and thermal engineering design, 1936-date. Consulting engineer, industrial drying problems and eqpt., 1944-date.

CLYDE U. SCHEXNAILDER, Maplewood; age 29. Endorsed: R. E. Burgess, E. D. Mattix, S. D. Nolan. Southwestern La. Institute, B.S.E.E., 1941. Panama Canal, Third Locks Project, Jr. Engineer, 1941-43. Consolidated Vultee Aircraft Corp., N.O. Division, Process Analyst, Tool Planner, 1944-45. Cities Service Refg. Corp., Butadiene Plant, Lake Charles, 1945-date.

VIVIAN E. SICKS, Lake Charles; age 38. Endorsed: R. W. Best, R. E. Burgess, E. D. Mattix. Oklahoma A. & M. College, B.S.M.E., 1933. Cities Service Oil Co., 1925-date. Eng. work from 1934-42; Chief Heat Exchanger and Pr. Vessel Div. of Petroleum Admin. for War, Washington, D.C., 1942-45; charge of eng. in Butadiene Plant, Lake Charles, 1945-47.

RALPH D. SKINNER, Baton Rouge; age 32. Endorsed: L. W. Harrell, H. L. Lehmann, J. J. Saurage. Miss. State College, B.S. in C.E., 1940. Resettlement Admin., Instrumentman, 1936-37. W.P.A., Surveyor and Project Mgr., 1938. Henry B. McKoy Co., Greenville, S.C., Office Engr. and Estimator, 1940-41. Jr. Structural Engr., T.V.A., 1941. U.S. Navy, Engr. and Fuel Officer, const. operation, maint. tank farm installations and petroleum logistics, 1941-45. Amer. Bitumuls Co., Sales Engr., 1946-date. Member Tau Beta Pi, Jr. Mbr. A. S. C. E.

134 *Proceedings of the Louisiana Engineering Society*

GLENDON L. SMITH, Maplewood; age 29. Endorsed: R. E. Burgess, S. D. Nolan, R. R. L. Ward. Louisiana State University, B. S. Pet. Engr., 1941. 6 mos. as party chief on land surveying and building construction, 1940. 3 mos. as trainee, petroleum production engr., 1941. Captain, Corps of Engrs., U. S. Army, 1941-46. Drafting, surveying, job estimating and designing, 1916-date.

HARRELL R. SMITH, Lake Charles; age 43. Endorsed: R. E. Burgess, F. T. Clarke, E. W. Ruhnow. Louisiana Tech, B. S. M. E., 1923. La. Oil Refg. Corp., Refinery Engr., 1923-27; Chief Engr. Refining Div., 1927-30. Arkansas Fuel Oil Co., Asst. Refinery Supt., 1933-42. Cities Service Refining Corp., 1942-present, now as Supt. of Operations.

CHARLES W. STOKES, Lake Charles; age 36. Endorsed: F. C. Gault, T. W. Kirby, S. D. Nolan. B. S. M. E., 1931; M. S. M. E., 1935. Member A. S. M. E., Tau Beta Pi. Texas State Board of Control, Asst. Consulting Engr., 1935-37., General Electric Co., Southwest Div., Turbine Installation Supervisor, 1937-44. Cities Service Refg. Corp., Technical Advisor to Chief Refinery Engr., 1944-present.

WILLIAM WENNER, Lake Charles; age 34. Endorsed: R. E. Burgess, S. D. Nolan, E. W. Ruhnow. Louisiana Polytechnic Institute, B. S. C. E., 1938. National Youth Admin., Supervisor and Engineer, 1939-42. Area Engineers, War Dept. Construction Div., as party chief, dept. head of construction reports office, asst. to engr. officer, 1942-43. U. S. Navy Construction Battalion, CEC Corp., Lt. (j.g.), 1943-46.

R. L. WILLIAMS, Port Sulphur; age 27. Endorsed: E. H. Flewellen, E. J. McNamara, D. L. Morris. Texas Technological College, B. S. M. E., 1941. Freeport Sulphur Co., 1941-date.

ROBERT S. WYNN, Ruston; age 47. Endorsed: A. J. Naquin, J. M. Robert, R. T. Sessums. Tulane University, B. E., University of Arkansas, M. A., Westinghouse Electric & Mfg. Co., Student Engineer, 1 yr. N. O. Public Service Inc., Asst. Electrical Engineer, 2 yrs. Louisiana Polytechnic Institute, teacher of mathematics, 2 years, and of electrical engineering, 16 years. Member A. I. E. E.

WADE H. YAWN, JR., DeRidder; age 36. Endorsed: E. H. Goodloe, B. H. Wade, W. C. Youngs. La. Highway Dept., Rodman, Inspector, Instrumentman; grading, drainage, asphalt and concrete paving, 7 years. Miss. State Highway Dept., Inspector and Instrumentman, paving and bridges, 3 yrs. U. S. Engineer Dist., Party Chief, Draftsman, Inspector, Supt. of Maintenance on airfields and military cantonements, 5 yrs.

For Affiliate Member

JOHANNA O. BAUMAN, Baton Rouge; age 45. Endorsed: J. H. Derr, C. A. Ibach, R. J. Robertson. Pensacola Electric Co., Operating Engineer, 1921-26. Alabama Power Co., Maintenance Engineer, 1926-27. Gulf States Utilities Co., Beaumont, Tex., Operator, 1927-30; Gulf States Pwr. Stations, Electrician, 1930-date, now in charge all electrical work in absence of Station Electrician.

LEON L. LABATT, JR., New Orleans; age 62. Endorsed: P. F. Jahncke, B. H. Grehan, C. F. Hadden, F. P. Hamilton. Tulane University, 2 yrs. mech. eng. (1900-01). N. O. Gas Co., Purchasing Agent and Mechanical Draftsman. World War I, Senior Artillery Instructor, Battalion Commander F. A. France. President, Motor Sales & Service Corp., Chrysler Dist., 1924-30. Auto Distributor, 1930-37. Cummins Diesel Engine Representative, 1938-39. Higgins Industries, Organized and managed Air Conditioning Division, 1940-41. Retired Lt. Col., U. S. Army; foreign service North Africa, 1942-44.

HUBERT L. SMITH, JR., Port Sulphur; age 39. Endorsed: F. B. Blackstone, K. T. Price, C. O. Lee. Texas Gulf Sulphur Co., Gulf, Tex., Material and Machinery handling, 1927-33. Freeport Sulphur Co., Asst. Supt., Supt. of Shipping, in charge of sulphur storage, blasting, loading and shipping operations, including design and maint. of sulphur handling facilities at mine and Port Sulphur ship loading terminal.

BARNEY R. SMITH, Bogalusa; age 34. Endorsed: M. R. Guell, C. H. Hundemer, B. B. Pierce. Mississippi State College, B. S. C. E., 1936. Gaylord Container Corp., Draftsman and Civil Engineer, 1937-date. Registered Civil Engineer, La., since 1941.

For Junior Member

CONRAD O. BOSTROM, Harahan; age 22. Endorsed: W. E. Blessey, R. N. Habans, J. P. Fernandez. Tulane University, B.S.C.E. U.S. Naval Reserve, Civil Eng. Corps, Ensign, construction work on Okinawa and at atomic bomb tests, Bikini Atoll. Louisiana State University, Instructor in C.E., 1946-47. Orleans Materials & Equipment Co., Steel Cost Estimator, 1947-date.

T. ELLIS PEAK, JR., Baton Rouge; age 22. Endorsed A. F. Fritchie, L. J. Lassalle, W. A. Whitaker, E. R. Wilkinson. B.S., Louisiana State University. U.S. Navy, Engineering Officer in command of a small minesweeper (YMS) 3 yrs. Standard Oil Co. of N.J. (La. Div.), April 1947-date.

JAMES V. REUTER, JR., New Orleans; age 20. Endorsed: J. K. Mayer, J. M. Robert, J. P. Fernandez. Tulane University, B.S.M.E., 1947

TROY L. WILSON, JR., Baton Rouge; age 23. Endorsed: T. E. Peak, J. E. Hassinger, Jr., W. A. Whitaker. Tulane University, B.S. in C.E. U.S.N.R., Civil Engr. Corps, Ensign, 1945-46. Standard Oil Co. of N.J. (La. Div.), Design and Construction Coordination Engr., 1946-date. Member A.S.C.E. Registered Civil Engineer, La. State Board of Engineering Examiners.

For Transfer from Student to Junior Member

AL BALTAZOR	H. DICK GOLDING	SALVADOR MAFFEI
CARLISLE DAVIDSON	J. MALLORY GRACE	JOSEPH M. SCHEYD
DONALD D. FULLMER	ROBERT B. LAUTNER	E. C. SINGLETARY

(All of the above are 1947 graduates in Mechanical Engineering at Louisiana State University)

PAPERS AND DISCUSSIONS

CO-ORDINATED REGIONAL POWER SYSTEM OPERATION

William T. Hess*

So-called "Power Pool" operation is not a new thing. Pool operations have been in effect for many years in the New England States, in the Southeastern States, in the Pacific Northwest and in this area. The idea has been expanded to include other areas and extended by interconnections between areas, due largely to the pressure of war energy requirements, to the extent that they become regional, in fact almost continental, in their scope. These pools operate on various bases, some allocating the cost of power and energy, as well as the supply, among the various participants, others pooling merely their sources of supply and each participant retaining first call to its own most efficient sources. Generally, however, they operate in such a manner as to take the energy from the cheapest sources available, without regard to ownership, resulting in overall economies for all participants. Due to the large number of interconnections made in recent years, assistance is often asked and given on a day to day basis as needed with very little formal contractual coverage.

In our own system, ALMNO, which consists of Arkansas Power & Light, Mississippi Power & Light, Louisiana Power & Light and New Orleans, pool operation has been in effect since 1927 in the Arkansas, Louisiana, Mississippi portion. The interconnection with New Orleans was completed in 1930. An operating committee composed of one member from each company meets periodically to review estimates of loads and capacity requirements, make recommendations concerning new facilities required or new operating practices to be set up and other such things involved in the operation of the system. The actual operation and load dispatching is under the control of a system operator to whose office the system tie line loads are telemetered by carrier communication over the transmission network and from whose office generation in various plants can also be controlled by carrier current load control devices. Eventually all major generating stations of the system will be under such control to some extent.

An extension of this system operation to Regional Operation resulted from the war when it was decided by the United States Government to erect a plant for the electrolytic production of

* Vice-President and Chief Engineer of The Louisiana Power and Light Co. Delivered at the regular meeting, September 8, 1947. This was a joint meeting with the N. O. Section, American Institute of Electrical Engineers.

alumnium at Lake Catherine in Arkansas and the companies in the area were called upon to supply a large part of the power required. No one company in the area had at the time a sufficient assured reserve capacity available to be able to provide the supply but it was available in the Southwest region if some additional transmission facilities could be provided and suitable agreements reached among a large number of companies operating in the area. This was accomplished by the creation of the Southwest Power Pool which pooled the power generating resources of Nebraska, Kansas, Oklahoma, Texas, Arkansas, Louisiana and western Mississippi, a group having generating capacity of nearly 3 million kilowatts. Problems of policy were handled by an Executive Committee and problems of operation and engineering by an Engineering Committee, each composed of one representative from each participating company. An operator with technical staff was set up in Little Rock, Arkansas to coordinate the operation of the group and handle all of the problems arising out of this operation. Power was scheduled from each company on the basis of estimates of availability made a week in advance. Many difficulties were encountered due principally to the fact that the pool was forced to operate without adequate telemetering and load control equipment due to material shortages. This resulted in many plants and whole systems getting off their schedules until information could be obtained by the system operator and corrective measures taken. However, in spite of all the difficulties, operation was reasonably satisfactory and reliable service was supplied to the Alumnium plant.

Due to the fact that this 3 million kilowatts of the southwest was interconnected with approximately 12 million kilowatts east of the Mississippi River through a single point of connection at Memphis, Tennessee it was important to maintain rates of power transfer between the areas through this interconnection safely within the stability limits of this connection. Fortunately, telemetering tie line and load control had already been provided at this point. Also, operations were improved by the work of the Interconnected Systems Committee, which, without any contractual agreements, has been able to work out mutually agreeable methods of operating such a vast system interconnected and in synchronism. As a matter of interest, frequency control for the southwest area is in one of the larger generating stations in Illinois or Ohio and any attempt to regulate frequency locally would result only in changing the tie line loadings until stability limits were exceeded and the protective equipment separated the circuits. This actually happens at times of heavy system disturbances or violent load swings.

As may be inferred from this, the gains from interconnection are not all "velvet", particularly as the size of the systems increases. The gain due to pooling reserves and due to diversity of loads generally speaking decreases as the size of the systems increase. The complexity of load control equipment increases with system size. Also, heavier interconnecting transmission lines are needed for satisfactory interconnection as the size of the system increases. The swings in load become larger, making frequency control more difficult. However, there have usually been advantages outweighing the disadvantages. Some interconnections have proven to be of value in times of emergency even though they can not always be operated normally closed. Such a case is the 110,000 volt line to Gulfport which was ordered built by the FPC in 1941 without any preliminary study, to relieve the shortage caused by the drought in the southeast. Due to the fact that this line closed a loop of approximately 1200 miles through which wide swings in phase angle take place at frequent intervals it has never been possible to operate with this line closing the loop. Power will not necessarily flow over a line in the direction in which it is drawn on paper, and complex studies must be made to determine division of power flow among lines in these large interconnected systems.

System planning today is more complex than it has ever been due to:

1. Time required to obtain equipment.
2. Increase in size (both load and extent) of systems.
3. Tremendously rapid increase in loads.
4. Uncertainty of Government intentions with regard to establishing competing systems.

Formerly it was possible to start construction of a steam generating station and have it in operation within 18 months or two years at most. Today generators must be ordered now in August, 1947 for operation in 1951. There are only three manufacturers in the United States that are equipped to build steam turbo generators of the size presently being installed in Central Stations. Their total production capacity is approximately 4 million kilowatts rating each year, and the present demand for these machines is so great that the production schedules of all manufacturers are filled up until 1951. To further complicate this situation one manufacturer was totally shut down for almost a year and production by each of the other two was seriously slowed down by strikes and the other labor troubles in 1946 and 1947. In 1940 it was possible, starting from scratch, to design, order material and complete construction of a 110000 volt transmission line with high voltage switching equipment and step down transformer substation in a total time of 75 days. We actually built such a line in 1940 from

Standard to Camp Livingston. Today it requires 26-28 months to get delivery on the transformers and nearly as long for insulators. What all of this means is that plans must be made and equipment ordered much farther ahead of the time scheduled for operation than formerly, thereby increasing the possibility of errors inherent in long range forecast.

The increase in size, both in extent and load, has interposed another difficulty in system planning. Proposed transmission lines and new generation for a system are studied on "Calculating Boards" on which the electrical constants of existing and proposed circuits are set up and results in load flows, voltage, etc., read on meters. Systems have become so large that no board in the country is large enough to accommodate all the problems for which answers are sought except by setting up equivalents for various parts, which is satisfactory for most problems but not for all except with a great deal of extra effort.

The tremendously rapid increase in loads imposed on the electrical companies of the United States since VJ Day present a serious problem in system planning because it has been necessary to provide means of handling these loads immediately as they occur even though this sometimes meant more or less makeshift arrangements. The pent up demand of residentials and small commercial customers for various equipment and appliances has been superimposed on that of industry and also on an industry that sprang fully machined and tooled up from the government surplus. It appears that manufacturers are turning out much more in the way of power consuming devices than they are in the way of power generating devices principally because there are so many more manufacturers capable of producing such devices, for instance 1100 watt toasters. We are therefore in the position of having to pour water on the fire that is hottest and, although we naturally try to do it in such a way that it fits in with long range planning, lost time and some errors are bound to result.

The United States Government proposes the development of some million and one half kilowatts of Hydro generation in the region in connection with so-called "multiple purpose projects" providing for flood control, navigation and power development mostly in north Arkansas and south Missouri. This adds a considerable difficulty to the job of system generation planning until such time as the schedule of development is coordinated with the plans for development in adjacent systems. Then too this Hydro power is by its nature good only for providing low load factor peaking supply and must be used in coordination with steam generation which will provide the base load supply, and it must be determined by whom the steam generation will be provided.

Touching on some of the specific benefits that have derived from the pool operations in this area might prove interesting. First and most obvious benefit is the gain from diversity of loads among the various companies comprising the systems. In the twelve months ending July 25, 1947 this amounted to nearly 25000 kilowatts in the ALMNO system. That is if each company comprising the system were providing service to its customers without the benefits of interconnection at least 25000 kilowatts of additional generating capacity would have been needed. This is about 4% of system capability. The percentage gain due to diversity between systems decreases as the size of the systems increases and is only about 1% at the time of area peak load for the Southwest area. However, advantage has been taken of the fact in scheduling unit outages for overhaul that greater diversities in addition to greater available reserves frequently exist at times other than the peak.

In all systems it is necessary to have generation reserves to provide against the event of unscheduled forced outages due to equipment failure. The amount of reserve generating equipment needed is largely determined as a matter of judgment and experience. Opinions vary considerably concerning the proper amount ranging from as low as 8% of capacity to as high as 20%. Certainly it can never be less than the largest generating unit installed on the system and for a small system with say four generators of the same size this would be as much as 25%. Obviously then, there is a gain in reserve capacity by interconnecting two such systems because the largest unit would then represent only 12½% of total capacity which let us say is the proper reserve for the particular system in the opinion of its operators. It is equally obvious that no great gain in required system reserves can be obtained by further interconnections. However, there will always be some benefit on this score from interconnection because the probability of each system in a pool having its total reserves shut down simultaneously decreases to some extent as the number of systems in the interconnection increase. The ALMNO system experienced an occurrence of this kind this summer when 152,000 kilowatts of generating capacity was out of service simultaneously due to equipment troubles but the system was able to operate without dropping any load by falling back on the reserves of the other systems with which it is interconnected. Similarly, power from this system has been delivered to another which in turn delivered some of its capacity to another and so on through about five systems total to relieve a similar situation in a distant area

ENGINEERING BRIEFS

New Type of Paddle Wheel. A new type of paddle wheel for shallow draft vessels has recently come into use. Instead of the conventional floats or paddles, placed parallel to the axis of the wheel, the new arrangement forms a point in the middle, giving each float a V shape. The complete wheel has the appearance of a herringbone gear. One of the disadvantages of the continuous flat paddle was the shock upon its entering the water. In the new design, since the float enters the water in sequence, less shock results. The new type wheel also has less tendency to pile the water up against the stern of the vessel when the wheel is turning in reverse.

The Turbo-Encabulator in Industry. For a number of years now work has been proceeding in order to bring perfection to the crudely conceived idea of a machine that would not only supply inverse reactive current for use in unilateral phase detractors, but would also be capable of automatically synchronizing cardinal grammeters. Such a machine is the "Turbo-Encabulator." Basically, the only new principle involved is that instead of power being generated by the relative motion of conductors and fluxes, it is produced by the modal interaction of magneto-reluctance and capacitive directance.

The original machine had a base-plate of prefabricated amulite surmounted by a malleable logarithmic casing in such a way that the two spurving bearings were in a direct line with the pentametric fan. The latter consisted simply of six hydrocoptic marzel-vanes, so fitted to the ambifacient lunar waneshart that side fumbling was effectively prevented. The main winding was of the normal lotus-o-delta type placed in panendermic semi-boloid slots in the stator, every seventh conductor being connected by a non-reversible tremie pipe to the differential girdlespring on the "up" end of the grammeters.

Forty-one manestically spaced grouting brushes were arranged to feed into the roto slip-stream a mixture of high S-value phenyl-hydrobenzamine and five per cent reminative tetryliodo-hexamine. Both of these liquids have specific pericosities given by $P = 2.5C_n^{0.7}$ where n is the diathetical evolute of retrograde temperature phase disposition and C is Cholmondeley's annular grillage coefficient. Initially, n was measured with the aid of a metapolar refractive pilfrometer (for a description of this ingenious instrument, see L. E. Rumpelverstein in "Zeitschrift für Elektrotechnik-statischs-Donnerblitze" vol. vii), but up to the present nothing has

been found to equal the transcendental hopper dadoscope. (See "Proceedings of the Peruvian Academy of Skatological Sciences" June, 1914.)

Electrical engineers will appreciate the difficulty of nubing together a regurgitative purwell and a supramitive wennelsprocket. Indeed, this proved to be a stumbling block to further development until, in 1942, it was found that the use of anhydrous nangling pins enabled a kryptonastic bolling shim to the tankered.

The early attempts to construct a sufficiently robust spiral decommutator failed largely because of a lack of appreciation of the large quasi-piestic stresses in the gremlin studs; the latter were specially designed to hold the roffit bars to the spamshaft. When, however, it was discovered that wending could be prevented by a simple addition to the living sockets, almost perfect running was secured.

The operating point is maintained as near as possible to the h.f. rem peak by constantly fromaging the bitumogenous spandrels. This is a distinct advance on the standard nivelsheave in that no dramcock oil is required after the phase detractors have remissed.

Undoubtedly, the turbo-encabulator has now reached a very high level of technical development. It has been successfully used for operating nofer trunnions. In addition, whenever a barescent skor motion is required, it may be employed in conjunction with a drawn reciprocating dingle arm to reduce sinusoidal depletion.

—Arthur D. Little, Inc.

Underground Storage of Gas. A recent installation for the storage of 1,250,000 cubic feet of natural gas at 2240 pounds per square inch has been made in northern Illinois. The equipment consists of fifty lengths of steel pipe, 24 inches outside diameter and 40 feet long. The ends are swaged and the pipes are connected by manifolding. Earth covering protects the pipe from seasonal temperature changes.

Home Sound Movies. A new development in sound movies consists of attaching a thin strip of metallic material to the 16 mm home movie camera film. A sound recording device of the magnetic type will enable the amateur to make his own sound movies, and project them with sound, in the home, with comparable simple and inexpensive equipment.

MINUTES OF MEETINGS AND BUSINESS OF THE SOCIETY

Joint Meeting of the Louisiana Engineering Society with the Louisiana Section, American Society of Civil Engineers, August 11, 1947

The meeting was called to order by President Nairne, with approximately 125 members and guests present. Mr. Nairne welcomed the A.S.C.E.

Mr. Charles P. Knost moved that the reading of minutes be dispensed with, seconded by Mr. A. W. Durning and carried. The Chair then was relinquished to Mr. Leo M. Odom, Chairman of the local A.S.C.E. group, and after the business of their meeting was completed, Mr. Odom introduced Colonel John R. Hardin, New Orleans District Engineer for the U. S. Army Corps of Engineers, who presented a most interesting paper on "Some Aspects of Military Engineering Activities in the European Theatre". This was followed by motion pictures of the artificial harbor built by our army in France.

The Chair then was returned to President Nairne, who thanked the speaker for his splendid address, and the meeting adjourned with a hearty round of applause.

JOHN P. FERNANDEZ,
Secretary-Treasurer

Minutes of Meeting of the Board of Direction, August 11, 1947

The meeting was called to order by President Nairne in a private dining room of Arnaud's Restaurant with Messrs. Cucullu, Leake, Lehmann, Newton and Fernandez present. Mr. John K. Mayer also was present by invitation. Minutes of the regular meeting of July 14 and of the special meeting of July 28 were accepted as read.

Discussion took place regarding taxes paid by the Society.

Upon the recommendation of Mr. Mayer, General Chairman for the 1948 Annual Meeting the Board named the following sub-committee chairmen and vice-chairmen:

General Vice-Chairman: Jeffery H. Collins, Sr.

Banquet Committee: Claiborne Perrilliat, Chairman, L. C. H. McLean, Vice-Chairman.

Contact with Woman's Auxiliary: Frederick H. Fox, Chairman, Arthur J. Naquin, Vice-Chairman.

Industrial Plant Inspection: Charles P. Knost, Chairman, E. A. McLellan, Vice-Chairman.

Finance Committee: (It was decided to dispense with this committee)

Reception Committee: James M. Todd, Chairman, R. A. Steinmayer, Vice-Chairman.

Program Committee: W. S. Nelson, Chairman, W. P. Oster, Vice-Chairman.

Publicity Committee: James S. Janssen, Chairman, Gerald C. Kerr, Vice-Chairman.

Technical Papers Committee: W. J. Drawe, Chairman, Noel P. Kammer, Vice-Chairman.

Recreation Committee: William Hardy, Chairman, Sydney Ellis, Jr., Vice-Chairman.

Registration Committee: J. J. Bulliung, Chairman, David Moodie, Vice-Chairman.

Student Conference Committee: W. P. Wallace, Chairman, O. W. Stephenson, Vice-Chairman.

Technical Exhibits Committee: Ivan H. Purinton, Chairman, Cary B. Gamble, Vice-Chairman.

Due to the shortage of time, the meeting adjourned in order to allow the Society's General Meeting to proceed on schedule.

JOHN P. FERNANDEZ,
Secretary-Treasurer

Meeting of the Louisiana Engineering Society, July 14, 1947

The meeting was called to order by President Nairne, with approximately 75 members and guests present. Reading of the minutes of the preceding meeting was dispensed with.

It was announced that the 17th annual outing and golf tournament would be held on the following Thursday at the Colonial Country Club.

It was also announced that a number of traffic safety pamphlets had been supplied by the Louisiana Highway Department and these could be obtained in the Society's library.

Mr. James S. Janssen then introduced the speaker of the evening, Mr. Kenneth King, City Traffic Engineer, who gave a most interesting lecture on the traffic problems of New Orleans. The lecture was followed by a lively discussion, after which Mr. Hill moved that a rising vote of thanks be given the speaker.

The motion was seconded by Mr. Melochee and promptly executed, following which the meeting adjourned.

JOHN P. FERNANDEZ,
Secretary-Treasurer

144 *Proceedings of the Louisiana Engineering Society*

Minutes of Meeting of the Board of Direction, July 14, 1947

The meeting was called to order by President Nairne at Arnaud's Restaurant. Messrs Cucullu, Lassalle, Leake, Lehman, Macdonald, Mire, Newton and ernandez were present. Minutes of the preceding meeting were accepted as read.

The Secretary reported that all applicants for membership listed in the June ballot were elected. A letter to the Board concerning one of the applicants was read.

The Treasurers' Semi-Annual report for the period ended June 30, 1947 was presented to the Board and accepted. The Auditor's report upon the calendar year 1946 also was presented.

The Secretary read a letter from Mrs. Ralph Chambers expressing thanks for the publication of her late husband's obituary.

A communication from Mr. Frank W. Macdonald, Assistant Secretary, State Board of Engineering Examiners, was read, concerning a vacancy in the membership of the board and requesting the Society to make recommendations to the Governor for filling such vacancy. After considerable deliberation, the secretary was instructed to submit the following names to Governor Davis: Walter E. Blessey, C. Glennon Melville, J. J. Munding, Claiborne Perrilliat, and Alvin M. Fromherz.

President Nairne read a letter from Governor Davis acknowledging receipt of the resolution passed at the Society's May meeting.

A communication from Mr. F. Tackett Clarke concerning the Engineers' License Law was read. Discussion followed concerning the polling of members of the Society for their opinion on a general license law.

Mr. Macdonald moved that John K. Mayer be appointed General Chairman of the 1948 Annual Meeting, seconded by Mr. Mire and unanimously passed.

Due to the shortage of time, the meeting adjourned until Monday, July 28, in order that the Society's general meeting could proceed on schedule.

JOHN P. FERNANDEZ,
Secretary-Treasurer

Minutes of Special Meeting of the Board of Direction, July 28, 1947

The meeting was called to order by President Nairne, with Messrs. Cucullu, Lassalle, Leake, Lehmann, Macdonald, Mire, Newton, and Fernandez present. Also present by invitation were Messrs. C. G. Cappel, F. T. Clarke, and C. M. Kerr.

Dr. Lassalle called the Board's attention to the fact that the proposed engineering law drafted by the sub-committee of the Louisiana Council of Engineers did not follow the new Illinois law, but the latest Model law. It was brought out in the discussion which followed that, though the Model Law was discarded in Illinois and deemed not to be acceptable in California and Kansas, it did not necessarily follow that it would not stand in the State of Louisiana. The Board decided that whenever a lawyer would be engaged to review the proposed act, he should be advised about the differences in the Illinois law compared with the Model Law, so that the best method of defining "professional engineer" would be incorporated in the proposed act.

Discussion followed concerning the passage of the act and it was suggested that the Society bring before the Louisiana Council of Engineers the question of retaining an attorney to investigate the legality of the act and to re-write it for consistency and assist in securing its adoption. It was proposed also that the Louisiana Engineering Society pay one-half of the legal fees and that the remainder of the cost be pro-rated among the other engineering societies according to membership.

A letter from Mr. T. Keith Legare, Executive Secretary of the National Council of State Boards of Engineering Examiners, addressed to Mr. F. T. Clarke, was read by President Nairne and a copy has been placed in the Society's records.

Then followed a review of the act and a copy of the original and the revised act is attached to these minutes. In addition to this revision, Mr. Macdonald called attention to the fact that the domicile of the proposed board is not mentioned in the proposed act. The Secretary was instructed to revise Section 9 "Receipts and Disbursements" to conform with the present Louisiana Law. (Note: upon examination it was discovered that the present law omits any reference to the manner of handling receipts and disbursements.)

After carefully going over the proposed act in detail the meeting adjourned.

JOHN P. FERNANDEZ,
Secretary-Treasurer

PROCEEDINGS

OF THE

LOUISIANA ENGINEERING SOCIETY

VOL. XXXIII

DECEMBER, 1947

NO. 6

CONTENTS

EDITORIAL NOTES AND COMMENTS:

Our Annual Meeting	145
Plans for Our State Licensing Law	145
Lake Charles Chapter Formed	156
Our State Police	157
Meeting of the American Society of Mechanical Engineers	157
Meeting of the American Institute of Chemical Engineers	157

PAPERS AND DISCUSSIONS:

"Some Aspects of Military Engineering in the European Theater"	
By Col. John R. Hardin	158

ENGINEERING BRIEFS	176
--------------------------	-----

PERSONAL	179
----------------	-----

MINUTES OF THE MEETING AND BUSINESS OF THE SOCIETY	180
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EDITORIAL NOTES AND COMMENTS

Our Annual Meeting. Each year, the highspot of our activities is the annual meeting. In 1948 the dates of January 8, 9, and 10 have been set. The program includes an interesting variety of papers sponsored by the American Institute of Chemical Engineers, American Institute of Electrical Engineers, the Illuminating Engineering Society, American Society of Heating and Ventilating Engineers, American Society of Refrigerating Engineers, Society of American Military Engineers, the American Society of Civil Engineers, American Institute of Mining and Metallurgical Engineers, the American Society of Mechanical Engineers. Plant inspection trips are planned, together with general features of an evening session of general interest. On the last day, a dinner dance will complete the program. The headquarters is the St. Charles Hotel. Professor John K. Mayer, Tulane University is general chairman.

Plans for Our State Licensing Law. The following suggested law has been circulated among the various engineering groups for their consideration and study. It is hoped that agreement may

be reached, and that a suitable bill, satisfactory to the majority of engineers may be passed by the 1948 legislature. The proposed bill is presented here. Please read this bill, and if you have suggestions or comments, please pass them on to President Nairne.

T I T L E

AN ACT to regulate the practices of engineering and land surveying; providing for the registration of qualified persons as professional engineers and land surveyors, and providing for the certification of Engineers-in-Training; defining the terms "Engineer", "Professional Engineer", "Engineer-in-Training", "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, and upon corporations, companies, partnerships, firms, and individuals in connection with construction work, projects, or industrial processes, and providing for the enforcement of this Act and penalties for its violation.

GENERAL PROVISIONS.

Section 1.—Be it enacted by the General Assembly 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 for any person to practice or to offer to practice in the 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, or for the State of Louisiana or any political subdivision thereof or any corporation, company, partnership, firm or individual to employ any person to perform or engage in the practice of engineering as defined in this Act, unless such person has been registered under the provisions of this Act except as hereinafter provided.

DEFINITION—ENGINEER.

Section 2.—The term Engineer as used in this Act shall mean a Professional Engineer as hereinafter defined.

DEFINITION—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.

DEFINITION—ENGINEER-IN-TRAINING.

The term Engineer-in-Training as used in this Act shall mean a candidate for registration as a Professional Engineer who is a graduate in an approved engineering curriculum of four years or more from a school or college approved by the Board as of satisfactory standing; or who has had four years or more of experience in engineering work of a character satisfactory to the Board and who, in addition, has successfully passed the examination in the fundamental engineering subjects prior to completion of the requisite years of experience in engineering work, as provided in Section 14 of this Act,

and who shall have received from the Board, as hereinafter defined, a certificate stating that he has successfully passed this portion of the professional examinations.

DEFINITION—PRACTICE OF ENGINEERING.

The term "Practice of Engineering" within the meaning and intent of this Act shall mean professional service which may include consultation, investigation, evaluation, planning, designing, or responsible supervision of construction, in connection with any public or private utilities, structures, buildings, 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 term "Responsible Charge of Work" when construed by the Board 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.

DEFINITION—ACT INAPPLICABLE TO CERTAIN OPERATORS, ETC.

The practice of engineering shall not include the work ordinarily performed by persons who operate or maintain machinery or equipment.

DEFINITION—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.

DEFINITION—LAND SURVEYING.

The practice of land surveying within the meaning and intent of this Act includes surveying of areas for their correct determination and description and for conveyancing, or for the establishment or re-establishment of land boundaries and the plotting of lands and subdivisions thereof.

DEFINITION—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.

BOARD—APPOINTMENTS—TERMS.

Section 3.—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 five 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 two nominations shall be made for each appointment required. The members of the first Board shall be appointed within ninety days after the passage of this Act, to serve for the following terms: One member for one year, one member for two years, one member for three years, one member for four years, and one member for five years from the date of their appointment, or until their successors are duly appointed and qualified. 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 receive a certificate of registration under this Act from said Board. On the expiration of the term of any member, the governor shall in the manner hereinbefore provided

appoint for a term of five years a registered professional engineer, having the qualifications required by Section 4, to take the place of the member whose term on said Board is about to expire. Each member shall hold office until the expiration of the term for which such member is appointed or until a successor shall have been duly appointed and shall have qualified.

BOARD—QUALIFICATIONS.

Section 4.—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.

The members of the first board that are appointed for a four year and a five year term in addition to all other requirements under this Act, shall be engaged in the practice of engineering teaching, one in Louisiana State University and one in Tulane University. On the expiration of their respective terms, their successors who are appointed as provided in this Act, shall, in addition to all other requirements under this Act, be engaged in the practice of engineering teaching in a school or college of the State offering an accredited engineering curriculum of four years or more and approved by the Board as of satisfactory standing under current rulings of the Engineers' Council for Professional Development or its duly recognized successor.

BOARD—COMPENSATION AND EXPENSES.

Section 5.—Each member of the Board shall receive the sum of twenty-five dollars (\$25.00) 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 reimbursed for all actual traveling, incidental, and clerical expenses necessarily incurred in carrying out the provisions of this Act.

BOARD—REMOVAL OF MEMBERS—VACANCIES.

Section 6.—The governor may remove any member of the Board for misconduct, incompetency, neglect of duty, or for any other sufficient cause. Vacancies in the membership of the Board shall be filled for the unexpired term by appointment by the governor as provided in Section 3.

BOARD—ORGANIZATION AND MEETINGS.

Section 7.—The Board shall hold a meeting within thirty days after its members are first appointed, and thereafter shall hold at least two regular meetings each year. Special meetings shall be held at such time as the by-laws of the Board may provide. Notice of all meetings shall be given in such manner as the by-laws may provide. The Board shall elect or appoint annually the following officers: A chairman, a vice-chairman, and a secretary. A quorum of the Board shall consist of not less than three members.

BOARD—POWERS.

Section 8.—The Board shall have the power to adopt and amend all by-laws and rules of procedure, not inconsistent with the constitution and laws of this state, which may be reasonably necessary for the proper performance of its duties and the regulations of the proceedings before it. The Board shall adopt and have an official seal.

In carrying into effect the provisions of this Act, the Board, under the hand of its chairman and the seal of the Board, may subpoena witnesses and compel their attendance, and also may require the production of books, papers, documents, etc., in a case involving the revocation of registration or practicing or offering to practice without registration or any other violation of this Act. Any member of the Board may administer oaths or affirmations to witnesses appearing before the Board. If any person shall refuse to obey any subpoena so issued, or shall refuse to testify or produce any books, papers, or documents, the Board may present its petition to the court having

jurisdiction, setting forth the facts, and thereupon such court shall, in a proper case, issue its subpoena to such person, requiring his attendance before such authority and there to testify or to produce such books, papers, and documents, as may be deemed necessary and pertinent by the Board. Any person failing or refusing to obey the subpoena or order of the said court may be proceeded against in the same manner as for refusal to obey any other subpoena or order of the court.

RECEIPTS AND DISBURSEMENTS.

Section 9.—The Board shall receive and account for all moneys derived under the provisions of this Act. The secretary of the Board shall receive such salary as the Board shall determine in addition to the compensation and expenses provided for in Section 5. The Board may employ such 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.

The Board may, at its discretion, pay any witness subpoena that appears 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.

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.

RECORDS AND REPORTS.

Section 10.—The Board shall keep a record of its proceedings and a register of all applications for registration, 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 of 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 effect as if the original were produced.

Annually, as of January 15, the Board shall submit to the governor a report of its transactions of the preceding year, and shall also transmit to him a complete statement of the receipts and expenditures of the Board, attested by affidavits of its chairman and its secretary.

ROSTER.

Section 11.—A roster showing the names and places of business of all registered professional engineers, engineers-in-training, the branch of engineering in which professional engineers are registered, and the branch of engineering in which engineers-in-training are certified, and all registered land surveyors shall be published by the secretary of the Board during the month of October of each year. Included in this roster shall be a list of all engineering courses in schools or colleges approved by the Board as of

150 *Proceedings of the Louisiana Engineering Society*

satisfactory standing. 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 library of all approved colleges and universities in the state.

The Board shall furnish to each applicant for registration a copy of the Act and a copy of the by-laws of the Board and, upon request, to any department of the state or political subdivision of the state.

A copy of this Act and the by-laws of the Board, together with an application for Engineer-in-Training, shall be mailed to the Dean of Engineering or other responsible official, for each candidate for graduation, not earlier than two months or later than one month before date of graduation, of all schools or colleges in the state that offer an engineering curriculum. The Dean of Engineering or other official receiving copies of this Act, by-laws of the Board, and the applications shall present or have presented one of each to every candidate for graduation in engineering and shall explain, or have explained, to each candidate either individually or in a group or groups the meaning of this Act and the necessity of each candidate upon being graduated to register with the Board before starting the practice of Engineering or before accepting a position to perform engineering work. Upon request from the Board, the Dean of Engineering or other responsible official of all schools or colleges in the state shall submit the total number (not names) of candidates for graduation in engineering and the date of graduation.

GENERAL REQUIREMENTS FOR REGISTRATION.

Section 12.—The Board shall register each applicant in that branch of engineering 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.

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, or for certification as an Engineer-in-Training, respectively:

- (1) As a Professional Engineer:

ENGINEERS—GRADUATION PLUS EXPERIENCE.

- a.—Graduation in an approved engineering curriculum of four years or more from a school or college approved by the Board as of satisfactory standing; and a specific record of an additional four 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 (in counting years of experience, the Board at its discretion may give credit, not in excess of two years, for satisfactory graduate study in 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

ENGINEERS—EXPERIENCE PLUS EXAMINATION.

- b.—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;

- (2) As Engineer-in-Training:

ENGINEERS-IN-TRAINING—GRADUATION.

- a.—Graduation in an engineering curriculum of four scholastic years or more from a school or college approved by the Board as of satisfactory standing; or

ENGINEERS-IN-TRAINING—EXPERIENCE PLUS EXAMINATION.

- b.—A specific record of four years or more of experience in engineering work of a character satisfactory to the Board, and successfully passing a written examination in the basic engineering subjects.

- (3) As a Land Surveyor:

LAND SURVEYORS—GRADUATION PLUS EXPERIENCE.

- a.—Graduation from a school or college approved by the Board as of satisfactory standing, including the completion of an approved course in surveying; and an additional two years or more of experience in land surveying work of a character satisfactory to the Board and indicating that the applicant is competent to practice land surveying; or

LAND SURVEYORS—EXPERIENCE PLUS EXAMINATION.

- b.—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.

CHARACTER.

No person shall be eligible for registration as a Professional Engineer, or Land Surveyor, or certification as an Engineer-in-Training, who is not of good character and reputation.

TEACHING CREDITS.

In considering the qualifications of applicants, engineering teaching may be construed as engineering experience.

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 12 (1) b and (2) b. 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 12 (1) b and (2) b, provided, however, that no applicant shall receive credit for more than four years of experience because of undergraduate educational qualifications. A degree in an engineering curriculum of four or more scholastic years from a school or college not approved by the Board may be considered as equivalent to four years of experience in Section 12 (2) b.

WORK AS CONTRACTOR.

The mere 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 the practice of engineering.

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.

APPLICATIONS AND REGISTRATION FEES.

Section 13.—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 engineers having personal knowledge of his engineering experience.

152 *Proceedings of the Louisiana Engineering Society*

The registration fee for professional engineers shall be set by the Board and shall not exceed twenty-five dollars (\$25.00), sixty percent of which shall accompany application, the remainder to be paid upon issuance of certificate. The Board may, upon application therefor, and the payment of a fee of ten dollars (\$10.00), 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 any country provided that the requirements for the registration of professional engineers under which said certificate of qualification or registration was issued conform with the provisions of this Act and are of a standard not lower than that specified in this Act.

The fee for Engineer-in-Training shall be set by the Board and shall not exceed fifteen dollars (\$15.00), which shall accompany the application and shall include the cost of examination and issuance of certificate. When registration as a Professional Engineer is completed by an Engineer-in-Training, an additional fee not to exceed ten dollars (\$10.00) shall be paid before issuance of certificate as a Professional Engineer.

The registration fee for Land Surveyors shall be the same as that for Professional Engineers.

Should the Board deny the issuance of a certificate of registration to any applicant the initial fee deposited shall be retained as an application fee.

EXAMINATIONS.

Section 14.—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 certificate stating that he has passed the examination and that his name has been recorded as an Engineer-in-Training. 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 examinations and the methods of procedure shall be prescribed by the Board with special reference to the applicant's ability 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 and will be re-examined without payment of additional fee. Subsequent examination will be granted upon payment of a fee to be determined by the Board, not to exceed fifteen dollars (\$15.00).

CERTIFICATES—SEALS.

Section 15.—The Board shall issue a certificate of registration in that branch of engineering in which the applicant has qualified upon payment of 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 an Engineer-in-Training, the certificate shall state that the applicant has successfully qualified in the fundamental engineering subjects required by the Board and has been enrolled as an "Engineer-in-Training."

In the case of a registered Land Surveyor, the certificate shall authorize the "practice of land surveying." Certificates of registration and certificates as Engineer-in-Training 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 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 shall 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 which the registrant is registered), or "Registered Land Surveyor." Plans, specifications, plats, and reports prepared by a registrant shall be stamped with the said seal when filed with public authorities, during the life of the registrant's certificate, but it shall be unlawful for any one to stamp or seal any documents with said seal after the certificate of the registrant named thereon has expired or has been revoked, unless said certificate shall have been renewed or reissued.

EXPIRATIONS AND RENEWALS.

Section 16.—Certificates of registration shall expire on the last day of the month of June 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 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 for 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 July by the payment of a fee not to exceed ten dollars (\$10.00). The failure on the part of any registrant to renew his certificate annually in the month of July 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 July shall be increased ten percent 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.

PRACTITIONERS AT TIME ACT BECAME EFFECTIVE.

Section 17.—At any time within one 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 that branch 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 year immediately preceding the date of his application, and was practicing engineering at the time this Act became effective, and has performed work of a character satisfactory to the Board. The above provisions of this paragraph shall not apply to the practice of Civil Engineering and Land Surveying. All civil engineers and land surveyors who are at present registered under the civil engineers and surveyors licensing law of 1920 as amended shall, upon payment of the renewal fee as set forth in Section 16 of this Act, be registered by the Board as Professional Engineer 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.

At any time within one year after this Act becomes effective, all persons employed by the State of Louisiana or any of its political subdivisions to practice engineering under the civil engineering licensing law of 1920 as

amended without registration shall be registered without examination to practice civil engineering for the State of Louisiana or any political subdivision thereof on a salaried basis (except as specified in Section 12) provided that nothing in this Section shall be construed to permit any person registered to accept employment by the State of Louisiana or its political subdivisions or by any firm, person or corporation as an engineer on a fee or commission basis. The registration fee and yearly renewal fee for any person granted this type of registration shall be three dollars (\$3.00).

No other person shall be registered as Professional Engineer or Engineer-in-Training to practice civil engineering or 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.

After this Act shall have been in effect one year, the Board shall issue certificates of registration only as provided for in Section 12 or Section 19 thereof.

PUBLIC AND PRIVATE WORK.

Section 18.—One year after this Act becomes law, it shall be unlawful for this state, or for any of its political subdivisions, such as a parish, city, town, township, or drainage board to engage in the construction of any public work involving the practice of engineering, unless the plans and specifications and estimates have been prepared by, and the construction executed under the direct supervision of, a Registered Professional Engineer; provided, that nothing in this section shall be held to apply to any public work wherein the expenditure for the complete project of which the work is a part does not exceed two thousand dollars (\$2000.00).

Private Work. One year after this Act becomes law, it shall be unlawful for any corporation, company, partnership, firm or individual in this state to engage in the construction of any work or in the operation of any process involving the practice of engineering unless the plans, specifications, estimates, or processes have been prepared by and the construction or process executed under the direct supervision of a Registered Professional Engineer; provided that nothing in this section shall be held to apply to any work wherein the expenditure for the complete project of which the work or process is a part does not exceed two thousand dollars (\$2000.00).

One year after this Act becomes law, it shall be unlawful for any corporation, company, partnership, firm or individual in this state to employ any person to have responsible charge or supervision of any work or process involving the practice of engineering and wherein life, health and property may be jeopardized unless such person is a registered Professional Engineer.

Persons performing sub-professional work as defined in the by-laws of the Board or construction or process superintendents or foremen 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.

It is not the intent of this Act that the planning, construction, or estimates in relation to the construction of a home or dwelling or other domestic structure shall come under the jurisdiction of this Act.

All land surveying must be performed by a registered Land Surveyor or Professional Civil Engineer.

INTERSTATE REGISTRATION.

Section 19.—The Board may, upon application therefor, and the payment of a fee of ten dollars (\$10.00), 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 that the applicant's qualifications meet the requirements of this Act and the rules established by the Board.

REVOCATIONS.

Section 20.—The Board shall have the power to revoke the certificate of registration of any registrant who is found guilty of:

- (a) The practice of any fraud or deceit in obtaining a certificate of registration;
- (b) Any gross negligence, incompetency, or misconduct in the practice of engineering or land surveying as a Registered Professional Engineer or Land Surveyor.

Any person may prefer charges of fraud, deceit, gross negligence, incompetency, or misconduct against any registrant. Such charges shall be in writing, and shall be sworn to by the person making them and shall be filed with the secretary of Board.

All charges, unless dismissed by the Board as unfounded or trivial, shall be heard by the Board within three (3) months after the date on which they shall have been preferred.

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.

If, after such hearing, three or more members of the Board vote in favor of finding the accused guilty, the Board shall revoke the certificate of registration of such registered Professional Engineer or Land Surveyor.

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 three or more members of the Board vote in favor of 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.

APPEALS.

Any person who shall feel aggrieved by any action of the Board in denying or revoking his certificate of registration may appeal therefrom to the proper court and, after full hearing, said court shall make such decree sustaining or reversing the action of the Board as may seem just and proper.

VIOLATIONS AND PENALTIES.

Section 21.—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 individual 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 dollars (\$500.00), nor more than one thousand dollars (\$1000.00). Each day of violation shall be a separate offense.

It shall be the duty of 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 the 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.

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, through its members, officers, counsel or agents, and if it deems necessary, prosecute any violator directly and in its own name.

SAVING CLAUSE.

Section 22.—This Act shall not be construed to prevent or to affect:

OTHER PROFESSIONS OR TRADES.

(a) The practice of any other legally recognized profession or trade; or
NONRESIDENTS.

(b) 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; or

RECENT ARRIVALS IN STATE.

(c) The practice of a person not a resident of and having no established place of business in this state, or who has recently become a resident thereof, practicing or offering to practice engineering or land surveying herein for more than thirty days in any calendar year, if he shall have filed with the Board an application for a certificate of registration and shall have paid the fee required by this Act; provided that such person is legally qualified by registration to practice engineering or land surveying in his own state or country in which the requirements and qualifications for obtaining a certificate of registration are not lower than those specified in this Act. Such practice shall continue only for such time as the Board requires for the consideration of the application for registration; or

GOVERNMENT OFFICERS AND EMPLOYEES.

(d) The practice of officers and employees of the Government of the United States while engaged within this state in the practice of engineering or land surveying, for said government.

INVALID SECTIONS.

Section 23.—If any Section or Sections of this Act shall be declared unconstitutional or invalid, this shall not invalidate any other sections of this Act.

REPEAL OF CONFLICTING LEGISLATION.

Section 24.—All laws or parts of laws in conflict with the provisions of this Act shall be, and the same are, hereby, repealed.

Lake Charles Chapter Formed. On Monday, November 3, 1947, the chapter held its first meeting. The following were elected:

F. T. Clarke, President; E. H. Goodloe, Vice-president; and R. E. Burgess, Secretary.

The Constitution and By-Laws calls for two members of the Executive Committee who are past presidents. Since it is not possible to comply with this ruling at the formation of the chapter, Harry Smith and G. H. Hill were elected to serve as interim members of the Executive Committee until such time as these positions can be filled by past presidents.

Our State Police. Probably most of us feel that our state police should be more numerous, but here is their record for September, 1947 as in LMTA News:

State police headquarters here have reported that 7,913 vehicles were halted during September for having improper lights, bringing to 21,026 the number reported during the three months of the current fiscal year.

Total violations of traffic and safety regulations during the month were 13,401, which brought the year's score up to 34,185, according to Wilbur D. Atkins, superintendent of state police.

Fines collected during September amounted to \$35,193, while sales totaled \$5,780.

State troopers investigated 232 accidents during September, the report showed. A total of 243 arrests were made and 69 convictions were obtained.

The report showed 7,878 trucks inspected during the month, making a total of 19,229 for the fiscal year.

Other violations reported included: no license 911, lost license 247, improper license 596, overloaded vehicles 492, no brakes 248, no name and address 1,337, no flags or flares 929, speeding and reckless driving 52, drunken driving 58, and miscellaneous 618.

The National Spring Meeting of the American Society of Mechanical Engineers will be held in New Orleans in 1948. The dates are March 1-4, inclusive. An interesting program is planned, featuring technical papers, plant trips, and entertainment in the evening. Headquarters will be at the St. Charles Hotel. Mr. M. C. Abraham, is general chairman.

The American Institute of Chemical Engineers will hold its first 1948 Regional Meeting at the Roosevelt Hotel in New Orleans, February 15-19. A comprehensive program of technical papers, plant trips, and entertainment is being worked up. Mr. E. A. Gastrock is general chairman.

PAPERS AND DISCUSSIONS

SOME ASPECTS OF MILITARY ENGINEERING IN THE EUROPEAN THEATER*

I believe I am safe in making the assertion that World War II was an Engineer's war. The unprecedented use of mechanical transportation and mechanized equipment, the rapidity of movement, the need for handling and transporting huge tonnages of equipment and supplies, the need for airfields in great numbers, the need for engineers in beach operations, port reconstruction or new construction, are some of the reasons why it truly was an Engineer's war.

Our military success was founded upon the highly developed stage of our engineering and construction professions, our ability to do things in a hurry through a "know how", and the best construction equipment in the world. I can only point out in a very limited way how we used this experience, this equipment, and the magnitude of the job. It was a job largely accomplished by the engineering and contracting professions, whose members put on a uniform for a while. It is true that the professional military engineer played an active part, but it is interesting to note that while before the war the commissioned strength of the Corps of Engineers was just under 800 the wartime commissioned strength grew to the huge figure of about 20,000.

Engineering and construction in war is a far more crude proposition than in our normal peace-time operations. Shortage of time and materials and insufficient construction forces to accomplish all tasks arising lead to the necessity for short cuts, improvising, and doing only so much as is essential to support the combat forces.

On the other hand, planning the engineer's support for a military operation of any importance requires the same carefulness, imagination and ingenuity which is generally applied in the largest undertaking in our peace-time war.

Planning for the engineering operations in Europe was a most important undertaking. Obviously, the first step in planning was to create a great base in England. This meant the provision of vast facilities for quartering and training troops, storage facilities for all elements of the force, air bases for bombardment and fighter units which would soften Germany and later support the invasion. It was a concurrent job to determine what engineering supplies, equipment and troop units would be required for the invasion and

* Presented by Colonel John R. Hardin, before a joint meeting of the Louisiana Engineering Society and the American Society of Civil Engineers, Louisiana Section, at a regular meeting of the Society, August 11, 1947.

to phase arrival of supplies in the United Kingdom so that the first three months' requirements on the continent would be available from our stock piles stored in England. We could not risk the early support for this unprecedented operation being at the mercy of a stepped-up undersea warfare, or new German weapons.

We did not actually build all the facilities required for our forces in England. The British Government early in the war obligated themselves to meet our needs, but as the war progressed they found themselves unable to meet their commitments to us due to labor, material and equipment shortages and at the same time provide the necessities for their own forces. As a consequence, engineering troops were sent to England beginning in 1942 in as large numbers as this country could organize and train, and a high priority was given movement of engineers to the United Kingdom up to and even long after D-Day. To be associated with the British effort in those days was to appreciate their staunch qualities. Of course, they didn't go at things like we did, and their equipment could not compare with that which the American construction industry was using, but nevertheless, the job the British did was of heroic proportions. Our construction forces, using British materials almost entirely, also made a magnificent contribution in completing about one third of the accommodations our forces occupied, over twenty major air bases, storage facilities of all kinds and also provided the facilities for embarking our own troops for the continental invasion.

The British began planning the military operations for the continental invasion early in the spring of 1942, and it was not until July 1942 that the U. S. Army and Navy representation appeared on the various planning committees. These committees undertook the task on the basis of a completely integrated effort, the British and American planners working side by side. The proposed operation was given the code name "Round-up" and it was to take place early in 1943. Landings were contemplated on the Le Havre peninsula but it was not very specific as to details. As the planning progressed it became obvious that "Round-up" presented logistical problems which were probably impractical of solution by the proposed jump-off date. Requirements of construction materials and engineer troops were determined with as much accuracy as the incomplete plan would permit, and procurement was initiated for those materials requiring the longest production period, but in the end this operation was abandoned in favor of the "Torch" operation which was the invasion of Africa; however, this planning was valuable as an exercise in training staffs, and in starting the procurement in this country and in England of engineer equipment and materials.

In April 1943 the headquarters of the Chief of Staff, Supreme Allied Command, nicknamed "Cossac" was established. Planning of a new continental operation began, but practically a new start was required in spite of the work which had been done before. In this operation each force, British and American, was to plan its portion of the operations separately rather than as a joint undertaking as before, but the principal of close U. S. British cooperation in the field was retained. This superior headquarters acted only on broad policies, or to settle questions on which an agreement between the two forces could not be reached. In January 1944 Supreme Headquarters, Allied Expeditionary Forces, short titled "Shaef", succeeded "Cossac", and General Eisenhower arrived soon after this date to take command. As our military strength increased, through the great training program in America, and as the availability of arms, equipment and supplies became assured through greatly increased shipments to our United Kingdom base, it was apparent we were on the verge of the long anticipated moment.

It might be interesting to note that until the late months in 1943 a definite point or points of landing on the continent had not yet been fixed, nor had the scheme of maneuver been fully determined. It was necessary, however, to have placed our orders on the U. S. and British supply agencies for the bulk of our equipment and supplies as early as June 1943. It was also necessary to indicate to the War Department the engineer troops units of various categories which would be required to support the field forces, and the service forces which operate behind the combat troops. We had received information from time to time in 1943 as to how many divisions would be available from United States. As the broad strategy changed with the success in the Mediterranean Theater, the number of available divisions for the invasion of Europe increased from sixteen in February 1943 to forty-seven in October 1943. Engineer requirements of all kinds had to be stepped up in successive increments accordingly, and the greater force resulted in greater demands for housing or camp facilities in the United Kingdom as well as more storage, more airfields, more supplies, equipment and construction materials to support the greater effort in France.

Engineering planning for military operations in the European Theater consisted primarily of the resolution of five problems:

1. Fixing responsibilities for engineering activities. This involved the outline of responsibility in the various engineer levels, Division, Corps, Army and Army group and Communications Zone, and also, engineering functions to be performed by the Navy and Air Forces.
2. To establish policies and procedures to be followed.

3. Determining requirements for installations on the continent, communication facilities, including roads, railroads, bridges, port facilities, etc. In other words, what was likely to be needed.
4. Determining requirements for engineering troops, both in combat and service forces, and
5. Determining requirements in equipment, materials and supplies.

In general, this type of planning was conducted in the office, Chief Engineer, and by numerous conferences with the various affected staffs, map exercises, and a lot of detail work on the part of selected individuals and groups of individuals using all available intelligence data obtained from American and British sources. I will not attempt to outline all of these activities, but instead will touch on those things which are more typically engineer planning functions in connection with construction.

Port Reconstruction. Required port facilities were initially based on a more or less arbitrary figure of 1,000 long tons of supplies required daily to maintain one combat division, plus its proportion of all other troops from the front line back to the port or ports of entry. The number of divisions ashore at any date was therefore a measure of the total port capacity required. Experience factors available prior to the operation indicated that an average of one long ton of cargo could be discharged over one linear foot of quay per day. Knowing the required daily maintenance tonnage, this relationship established the total length of quay space required. The enemy's demolition policy, as deduced from the North African and Italian operations, and intelligence then available on his preparations in French ports, indicated that he would make every effort to deny ports to our use. It was therefore assumed that destruction due both to enemy activity and our own air attack would render ninety per cent of the facilities in major ports, and seventy-five per cent of those in minor ports initially unusable. Application of those assumptions to the total length of quay required determined the amount for which reconstruction had to be planned. An arbitrary increase in this length of quay was made to provide materials for subsequent maintenance. Under the conditions of tide and weather which generally exist in the channel ports, marine operation even under normal conditions is not a simple problem. It was early recognized that successful operation after capture would depend upon such facilities as could be provided through rapid repair and improvisation of structures for the discharge of military cargo. Accordingly, various methods of quay reconstruction were devised covering all known physical conditions and all conceivable demolition effects. A bill of materials and estimates of labor were prepared for reconstruction of a 100

foot unit length of quay by each of these methods. Appropriate types were selected for planned reconstruction in each of the ports under consideration, and a total bill of materials was computed.

In addition to reconstruction materials it was necessary to estimate and provide dredging plant for the maintenance of approach channels and the removal of accumulated debris in basins. The desirability of providing special ships for port repair work, equipped with heavy lifting gear, diving apparatus, and fire fighting equipment was also investigated. On the results of this study, five such port repair ships were designed and built for U.S. use in the operations. No discussion of port construction in the continental invasion would be complete without a reference to "Mulberry A" and "Mulberry B," two artificial harbors erected on the channel beaches during the early stages of the operation. Participation of the U. S. Planning Staff in preparations for this venture were limited. The project was conceived by the British and largely carried forward under their direction. Some assistance was given in the preliminary tidal studies undertaken to determine the feasibility of the scheme. Thereafter, participation was limited to technical advice on the construction of concrete caisson units which formed the artificial breakwaters, and the actual construction of some of these units when it became evident that British labor was incapable of completing all construction before the invasion. The responsibility for assembling in place the American artificial harbor was assigned to the U. S. Navy. Planning the facility and fitting it into the beach area assigned the American forces was a cooperative undertaking with the Corps of Engineers.

Railway Reconstruction. Prior to the time that location of the proposed landings was definitely known it was necessary to plan railway reconstruction on a generalized basis. Average capacities of French railways, in the general area under consideration, were investigated and the number of separate rail lines required to transport maintenance tonnages involved was determined. No attempt was made, however at this time to select specific lines for reconstruction. Subsequently, as operational data became firm it was possible to select a definite rail net and revise original approximations. Aerial photographs covering more than 1,000 miles of French railway lines were studied and the average bridge gap per mile of track and percentage of each length of span was ascertained. This permitted the compilations of a schedule of bridging material which would be required for replacement of all bridging over a typical 100 mile length of line. Similar schedules were prepared for replacement of track structure and road bed. Extreme difficulties were experienced throughout the plan in attempting to establish a reasonable demolition factor for rail and for railway bridging. This was particularly true since a comparatively small

change in the demolition factor would alter the total tonnage of reconstruction materials required. Experience gained in the North African operation indicated that rail and bridge demolition would be minor. Planning proceeded on that assumption until shortly after the invasion of Italy. Here the enemy concentrated heavily on bridge destruction and here also the effects of his track rooter, a device for completely rupturing each tie and blowing each length of rail, were first met. Whether this latter device would be used in northern France was, until the mounting of the operation, entirely a matter of conjecture. It caused great concern. However, demolition factors were finally established, varying from 25 to 50 per cent in the case of track structure, and 50 to 75 per cent in the case of bridges, dependent upon span length. Once the above factors had been established, computations of the total bill of materials, using the unit schedules previously described, was a matter of simple arithmetic.

Road Reconstruction and Maintenance. As in the case of railway reconstruction, it was only possible in the initial planning period to approach this problem on a generalized basis. Typical road nets from previous operations were studied and an average road density, expressed in miles of road per square mile of territory occupied, was obtained. Once the planned position of the front line was known, or assumed as of any given future date, the total area under occupation could be computed and it was then possible to determine the extent of the road problem. In the later stages of the planning, special road nets were selected for support of the operations. In every case, however, the over all accuracy of the original approximations was confirmed.

Aerial photographs and technical publications were studied to determine the character of French roads and the average length of bridging per mile. Material schedules were then prepared for reconstruction of a typical mile of road base and surface, for maintenance of one mile of road over a period of one month, and for the replacement of all bridges over a unit length of highway. The British Bailey bridge, adopted as standard by U. S. forces, was the basic structure in this bridge schedule, supplemented by steel stringer and timber bridges for the shorter spans. Again, as in the case of railroads, study of the previous operations in the Mediterranean Theater permitted the establishment of a reasonable demolition factor for roads and bridges, and compilation of the total bill of materials was a simple matter.

POL—this was a very commonly used expression in Europe. It was of British derivation and it meant petrol, oils and lubricants. The importance of this element of engineer responsibility is not indicated by the brief title it was given. It meant to us the construction and operation of bulk facilities for unloading gasoline

from tanker, its storage at ports, transportation through pipelines, and the construction of bulk storage facilities along and at the end of the pipelines. Planning bulk POL distribution did not lend itself readily to a generalized solution such as in the case of other activities I have mentioned. In each operation studied it became obvious that it was necessary to lay out the proposed pipeline system based on the best available data on total consumption and probable points of use. Therefore, the tactical plan was really a necessity before this type of planning could be undertaken with any accuracy. The necessity of insuring pipeline distribution of gasoline even before the seizure of a major port for the accommodation of large tankers was early recognized. Experiments were conducted both in the U. S. and in Great Britain on the laying of ship to shore pipe lines by which small tankers could moor one half to one mile off the beach and discharge direct into the shore side distribution system. The method of pulling successive lengths of pipe seaward from the beach using a vessel similar to a submarine net tender was adopted as the most feasible solution, and was actually used by the American forces in conjunction with the early operations at Omaha Beach. A flexible buoyed hose attached to the seaward end of the anchored pipe permitted tankers to moor and discharge their contents directly into the system. The vulnerability of tankers discharging off the open beach, or from a berth in a port, and the comparatively short distance across the English Channel, led automatically to consideration of submarine pipelines laid between the British and French shore lines. Very secret experiments in the laying of such lines were carried out both in the U. S. and in the United Kingdom. The British selected two types of lines, one of the conventional transatlantic telegraph cable, two two or three inch inside diameter, with the conductor wires omitted; and the second, a flexible light weight three inch pipe welded together in 10 mile lengths and wound on large reels which were buoyant enough to be towed. The pipe was to be payed out as the tow moved to the French coast. Experiments conducted in the United States consisted of pulling to sea successive long lengths of extra strong high pressure 4 inch steel pipe and joining these lengths at sea by a flexible communication called a "grasshopper joint." The procedure required the services of a diver, and in the depths and currents encountered in the English Channel, it was determined that diver's work would be very difficult, if not impossible. However, the project might have been successfully undertaken had it not been for a shortage of heavy tugs required for the towing, and the necessity for preserving utmost secrecy before D-Day. Preparations on the English coast which would enable the welding of several miles of this pipe would have been very difficult to accomplish, and if discovered by the Germans would have been as

good as a finger pointing to the intended landing on the French coast. Incidentally, the British were unsuccessful in laying a cross channel line in the early phases of the operation, and it was not until the port of Antwerp had been secured that they were able to install a few lines of the transatlantic cable type.

In all of these planning activities the ultimate aim, of course, was to provide for a stock pile of supplies and a pool of engineer labor which would permit meeting engineer responsibilities. As you can well imagine, it was not possible to accept blindly the estimates by the technical personnel responsible for each individual category of construction. The natural tendency of each specialist was to play safe and sure that his particular phase of the work did not want throughout the entire course of the operations. It was necessary, therefore, to take a detached viewpoint and to cut down the enormous estimates to something which was practical to procure, ship, store, and trans-ship to the continent. General judgment played a large part in the final analysis of the planning, but a thorough-going initial analysis of the various problems was considered the best approach to the problem. Accepting the risk involved in these reductions was, of course, an element of the planning effort.

Construction on the Continent. The construction program on the continent, other than engineer operations in actual combat, consisted in general of providing transportation facilities, handling gasoline in bulk, general construction, rehabilitation of utilities, and construction for the air forces.

The most difficult problems incident to construction on the continent were in making construction supplies available at the point of desired use at the time needed. This applied particularly to items that could not be readily improvised from materials available from captured stocks and local sources. Limitations in shipping space, port facilities and overland transport imposed strict priorities on the allocation of tonnages for various purposes. Essential operational supplies such as food and ammunition necessarily were given first priority. Materials for rehabilitation of ports, POL facilities and railroads were given next consideration. Limitations in overland transport were generally a controlling factor in the rate of construction. During the campaign in Normandy and northern France the major portion of general construction exclusive of POL facilities was accomplished by the use of captured stocks and by exploitation of local resources. During the latter period of the campaign general construction supplies shipped from the United Kingdom Base became available in sufficient quantity to relieve the shortage that was becoming critical as the result of virtual exhaustion of captured and locally available materials.

During the two years preceding D-Day, preparations were made for the reconstruction of various ports of entry on the continent. All available intelligence data, including tide table, charts, current velocity statistics, harbor plans, existing port facility records, information on underwater structures, aerial photographs and local resources information were studied and screened and incorporated in a plan and estimate for the reconstruction of each port studied.

In the case of Cherbourg the estimate of German demolition closely paralleled the conditions found. If the supply situation had been as anticipated, the reconstruction would have been in close agreement with the advance planning. Port reconstruction studies were based on the use of various types of steel trestling, cribbing, and wood piling, all of which were stocked in the UK depots. The difficulty of delivering these materials, except pile rafts, and the availability of local timber, resulted in considerably more pile construction than had been planned. The familiarity of American construction personnel with pile construction and their lack of experience with British substitutes had considerable bearing on this change. Those engineer units recruited from the U. S. construction industry and those which had been employed for a long period in the construction program in England performed with outstanding success. Other units whose personnel consisted mainly of draftees, although given reasonably good training before landing on the continent, were at times slow in finding themselves, but it must be admitted to their everlasting credit that within a reasonable period of time they too became well qualified for their tasks.

Cherbourg was the only major port used by the U. S. forces during the first ninety days of operation. It was captured on D plus twenty, and the first shipping entered on D plus forty-three. Mines of every description were encountered and block ships of every size were sunk in the harbor, making the Navy's job of clearing underwater obstacles a major task. The difficulty of the Navy's job allowed ample time for the carrying out of the Engineer's responsibilities. The first construction efforts were devoted to providing concrete aprons laid on the beach formations within the harbor area so that DUWK's and landing craft could unload with the greatest possible dispatch. (Bear in mind the tide range was over 20 feet). Next priority was given to the construction of barge unloading facilities by the construction of wooden pile wharves about forty feet wide, extending out over an existing sloping seawall; and finally, timber pile wharves suitable for serving ocean-going ships were constructed at numerous places within the harbor area, either where stone quays had been destroyed or the modern facilities for the "Normandy" and other large vessels had been completely wrecked by German demolitions. It was a case of picking the most likely sites which could be most

readily cleared and reconstructed with a minimum of materials and labor. The port was finally developed to an unloading capacity of 26,000 tons per day as compared with the 10,500 originally planned. Greater unloading capacity could have been provided but there was insufficient rail and road capacity to serve it.

While Cherbourg harbor was being prepared for the major point of entry, numerous minor ports were also cleared and utilized as far as possible for the accommodation of coast-wise ships which were used in large numbers in moving supplies from England. These "Coasters" were sturdy craft and could as well sit on a clean hard bottom as tie up to a dock or wharf. In many of the minor ports these "Coasters" had insufficient depths to remain floating all through the tide cycle and therefore had to unload to "Lighters" or to Army DUKW's. There was great pressure, of course, for any kind of port facilities because the beach operations required tremendous effort to move a ton of material from a ship to the shore, over the beaches and to the points of use by the combat forces by truck transport.

Opening the port of Le Havre was a similar problem to that encountered at Cherbourg. One outstanding difference at Le Havre was the construction of a floating pier 2200 feet long required for berthing ships with personnel and light cargo. These floating piers were made out of assemblies of the NL pontoons, the famous Navy Lighterage pontoon, held in place by pile clusters. In view of the great tidal variation, which ranged up to 22 feet, and the depths of water found in Le Havre harbor outside of the locks, it became a serious problem in keeping these pile clumps in place, but this same facility which served to disembark over a million men on the continent also served for the return of a major part of our European forces.

Railways. Up to VE-Day there were constructed or rehabilitated over 19,000 single track miles of railways and 538 bridges for military use only, all within a period of eleven months. The timing for all railway construction was coordinated with the phase lines of the tactical plan in order to determine the materials and labor requirements in any given period. The actual amount of railway track rehabilitated in the campaign across northern France considerably exceeded the original estimates. In some cases temporary rail lines that could be more quickly repaired were put in use until the planned main lines could be rehabilitated. The major portion of the railroad construction in the north of Europe was performed by the Advance Section of the Communication Zone. This organization was assigned responsibility in the territory immediately in rear of the advancing armies, and as conditions would permit they were relieved of their responsibility for rear areas so

that they might keep up with the rapid advance of the tactical forces. The work this organization performed on railroads was truly amazing. Engineer units were organized into groups, each with allotted territory under a group commander. Reconnaissance for railroad construction was carried out by organized teams for each group. Important field engineering on railroad reconstruction was the responsibility of the Section Engineer. Almost the only engineering of importance was involved in the construction of bridges. Plans for bridges were, in general, prepared by group commanders, who in the case of major bridges submitted plans to the Engineer, Advance Section, for approval. In the case of bridges of great importance, such as the Rhine railroad bridges, plans for the work were submitted to the office of the Chief Engineer in advance of construction. Decentralization of this railroad work to a competent, well equipped force was considered absolutely necessary for successful operations.

The difficulty of obtaining shipping from England and transportation difficulties on the continent precluded the use of many items in the stock pile of heavy construction materials which were accumulated in England prior to the invasion. Our luck was not all bad, however, because we were most fortunate in finding that the Germans had manufactured steel beams one meter in depth and up to twenty-nine meters in length at a steel plant in Luxembourg, which they were using extensively for bridging in their attempt to repair extensive bomb damage by our air forces. These beams, used one to three per rail, depending upon the length of the span, made an adequate and simple bridge for military purposes. With our fine construction equipment, particularly the heavy cranes which we had fortunately provided to supplement ordinary troop unit equipment, it was possible to handle these heavy beams with great facility. A number of these beams were captured in France and the first major bridge reconstructed, that at Caretan, used these beams. As soon as the steel plant in Luxembourg was captured, production of additional beams was started. About 90 per cent of the railroad bridging for continental operations was built with them.

In the pre-invasion planning it was realized that the two greatest problems would be the reconstruction of ports and bridging the Rhine. Studies of the Rhine railroad bridges were initiated at that time and carried on continuously. Work on these studies was accelerated in the fall of 1944 after a foothold had been gained on the continent. Typical plans of a pile railroad bridge utilizing available materials were prepared and furnished to the section engineers who were to be responsible for their construction.

As the pressure for port work was lessened through the capture of the great port of Antwerp, practically unharmed, it became

possible to divert the highly trained port construction units and engineer general and special service regiments to the engineers who would be responsible for the Rhine crossing. Necessary equipment and supplies were sent to forward dumps. Steps were taken to cut and stock huge quantities of timber piling, and the steel mill in Luxembourg was put on a stepped-up schedule for providing meter beams which were going to play an outstanding part in the crossing of the Rhine.

All rail and highway bridges in the American sector of the Rhine were destroyed, although quick work by the Ninth Armored Division resulted in the capture of the bridge at Remagen before all demolition charges were set off. Despite tremendous efforts by the Army and Advance Section Engineers, the bridge finally collapsed. It had, however, served its purpose since at the time of its collapse a bridgehead had been well established.

The railroad bridge at Wesel was one of the first five to be completed. This bridge was near the northern boundary of the American sector and was on the north flank of the Ruhr industrial area in Germany. Ground reconnaissance made immediately following the assault crossing of the Rhine was carried out to determine the exact location of the bridge, although its approximate location had been a matter of study for several years. Only a minor change in the planned location was found necessary.

Light standard steel trestling on timber piles was used for the piers. Meter depth beams were used for the girders. A long approach fill was required as well as a bridge 460 feet long across a tributary called the Lippe River. The main crossing of the Rhine was 1,753 feet long. Counting the bridges and approaches, 13,692 feet of track was constructed for the crossing. The first train crossed 10 days, 4 hours, and 25 minutes after the start of construction. Major equipment used was five skid rig pile-drivers and four two-yard cranes equipped with long booms, all mounted on NL pontoon barges. A Port construction and repair group, a construction battalion, two general service regiments, as well as other small engineer units were employed on the project.

The bridge at Mainz was planned in the same manner as the Wesel bridge. Here, as at Wesel, a change in location over that previously planned was made as a result of a physical reconnaissance. Fourteen-inch steel piles were used on this project. Because of their greater bearing capacity only nine were needed for a pier compared with twenty-four timber piles used at Wesel. This reduction in the number of piles resulted in three floating pile driver rigs being sufficient. The bridge in other respects was similar to

the one at Wesel. It was nearly 2,100 feet long and took 10 days, 35 minutes to construct.

Railroad bridges were also constructed at

Manheim

Karlsruhe

Duisberg

At Duisberg the decision to construct the bridge came a month after the initial assault crossing. Experience on the previous bridges plus superb planning resulted in this bridge being completed in six days, 14 hours after the start. The speed of construction did not interfere with the quality of the work, and this bridge was the most substantial of the five built.

Permanent highway crossings of the Rhine had been planned, as were the railroad structures, well in advance of the operation. They were generally steel stringer bridges with double timber or steel pile bents, having a central span of 80 feet for a navigation opening and a vertical clearance to low steel of 22 feet at high (navigable) water. They provided a roadway 25 feet in width, two-way travel for class 40 loads, with footwalks 4 feet wide on each side of the roadway. All plans included the protection of bridges against enemy action by providing anti-mine booms upstream from each bridge. Since preliminary investigation had indicated that firm gravel and boulders might be encountered, stocks of H piles were assembled together with the necessary timber piles.

Eight major highway bridges were built; six by the Army Engineers and two by the Communications Zone Engineers. Even Naval equipment participated in these operations. The Navy landing craft of various types which could be moved over land and through inland waterways proved extremely valuable in the swift currents of the Rhine. Large quantities of engineer pontoon equipage was also used for floating cranes and transportation of heavy materials.

This type of bridging across the Rhine followed the tactical crossings which were made by the assault troops using assault boats, ferrying methods and floating bridge equipment. Having established these semi-permanent highway bridges it was then possible for the combat engineers to remove their floating bridges and have them available for moving forward in close support of the field forces in the area to the east of the Rhine.

Roads. The tremendous number of motor vehicles used in the operations on the continent made adequate road maintenance a subject of primary importance. Heavy loads and the use of tracked vehicle subjected many of the roads to traffic for which they were never designed. The speed of advance made a various times could not have been sustained without a usable road net, and the rehabilitation of bridges and the maintenance of such a road system

was a task, in the first instance, of the attacking Armies. Their methods were necessarily such as to provide immediate access. Floating bridges and Bailey bridges were their primary means of making the initial crossings where bridges had been destroyed. They frequently built pile structures with timber decks, using either materials locally available or materials which were pushed forward rapidly for their use. As the armies advanced, the Communication Zone troops took over the road and bridge operations in their rear. Bailey bridges were replaced as promptly as possible with more substantial structures. As soon as possible the maintenance of roads was turned over to the civilian organizations, but then it was a problem of furnishing them the necessary materials and equipment.

The problem of road reconstruction and maintenance is a story in itself, but the great dependence and importance placed upon road transport for long hauls was demonstrated immediately after the break through at St. Lo. At this time, rail facilities were not sufficient to carry a tremendous traffic. It was necessary to supplement the limited rail facilities for a period of three months following the break-through by designating a selected road route as an express highway called the "Red Ball Route." It was restricted to one-way travel and limited to essential high priority truck traffic. It followed the shortest available routes from St. Lo to Hirson and Commercy, which involved roundtrips of 686 and 781 miles respectively. At other times, during the operation other express roads were established as the need arose, such as the "Green Diamond Route" in the Cotentin Peninsula from Cherbourg and Utah Beach to railheads at Granville and the "White Ball Route" from Le Havre to railheads at Paris.

A word or two about our POL facilities might be of interest. As I mentioned before, the supply of gasoline in unprecedented quantities to support military operations on the continent was accomplished by establishing a bulk distribution system. The facilities constructed and operated by the Engineer Service consisted of five principal pipe line and port systems plus numerous rail serviced minor bulk storage and issue points prepared for operation by the Quartermaster. In all, approximately 3,600 miles of pipelines were constructed, of which about 2,200 miles were of 6 inch pipe and the balance 4". Storage facilities with a capacity of over 7 million barrels were constructed or rehabilitated. During the month of April 1945 the pipeline systems pumped better than 78 million ton miles.

A minor system was installed beginning at D plus 3 to provide a bulk distribution system during the initial period preceding the capture of Cherbourg. Facilities were constructed at Port-en-Bessin for the reception of small tankers, two 6 inch lines being provided for motor transport gasoline and one 6 inch line for

aviation gasoline. Two ship to shore submarine lines were constructed which permitted discharge by larger tankers. From these reception points, which were generally north of Omaha Beach, or adjacent to it, pipe lines were constructed to dispensing points at three towns just north of St. Lo.

The major system originated in the port of Cherbourg. From rehabilitated storage in Cherbourg two 6 inch lines were pushed south to St. Lo and in successive steps on to the Seine at a point about 50 miles east of Paris, and from that point on to the Rhine at Mainz, Germany. The linear distance from Cherbourg to Mainz is approximately 600 miles. Another system was installed from the port of Antwerp, Belgium, where storage facilities, virtually undamaged, were promptly put into use for servicing the pipeline from this port to Maastricht, Holland. These lines were later carried across the Rhine at Wesel, the point where our first railroad bridge was constructed. The linear distance from Antwerp to Wesel is 150 miles. The southern system originated at Marseilles. Two lines were built from this southern port and continued through Lyons, Dijon and across the Rhine at Frankenthal, Germany. This system was 586 miles long. Two additional systems were installed, one along the Seine from the port of Le Havre, and another to supply units in the operation following establishment of the Remagen bridgehead.

With certain minor exceptions, all pipeline used was either 6 inch or 4 inch grooved for assembly by victualic couplings. The victualic coupling made the continent pipe line operation possible since welded or screwed lines could not have been constructed fast enough to support the operation. Tanks were bolted steel storage tanks ranging in size from 250 to 10,000 barrel capacity. The pipe lines, of course, required a number of pumping station. Both centrifugal and reciprocating pumps were used, selection being governed by the type available. The magnitude of the pump requirements was such that only a small percentage could be produced in the United States with industrial type engines. The automotive type engine which was normally received was the source of constant apprehension and tremendous maintenance difficulties, but was successful and did not prevent meeting the required deliveries.

The pipelines were designed so that each 6 inch line would transport 1,500 tons per day and each 4 inch line 500 tons per day, the day consisting of a 20 hour operating period. This allowed 4 hours per day shutdown for maintenance and repair of equipment and for repair of line leaks and breaks.

Pipelines were laid on the surface of the ground and were connected by victualic couplings except at road and railroad crossings and in inhabited localities, where welded buried lines were used.

Wherever possible the route followed a hard surfaced road to facilitate delivery of materials. In the early days in Normandy, lines were laid on road shoulders and in some cases in ditches. This was necessary because the urgency for speed of construction did not permit breaking through hedgerows and removing mines so as to lay pipeline on the far side of drainage ditches. This procedure of course, resulted in numerous breaks caused by vehicular accidents since the pipeline route was also the "Red Ball Highway" route. As soon as time permitted, the most exposed portions of the line were relaid on the far side of the ditches.

Underwater crossings were made with heavy screwed casing when it was available and with heavy welded pipe when screwed casing was not obtainable. Numerous suspended crossings of relatively narrow streams up to 300 feet wide were installed. For the crossings of the Rhine River all methods were utilized. Two months before the assault of the Rhine was planned, materials were assembled in forward dumps for the three planned pipe line crossings, plus materials for a fourth crossing in the event a change in plans would require an additional line. Since physical reconnaissance was impossible at the time, each stock pile contained materials to permit crossing by suspension from above-water portions of demolished bridges, and four underwater crossings if the latter should be required. This type of advance planning proved to be extremely wise because in the end, all materials had to be used.

Housing. With only a few minor exceptions, there was no new construction of hutted or other semi-permanent type housing prior to VE day. Existing installations were used to a maximum. Troops in transit or in locations for relatively short durations normally used organizational tentage when existing shelter was not available. Such new fixed camps as were constructed were completely tented, the principal engineer items consisting of the provision of roads, hardstandings, sanitary facilities and water supply. After VE day it was necessary to construct large camps for the accommodation of troops who were to be deployed either to the United States or to Japan. This program called for the provision of over 600,000 capacity in four major camp areas. Again they were of the tented type but of a higher degree of comfort than the few bivouac sites prepared for the reception of troops. The provision of hospitals required a considerable construction effort. Prior to the break-through at St. Lo, 10 tented general hospitals were completed or were under construction on the Cotentin Peninsula below Cherbourg. Following the St. Lo break-through, the rate of advance was so rapid as to reduce anticipated requirements for installations in Normandy and Brittany, and permitted the use of existing facilities available in Paris and other population cen-

ters further forward at such places as Liege, Nancy and Verdun. These existing facilities were generally in need of rehabilitation or had to be greatly expanded for our use. We not only used existing hospitals but converted many public buildings and schools. This was a type of work for which Army Engineer units were not particularly well adapted and it was a severe struggle to keep up with the Medical Corps requirements. Large numbers of civilian technicians were employed but they were practically without tools and materials. In summary, 20 per cent of the hospital requirements were provided by new construction, mainly in tents; 49 per cent through conversion of existing buildings; and 31 per cent by utilizing existing hospitals.

The construction of airfields on the continent called for the provision of one advanced landing ground to be operational by the morning of D plus 14. It was further planned to have 12 ALG's in operation by D plus 25, and 20 by D plus 40. In order to provide as close support as possible, it was decided that fighter fields should be within 60 miles of the front. All site selection for this pre-invasion planning was based on intelligence data. Aerial photos, multiplex site maps, soil studies, plus other technical intelligence were combined to permit selection of the most suitable sites for rapid development.

For the operation, two light-weight temporary airfield surfacing materials were developed, basically by the British. These were square mesh track and prefabricated bituminous surfacing called PBS. While it was originally intended that either one or the other of these materials would be used, depending on the situation, in actual practice it developed that a combination of the two was more durable. Pierced steel plank (PSP) was to be used as soon as transportation facilities would permit moving this material from United Kingdom bases. In general, during the early invasion period PBS and square mesh track were used, with pierced steel plank being utilized solely for medium bomber fields. Following the breakthrough and all during the rapid movement across France logistics limited surfacing on new sites to PBS. During this period many existing hard surfaced fields were uncovered and rehabilitated, thus alleviating the supply problem a great deal. As winter came on and the static period of operation began it was necessary to utilize PSP as the primary surfacing material, but gravel and crushed stone had to be used in large quantities for base course construction in certain areas where soils were not good.

Engineer troop units supporting the Air Forces were grouped under a single command, termed "Ninth Engineer Command." By D plus 40 at the time of the St. Lo break-through some 16,000 engineer aviation troops were then on the continent and they had placed 18 fields in operation. By D plus 90 some 50,000 tons of

surfacing materials had been used. The rapid advance by the Air Forces to the German borders produced an ever-increasing shortage of surface materials. Rehabilitation of fields was relied on to the maximum extent. In the first 100 days, that is, by 15 September, 67 fields had been completed and 18 were under construction. By VE day a grand total of 241 fields had been constructed or rehabilitated since the invasion began.

I hope I have given you some conception of the engineer operations in Europe. It is important, to realize the magnitude of such an operation and if in the future we are confronted with the necessity of again supporting combat forces on foreign soil, which I hope will never come to pass, it is necessary to enter the job on rather a grand scale. If the engineer effort fails, the whole effort fails.

Where so much is at stake, preparations must be on a generous basis. Failure of an operation through lack of sufficient support is, of course, unforgivable, and no chances could be taken on having our forces driven back into the sea. It is true that we had many materials available which we were never able to use, but war in any event is a wasteful process, and where large numbers of lives are involved, chance-taking from an engineer standpoint should be held to a minimum.

In conclusion let me read one extract from the report of the Chief Engineer, European Theater, pertaining to construction. "Construction even in an active theater is basically not far different from normal civil construction and should be so recognized. The necessity for simplification, improvisation and speed are, of course, greater in military construction but the basic problems of organization, materials, equipment, and labor are essentially the same. Military construction should therefore be approached from the standpoint of adapting, insofar as possible, established civilian construction methods and organizations to function within a military machine. Organizations and labor that have been developed by civilian concerns should be exploited to the fullest."

ENGINEERING BRIEFS

Tunnel Under English Channel. Despite a half-century of opposition, the Channel Tunnel Co. held its regular annual meeting at London recently and reiterated to the people of Britain and France the advantages of a tunnel under the English channel to connect the two countries.

Sir Herbert Walker, chairman of the Tunnel Company, declared that the proposal is today more attractive than at any time since it was proposed nearly 80 years ago.

Estimates prepared by the company before the outbreak of the war said that the tunnel should be driven from a location between Dover and Folkstone on the southern British coast to a point near Wissant, near Boulogne and Calais in France. The tunnel would be about 31 miles long, including more than 20 miles under the open sea, and its estimated cost at prewar figures was between \$100,000,000 and \$120,000,000. The plan calls for two tunnels, about 20 ft. in diameter, 50 ft. apart, and connected by frequent cross galleries.

—*Engineering News Record.*

Building Officials to Publish National Modern Building Code. The U. S. has inched a mite closer toward filling a long felt need, says **BUSINESS WEEK**, with a uniform, modern building code that could replace the varied, archaic ones harassing builders and materials manufacturers. "A national model code which has been in preparation by the semi-independent Building Officials Foundation set up last year by the Building Officials Conference is shortly to be published," the magazine reports, "and the foundation already has \$60,000 of the \$600,000 it wants to collect from the building industry to finance itself.

"For U. S. builders, the difference between B.O.F.'s code—if adopted widely—and those generally in force throughout the nation would be almost revolutionary. The usual local building code is a 'specification' code, which names in detail just what materials are allowable. B.O.F.'s blueprint is a 'performance' (or functional) code; it sets up certain performance standards that materials must meet with B.O.F. acting as the national testing agency. Backers of the new code claim it will give flexibility to the nation's rigid building regulations and that it would permit widespread use of

newly developed materials now banned in many communities. It would also help prefabrication.

"B.O.F. promises it will submit its new code to the industry for study and criticism soon, but as yet, few outside the circle of 70 experts who hammered out the code have seen it. Some reports indicate, however, that the blueprints strayed somewhat from the original intent of making the code purely functional since they had to find a compromise among the views of the many consultants.

"Just what chance the code has for acceptance remains to be seen. Some opponents are already criticizing the testing functions that B.O.F. would assign to itself on the grounds that it would create a 'monopoly.' And there are no indications yet how government agencies, cities, building craft unions, and home builders' associations will view the model code."

Car Stabilized. Getting rid of unwanted motion has been a big problem ever since man started traveling on wheeled vehicles. Shock absorbers and springs have been improved greatly over the years, but the first major advance in a long time had its debut, strangely enough, on the battlefields of North Africa. There a gyroscopically controlled hydraulic stabilizer kept Allied tank guns trained on the enemy even while the tanks were bouncing along over rough and mountainous terrain.

Now Dr. Clinton R. Hanna, inventor of the tank-gun stabilizer, and his associates, S. J. Mikina and L. B. Lynn, at the Westinghouse Research Laboratories have applied the same idea to take the bounce and sway from railroad cars, busses, and automobiles. Combined with a tilt regulator that banks the vehicle at the proper angle regardless of speed, the new unit promises to give travelers the smoothest ride in transportation history.

Six power-driven hydraulic shock absorbers—four to handle vertical bumps and two for sidesway—perform the trick of stabilization. A set of sensitive valves with floating weights attached instantly detect the slightest motion of the car body and signal the absorbers to provide just the right force to oppose the motion. In effect, the stabilizer pushes the wheels down into the valleys and raises them over the peaks, while the car body remains relatively motionless. This is a special advantage of the stabilizer because all of the hydraulic power goes to movement of the wheels, helping them up and down and thereby improving traction.

The car tilter consists of a pair of electrically driven screw jacks, mounted between trucks and car body at diagonal ends of the vehicle, and controlled by a small pendulum and gyroscope. When the car rounds a curve that is not correctly banked for the particular speed at which the car is traveling, the pendulum feels gravity and centrifugal force and moves inward or outward to close electrical contacts. This sends a signal to a motor-generator set that provides the power for a variable voltage system, and the jacks are actuated to tilt the car body to the correct bank angle.

This angle is such that the passengers tend to fall inward, because of gravity, with a force that just opposes the outward centrifugal force, enabling them to walk along the car aisle just as easily as if the car were on smooth straight track. A maximum bank of six degrees is provided by the tilter, which can be added to or subtracted from the customary track bank, depending upon the condition to be corrected. Even under the worst conditions—40 percent overspeed, for example—the tilter can bring the car to within less than one degree of perfect equilibrium.

With development of the stabilizer, Westinghouse research men have cut a large swath in the major problem of shock-absorber design: how to control the resonant frequencies of car bodies in motion. At such frequencies, a one-inch irregularity will cause a bounce several inches in the car body; and if there were no damping, the amplitude of the oscillation would build up until the car would shake itself to pieces. The best shock absorbers are capable of reducing this bounce to about three or four times the road bumps. The new stabilizer brings it down to less than one, an improvement in rideability by a factor of four to one. Thus, the bumps in railroad or bus travel are lessened some 75 percent.

Passenger comfort is the chief objective of the car stabilizer and tilter. But there is also an important economic advantage for railroad and bus lines. Higher speeds will be permissible, with safety and with comfort greatly exceeding present standards. The resulting improved schedules will permit greater traffic over present roads. What's more, the cost of stabilizers is insignificant compared to the cost of re-laying track to make present curves easier for the needed higher speeds.

—Westinghouse Engineer

High Pressures. "Power Plant Engineering" has published some interesting information concerning high pressures. These experiments were performed by Dr. P. W. Bridgeman. The pressure at

the center of the earth is estimated at 3,500,000 atmospheres; Dr. Bridgeman has produced pressures as high as 400,000 atmospheres, or 6,000,000 pounds per square inch.

Some interesting results are found in the behavior of fluids, Mercury, with a normal freezing point of -40°F , under a pressure of 12,000 atmospheres freezes at room temperature.

At 30,000 psi water freezes at -8°F instead of the usual 32°F .

Six kinds of ice have been produced, one variety having a melting point about the same as solder. The pressure in this case was 40,000 atmospheres.

PERSONAL

Mr. Robert S. Cooper recently wrote to the secretary stating that he is now Division Engineer with the Texas Eastern Transportation Corporation. He asks to be remembered to his many friends in L.E.S.

MINUTES OF MEETINGS AND BUSINESS OF THE SOCIETY

Minutes of Meeting of the Board of Direction Held September 8, 1947

The meeting was called to order by President Nairne in a private dining room at Arnaud's Restaurant. Those present were Messrs. Cucullu, Leake, Lehmann, Macdonald, Mire and Fernandez. Reading of minutes of the preceding meeting was dispensed with.

A financial report on the Annual Outing was presented by the Secretary who was instructed to thank Chairman Allen Betz for his splendid work on the outing.

A letter from Mayor deLesseps Morrison concerning the bond issue for public improvements was read.

A communication from Mr. Philip H. Landwehr, Chairman of the New Orleans Council for National Defense and Preparedness, was read, in which the Society was invited to join that body. The Secretary was instructed to decline the invitation, since the opinion was that the activities of the organization did not come within the scope of a purely technical society such as ours.

A communication from Paul & Beekman, Inc., of Philadelphia was read, in which the names of prospective sales representatives were requested. The Secretary was instructed to ask the firm for permission to publish their request in the next issue of the Proceedings, since there doubtless were a number of eligible and interested prospects among the Society's membership.

A draft of the engineers' License Law as devised at the special Board meeting of July 28, and a further revision by the sub-committee of the Louisiana Council of Engineers was discussed, but due to lack of time the Board members were requested to study the proposed changes individually and submit any recommendations they may wish to make.

It was moved by Mr. Macdonald, seconded by Mr. Mire, and carried unanimously, that the grade of Associate Membership be abolished. The Secretary was instructed to advise the two members now listed as Associates that they would be transferred to Affiliate members.

The resignation of Mr. Chester G. Lob was accepted with regret. A letter of resignation from Mr. E. J. Wheelahan was read, and the Secretary was instructed to advise Mr. Wheelahan that in order to resign in good standing his arrear dues must be paid.

A petition requesting the award of honorary membership to Professor Donald Derickson was read, and President Nairne stated that he would take the necessary action with the Honorary Membership Committee in the near future.

There being no further business, the meeting adjourned.

JOHN P. FERNANDEZ,
Secretary-Treasurer

Minutes of Joint Meeting of the Louisiana Engineering Society with the New Orleans Section, American Institute of Electrical Engineers, Held September 8, 1947

The meeting was called to order by President Nairne, with approximately 150 members and guests present. President Nairne welcomed the A.I.E.E. members and guests. Reading of minutes of the preceding meeting was dispensed with.

The President outlined the activities of the following committees:

Legislative
Publications
Annual Outing
Professional, Civic and Industrial Affairs
Revision of the Constitution and By-Laws

The meeting then was turned over to the chairman of A.I.E.E., Mr. William Stroud, who conducted the business meeting of that body, following which

Minutes of Meetings and Business of the Society 181

Mr. Raymond Frischertz introduced Mr. Eugene Anderson, President, Delta Society of Safety Engineers, who gave a short talk on safety engineering.

Mr. M. G. Zervigon then introduced the main speaker of the evening, Mr. William T. Hess, Vice-President and Chief Engineer of the Louisiana Power and Light Company, who delivered a most interesting and informative lecture on "Cordinated Regional Power System Operations".

Following the usual question period, the meeting was returned to President Nairne, and adjourned with a rising vote of thanks to the speaker.

JOHN P. FERNANDEZ,
Secretary-Treasurer

Minutes of Meeting of the Louisiana Engineering Society, October 13, 1947

The meeting was called to order by President Nairne in the Jackson Room of the St. Charles Hotel, with approximately 135 members and guests present.

Mr. John H. Bernhard moved that the reading of minutes be dispensed with, seconded by Mr. Wilhelm Koch and carried.

President Nairne then announced that a petition had been received requesting the award of honorary membership in the Society to Professor Donald Derickson, and that same had been approved by the Honorary Membership Committee consisting of all living past presidents of the Society, as well as by the Board of Direction. Mr. Allan Dusenbury moved that Professor Derickson be elected to honorary membership, seconded by Mr. John K. Mayer and carried unanimously.

Colonel John K. Hardin, District Engineer of the New Orleans District, Corps of U. S. Engineers, introduced Mr. A. A. Mabson, Chief of General Planning Branch, New Orleans Engineer District, who gave most comprehensive and interesting talk on "Some Engineering Aspects of the Algiers Lock and Canal".

Following the usual question period, the meeting adjourned with a rising vote of thanks to the speaker.

JOHN P. FERNANDEZ,
Secretary-Treasurer

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