

THE PROCEEDINGS

OF THE

LOUISIANA ENGINEERING SOCIETY

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Arthur M. Hill, Editor

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VOL. XXXVIII	MARCH, 1952	No. 1
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EDITORIAL NOTES AND COMMENTS

Our New President. Our new President, John A. McNiven, has a valuable and varied engineering experience, having been employed for about six years prior to coming to New Orleans by structural steel concerns in Toronto and Montreal, Canada as draftsman and designer on structural steel office buildings, mill buildings and bridges. Then he was designer, construction engineer and construction superintendent with engineer-contractors on piers and other marine work along the Great Lakes and on terminal grain elevators in various parts of Canada.

In 1916, Mr. McNiven came to New Orleans as construction engineer with the contractors on the construction of the Public Grain Elevator for the Dock Board. Completing this work in the fall of 1917, he was employed by the Board as assistant engineer and, later, as assistant superintendent of construction on the Inner Harbor-Navigation Canal. Later, he went with Ford, Bacon and

Davis Company, consulting engineers to the construction quartermaster on the New Orleans Army Supply Base (now the New Orleans Port of Embarkation) as chief designer on that project. In October 1920, he was re-employed by the Dock Board as special engineer to supervise the design and construction of the marine leg at the Public Grain Elevator. Following this, he was successively assistant engineer and principal assistant engineer with the Board until October 1930, when he became its chief engineer, which position he still holds.

He is a member of the American Society of Civil Engineers and was President of the New Orleans Section during the year 1941. At our annual meeting he was presented with life membership in the Louisiana Engineering Society. Our Society is fortunate in having such an able engineer as its President. President McNiven is also a member of the American Association of Port Authorities, American Public Works Association, International House, New Orleans Chamber of Commerce, Propeller Club, American Wood Preservers Association, American Society for Testing Materials.

A Message From Our President. It is with a true sense of gratitude and humility that I acknowledge the great honor that has been conferred upon me by my election as President of the Louisiana Engineering Society. I realize too the duties and responsibilities that this office will entail, if I am to prove myself a worthy successor of those distinguished members of our Society who have preceded me as its presiding officer.

"It is trite to say that the success of an organization like ours depends not so much upon its officers as upon the cooperation and support that the officers receive from the rank and file of the membership. Knowing that I can depend upon that interest and cooperation upon your part, I pledge myself and my fellow-officers to serve you, and the high profession we represent, to the best of our ability during the coming year.

"Let us all join together and make 1952 a banner year for the Louisiana Engineering Society. Again I thank you for the honor, privilege and opportunity of serving you which you have given to me.

JOHN A. McNIVEN, President

Report of the Retiring President. Members of the Louisiana Engineering Society, Ladies, and Guests: One of the "musts" on every Annual Meeting program is a report by the retiring President. Here and now I want you to know that I am most grateful for the wholehearted co-operation extended me during the past year by my fellow officers, the various committees, the Editor of our Proceedings, individual members, and particularly John A. McNiven, Lionel J. Cucullu, and John P. Fernandez, who carried the ball for

me from July to December. To all of them and to each of you I wish to express my most sincere thanks. No one could have received a greater honor than that bestowed upon me by you when you chose me to be your President. My employers, the U. S. Department of Agriculture, selected another area and a different position for me in the office of the Chief of the Bureau of Agricultural and Industrial Chemistry. This new work is taking me away from the professional and personal associations with you, that I cherish. In a few years I hope to come back and enjoy your companionship and hospitality.

Again our membership has increased, with the main increase coming from state members. Mr. Fernandez, the Secretary, has reported to you that our Society is sound financially, even with new activities and the equipping of the Office and Conference Room.

Among the activities that I am proud to report on are the following:

1. A Career Guidance Committee has been established, composed of members from the parent Society and each of the State Sections. Under the able leadership of Past President Cucullu, this Committee has made favorable progress in organization and establishing contact with public and parochial high schools where the engineers of tomorrow are now students. This State-wide Committee needs your help in reaching and advising our young people on their pre-engineering education.
2. Finally the Engineers Club is a reality and is now well established and operating in the DeSoto Hotel. Today I had lunch there and I want to congratulate Mike Abraham and his Committee for the fine job that they have done.
3. The engineers' and surveyors' license law has been in operation over a year now and it has demonstrated its worthwhileness to both the professional engineers and the general public. To insure its success it will still need and require your full support and mine.

Whatever success I have attained in this world I owe to the support and advice of my wife and friends. I am very appreciative of the time and help that many members have given toward the Society's benefit the past year. To Allen Betz, the General Chairman, and all of his associates, whose contributions will make this Annual Meeting a grand success, I am deeply indebted. Most of all, I want to thank the membership at large for having permitted me to serve as President of this organization. No other office that I have ever held has meant as much to me and I shall always cherish the privilege and pleasure of having been your President.

Thank you.

HARRY P. NEWTON

The Front Cover. Twenty-eight filters of the New Orleans Water Purification Plant have a combined area of 40,068 square feet. Their rated capacity is 112 million gallons per day. Source of New Orleans drinking water is the Mississippi River. Treatment consists of the addition of chemicals and chlorination.

Our Annual Meeting. The annual meeting in January was well attended. Technical papers, the general interest program, and the student conference were excellent. The banquet and dance was a splendid affair. All committees can feel justly proud of a job well done;

Vocational Guidance. At this time of critical shortage of engineers, the Society could devote its energies to no better cause perhaps, than guidance work in the high schools.

Chairman Cucullu has furnished the following report on this activity:

Report of Statewide Committee on Vocational Guidance constituted by Louisiana Engineering Society with participation by New Orleans Sections—AICHE, AIEE, and ASME; Louisiana Section—ASCE.

This committee held its organization meeting October 5, 1951. Its personnel is, as follows:

Representing L. E. S.—Tom C. David, Alexandria Section; Wayne Paul Wallace, Baton Rouge Section; Felix J. Boudreaux, Lafayette Section; Richard R. L. Ward, Lake Charles Section; Calvin T. Watts, Monroe Section; Wm. E. Fitzgerald, Shreveport Section; C. P. Knost, New Orleans; Henri J. Molaison, New Orleans, and L. J. Cucullu, Statewide.

Representing National Societies—R. M. Persell, AICHE; B. F. Hatfield, AIEE; F. W. Macdonald, ASCE, and Sydney Ellis, Jr., ASME.

A program of activity was decided upon which embraced these items:

(a) Preparation of speakers' aids which would facilitate the presentation of the engineering profession's story to student and faculty audiences.

(b) Promotion of an annual event at each of the engineering colleges of the state at which high school students would be invited to the campus to participate in a program designed to interest them in the possibilities of an engineering career.

(c) Systematic contracts with high school groups through the medium of addresses at career days and other events by the Committee's speakers and by means of counseling with individual students to such extent as may be requested.

Subcommittees were appointed and charged with responsibilities as follows:

B. F. Hatfield, chairman; R. M. Persell.

1. To review and bring up to date the speakers' outline which will be distributed to committee members for use in addressing student groups.

2. To prepare a small handout leaflet which can be produced inexpensively in quantities sufficient for distribution to interested high school students.

S. Ellis, chairman; F. W. Macdonald.

1. To prepare a sample set of placards giving, in graphic form, some of the essential points of the message to be conveyed to student groups by speakers.

The other members of the Statewide Committee were assigned the responsibility for establishing contact with the high schools in their areas and arranging to meet with the students in such manner as might prove best adapted to local conditions.

As of Jan. 10, 1952, a draft of the proposed leaflet has been prepared, cost of printing determined, and the manner of financing printing expense is being investigated. Revision of the speakers' outline is essentially complete and should be available for use by Feb. 1, 1952. A set of 16 placards has been produced and tried out in a meeting at which approximately 200 students were addressed by representatives of the committee. The unanimous opinion of those members present was that they were very effective as speakers' aids.

The four engineering colleges of the state have been contacted relative to arrangements for visits and inspection of laboratories, etc., by high school students. All have either decided to use this method of arousing interest or are studying modifications of the basic idea which appear to hold more promise for their particular conditions.

Activities directed toward the establishing of contact with the high schools and addressing or counseling with the students are being pursued with vigor in the Baton Rouge, Lafayette and Monroe Sections of the Louisiana Engineering Society and in New Orleans. It is planned to intensify these activities as the contacts with school principals and vocational guidance counselors bear fruit. Efforts will be continued to stimulate interest and promote guidance work in those state sections which have not yet begun active programs.

Respectfully submitted for the Committee—

L. J. CUCULLU, Chairman

New Members. The following new members were elected on the December ballot. We welcome them into the Society, and hope that they will take an active part in its affairs.

For Member

JERRY W. AFFOLTER, JR., Baton Rouge; Age 31. Endorsed: J. T. O'Brien, K. A. Rees, J. E. Ritter. Louisiana State University, B.S.Ch.E. 1942. Esso Standard Oil Co., La. Div. Process Control Engineer, Scheduling & Planning Staff Member in General Supt.'s Office, 1948-date. Member A.I.Ch.E., American Chemical Society, Alpha Chi Sigma.

NORMAN G. ALVIS, New Orleans; Age 30. Endorsed: G. A. Heft, Kearny Robert, G. F. Stevenson. Central Missouri State Teachers College, Engineering 1944-45. Iowa State College, B.S.E.E. 1947. Wagner Electric Corp., since 1948. Field Engineer in charge of sub-branch office in New Orleans, Jan. 1950-date. Associate Member A.I.E.E. Registered P.E., La.

JAMES YOUNG BRIGGS, Shreveport; Age 37. Endorsed: J. C. Faulkner, A. J. Shoup, E. T. Robinson. Louisiana Polytechnic Institute, B.S.M.E. 1941. Kellogg Construction Co., N.Y. Field Engineer 1942. U.S. Army, Combat Engineers, 1942-46. M. S. Carroll Co., Ruston, La., Engineer and Supt., 1946-47. Texas Eastern Transmission Corp., Shreveport, Engineer 1947-date. Registered P. E., La.

DEWEY E. BUCHETT, Benton, La.; Age 49. Endorsed: H. N. Brown, E. M. Gillen, R. H. Vaughan. International Correspondence Schools, Civil Engineering 1925-26. L & N RR Co., Surveyor 1925-26. Bossier Parish, office engineer and surveyor 1927-30. Bossier Parish, Parish Engineer, 1930-51. Registered P.E., La.

ALBERT H. FAY, New Orleans; Age 40. Endorsed: J. L. Dickson, E. L. Mire, R. L. Nall. Columbia University, B. Arch. 1934, M. S. Arch., 1935. American Radiator Co., N. Y. designer, 1935-36. Flintkote Co., N. Y. Product Development Manager 1936-44. U. S. Navy, 1944-46. Flintkote Co., New Jersey, Production Manager, asphalt roofing products 1946-50. Asbestone Corp., New Orleans, Sales Promotion Manager, 1951-date. Former member A.I.M.M.E. and Am. Assn. for Advancement of Science.

ROBERT R. FIGHTMASTER, Shreveport; Age 29. Endorsed: J. P. McCullough, G. L. Logan, O. D. Jackson. Louisiana State University, graduate in Petroleum Engineering. Engineering Construction Battalion, officer and unit commander, 3½ years. Field experience in oil well completion and general oil field practices, 3½ years. Member A.I.M.M.E., A.P.I. and Southwest La. Geological Society.

PRENTIS GRAVES GRAMBLING, JR., Ruston; Age 44. Endorsed: B. T. Bogard, H. M. James, C. T. Watts. Louisiana Polytechnic Institute, B. S. Engr. 1929. La. Power & Light Co., Sterlington, La., Technical Engineer, 1929-37. City of Ruston, Mechanic Engineer, Municipal Power Plant, 1937-42; Supt. Dept. of Water and Light, 1949-date. Registered P.E., La.

HARBERT SCOTT GREGORY, New Orleans; Age 37. Endorsed: L. N. Goodman, J. M. Guillory, J. P. Fernandez. University of Florida, B.S.E.E. 1938. Univ. of Florida, Instructor in College of Engineering 1938-39. General Electric Company, Test Engineer and Sales Engineer, 1939-42. U. S. Navy, Electrical Engineering Officer, 1942-46. General Electric Supply Corp., Sales Engineer, 1946. Independent Manufacturer's Representative, Sales Engineer, 1946-date. Member A.I.E.E., I.E.S. Registered P.E. La.

THOMAS M. KELLER, Monroe; Age 38. Endorsed: S. S. Gill, S. E. Huey, H. M. James. Virginia Military Institute, B.S.C.E. 1934. Various engineering positions 1934-37. Leary Co., road construction 1937-40. Dept. Public Works, Baton Rouge, Airport Construction 1940-41. U. S. Army 1941-46. Private practice of civil engineering, 1946-date. Registered P.E., La.

JOSEPH D. MIDWIKIS, Baton Rouge; Age 37. Endorsed: J. T. O'Brien, R. W. Williams, F. Kring, Jr. University of Pittsburgh, B.S.Ch.E. 1948. Esso Standard Oil Company, Chemical Engineer, Group Head, 1948-date. Member American Chemical Society.

JOHNNIE EDWIN REBOLD, New Orleans; Age 38. Endorsed: C. E. Cassagne, Jr., F. W. Macdonald, J. P. Ewing, Jr. Millsap College, B.S. in Engineering. Ludwig Construction Co., Supt. of Construction, 1933-42. Welding &

Manufacturing Co., Production Manager, in charge of design work, fabrication and erection of steel, pressure vessels, boiler insulations, and steam pipe fittings. 1947-date. Member Am. Public Works Assn. Registered P.E., La.

BINGHAM C. STEWART, New Orleans; Age 46. Endorsed: R. J. Dreuding, D. E. Guiza, H. L. Lehmann. Louisiana State University, B.S.C.E. 1926. A. C. Stewart, General construction 1926-31. La. Highway Commission, construction of concrete roads 1931-35. W. A. Aldrich & Co., Construction Supt. of concrete roads, 1936-37. Boh Bros. Construction Co., Supt. of heavy road construction, 1938-date.

FREDERICK W. SURBURG, Lafayette; Age 46. Endorsed: G. G. Hughes, H. R. Mason, C. J. Russell. University of North Carolina, B.S. 1927; M.S. 1928. Virginia Polytechnic Institute, Ph.D. 1943. Clemson College, progressively from Instructor to Head of Chemical Engineering, 1929-42. Southwestern Louisiana Institute, Head of Chemical Engineering Dept., 1942-date. Member A.I.Ch.E., A.S.E.E., Am. Chemical Society. Registered P.E., La.

HARRY H. TORMEY, New Orleans; Age 49. Endorsed: Henry Boh, Paul F. Jahncke, O. K. Olsen. Baltimore Polytechnic Institute, 1919-23. Johns Hopkins University, Civil Engineering, 1924. Field Engineer and Surveyor on various projects, 1924-33. U.S. Dept. Agriculture, Office Engineer 1934. Geo. A. Fuller Co., Field Engineer, 1935-47. Jahncke Service Inc., Manager Concrete Product Department, 1947-date.

LESTER E. WENK, Shreveport; Age 33. Endorsed: E. M. Freeman, T. J. Rogue, R. O. Williams. Louisiana Polytechnic Institute, B.S.E.E. 1948. Southwestern Gas and Electric Co., Distribution Engineer, 1948-date. Member A.I.E.E., I.A.E.I. Registered P.E., La.

For Affiliate Member

LOUIE LEROY HINES, Baton Rouge; Age 33. Endorsed: T. L. Cappel, F. A. Hannaman, T. J. Innes. Louisiana State University, B.S.E.E. 1949. Esso Standard Oil Co., Engineer 1949-date. Member A.I.E.E. Registered P.E., La.

THOMAS P. ORR, JR., New Orleans; Age 34. Endorsed: A. R. Kusel, S. M. Lccourt, Frank Riess. Avondale Marine Ways, Engineering draftsman, 1942-46. Equitable Equipment Co., Asst. Naval Architect, 1947. Avondale Marine Ways, Inc., Marine design and detailing, engineering, 1947-49. Private practice of mechanical drafting and engineering 1949-date.

For Junior Member

AYLMER PRICE BATCHELOR, Shreveport; Age 31. Endorsed: E. M. Freeman, C. A. Matherne, Jr., L. J. Lassalle. Louisiana State University, B.S.M.E. 1948. United Gas Pipe Line Co., Engineer, 1948-date. Member A.S.M.E. Registered P.E., La.

DAVID GRESHAN DOUGLAS, New Orleans; Age 22. Endorsed: R. H. Earl, F. J. Germano, H. I. Morris. Louisiana State University, B.S.M.E. 1949. Sewerage & Water Board, Engineer's Aid and Drainage Surveyor, 1949-51. Freeport Sulphur Co., Mechanical Design Engineer, 1951-date.

ENGINE RAY FELTON, Baton Rouge; Age 30. Endorsed: T. L. Cappel, F. A. Hannaman, T. J. Innes. Virginia Polytechnic Institute, B.S.E.E. 1951. Esso Standard Oil Co., Electrical Engineer, June 1951-date. Member A.I.E.E. Registered P.E., La.

RALPH WILLIAM JUNIUS, New Orleans; Age 28. Endorsed: R. J. Dreuding, Henry Boh, D. E. Guiza. Louisiana State University, Mechanical Engineering 1941-44. Tulane University, B.S.Arch. 1947. Pittman Construction 1947. Boh Bros. Const. Co., project supt. 1947-date.

NEVILLE J. ORY, New Orleans; Age 23. Endorsed: F. F. Pilet, W. P. Wallace, Wm. A. Wintz. Louisiana State University B.S.C.E. 1951. Member L.S.U. Student Chapter A.S.C.E

PAPERS AND DISCUSSIONS

MOISTURE MIGRATION IN INSULATION AND ITS CONTROL*

By M. W. Burleson

This is a physicist's subject. I am not a physicist and do not understand his language too well. Therefore, I am going to put this subject in the language of the engineer. While a physicist may not agree entirely with the way in which I put some things, from our standpoint of practical application, everything I have to say is accurate.

"Moisture Migration in Insulation and its Control"—even in the middle of the 20th Century, much thinking on this subject borders on the 'whiskey can cure anything' side. Why do manufacturers put tar liners in their wool felt pipe covering? Actually it may possibly prevent small amounts of water which condense in the covering from getting to the pipe and corroding it. But if there is any appreciable amount of condensation, it will enter through the joints anyway. As you shall see later, it is a barn door locked after the horse is gone. A lot of plumbers still believe that water pipes sweat and will wet the covering if it does not have that tar liner. You and I know that water pipes, in the ordinary sense of the word, do not sweat. Moisture migrates in some way to them and condenses in the insulation, if the pipes are insulated and conditions are right. But I am going ahead of myself, so I will put things in their proper places and first talk about moisture migration. Second, I will show you how it affects insulations of cold surfaces, and third, ways that we can control it.

THE PHYSICAL MAKE-UP OF THE ATMOSPHERE

Actually what is it that surrounds us and our equipment? It is our atmosphere. You have, I understand, an extra special one here in New Orleans! What is this atmosphere? Well for our purposes, it is a group of gases so highly superheated that they act as what our physicist friends call a perfect gas; in other words, most of the time we can consider them as being non-condensable. They are oxygen, nitrogen, the rare gases. Then there is the other ingredient, water vapor, or steam as you like. All natural atmosphere contains some water vapor. You have more than your share, I am told. It reveals itself in many ways, as those glistening drops on a tall glass or the frost on a mint julep; a steaming breath on a cold day; cloud formations and so on. What is common to all of these examples? A warm atmosphere bumps into a lower temperature.

* Commodities Manager of Insulation, Johns-Manville Sales Corp., New York. Delivered January 11, 1952.

The cold drink in the warm atmosphere, a warm breath in a cold atmosphere, a cold air mass edging under a warm air mass. You and I know that if we place a cold object in a warm moist atmosphere, water forms on its surface and since there is no other source, that water must come from the air. It does and I will show you how so that you can better understand what happens in an insulation on a cold surface.

If condensation is to take place in the insulation, and it does at times as we all know, and since the insulation, at least, should be put up dry, water must move into it in some manner. This is what we want to understand. If there is a key to the understanding of where the moisture comes from, it is probably Dalton's Law of Partial Pressures. A statement of the law is: "The pressure exerted by a mixture of gases is equal to the sum of the separate pressures which each gas would exert if it alone occupied the whole volume at the given temperature."

Now I want to show you how this law applies to water vapor in our atmosphere. The boiling point of water we say is 212F. But this is only its boiling point at 14.7 lb. per sq. in. At 1 lb. per sq. in. it is 101.74F and at 0.2 lb. it is 53.14F. Now if we have a tight room at 53F and reduce the pressure down to .2 lb. per sq. in., water placed in the room would boil and fill it with vapor. But according to Dalton's Law we can get, in effect, the .2 lb per sq in. pressure at atmospheric pressure by having the other gases supply their share of the pressure. So again if we take a tight room filled with air at 53.1F and with regulating devices to keep the pressure at 14.7 lb. per sq. in. and place a can of water in it, eventually the non-condensable gases would exist at 14.5 lb. per sq. in. and the water at 0.2 lb. per sq. in. making the total of 14.7. And there would be exactly the same amount of vapor in the room as was there when the total pressure was 0.2 lb. per sq. in. and there was nothing but water vapor in the room. This same condition exists in many boilers too. Saturated steam at 115 lb. has a temperature of 338F, but in practice may be below this. This is because there frequently is some air in the steam so that we have a mixture. If the air is exerting 5 lb. (psi) of the pressure, then the steam is exerting only 110 lb. and the temperature will be 335F instead of 338.

The condition I described in the room is the condition that exists when we say the relative humidity is 100%. The definitions that are used for relative humidity are misleading to me, because they imply that air is like a sponge; that it soaks up water vapor. As the example I gave shows, air is not like a sponge; a given space will hold a definite amount of water vapor at a given temperature whether there is any air in that space or not. Relative humidity is simply the water vapor that the space contains right now ex-

pressed in percent of the vapor which the space could hold at the given temperature and pressure. Starting with 100% relative humidity and raising the temperature, we superheat the vapor and the space will then hold more water vapor. If, on the other hand, we drop the temperature, condensation occurs, as at a lower temperature, the boiling point or vapor pressure is lower and to lower the pressure we must remove some of the vapor.

Now with any mixture of air and water vapor there is some temperature at which the vapor will condense into water. This temperature we commonly call the dewpoint. At this temperature the pressure of the vapor corresponds to that at the boiling point of water at that temperature, and the RH is 100%. Any depression in T will bring about condensation. If the pressure is less than that of the boiling point of water at the temperature, then the water vapor is superheated and must be cooled before condensation will take place.

I had two reasons for going into this so extensively. The first was to correct that popular notion that air is like a sponge which is thirsty for water vapor, and the second is to show you that to get condensation we must change temperature. Remember I am speaking from the standpoint of insulation, and there seems to be no way to lower the temperature of free air except to move the air into contact with something colder than it is. While primarily our problem is one of temperature change, practically doesn't it become one of movement? So I am going to discuss the three means by which water vapor moves.

THE THREE METHODS OF MOISTURE MIGRATION

These are:

1. Movement by total volumes
2. Movement by diffusion
3. Movement by Hygroscopic action

The first is the most common, in fact so common that we see it happen and do not take the trouble to think about what is going on. This method is "*Movement by Total Volumes*". This is the method that nature uses to carry water from the seas to the inland areas. It is the way we carry the moisture in our humidified air from the humidifying unit to the places where the air is used. Steam through a pipe is another very common example. In this method a volume of the gas mixture is physically moved from one place to another.

A gas or mixture of gases, like water, must have some sort of external force pushing on it before it moves. This is the outstanding characteristic of this type of movement, energy is required. There is an old definition that we once studied which says that force over a distance is work. So in this movement energy is used

up in overcoming internal and external friction. Remember that last remark. While this method is probably the least important in insulation, it still operates in some cases and must not be overlooked.

Now the second and most important method of movement from your standpoint and the one most difficult to understand is "Diffusion". I don't know exactly how to define this word. Webster doesn't help much by saying "a spontaneous process of equalization of physical status, as of gases when one gas is liberated in another." One of our physicists, the late Paul McDermott, describes the process "In contrast to the case wherein an entire volume is moved from one location to another, is the movement of one gas into another or the movement of one of the constituents of a mixture through that mixture. This type of action, termed diffusion, is dependent upon molecular energy in a manner distinct from the external forces required to move the whole mass, and is thought of as motion internal with respect to the gas." This explanation is involved but is accurate. I prefer to explain the process by example as that is the only way I can understand it myself. But I would like to underscore one thing that McDermott said and that is—*"is dependent upon molecular energy in a manner distinct from the external forces required to move the whole mass."*

Once, many years ago, when a buck was a buck and very hard to get, and I was a poor newlywed, my wife and I invited my scotch-drinking boss for dinner. So I had to bend the budget enough to get a bottle of scotch. I held this in my lap as I sat that evening in the famous Chicago elevated reading my paper while going to the place I called home. Somehow I became so interested in the paper that I forgot my bottle and let it fall. To me Doom had struck, but to anyone else, it, pleasantly or unpleasantly depending on the viewpoint, demonstrated diffusion. Even though the car was tightly closed and practically without drafts, it, in a few seconds, reeked with scotch. No external forces were applied; those alcohol and bouquet molecules quickly worked their way through all the air molecules in the car. The same will happen with perfume. If we have a tightly closed draftless room and spill some perfume in one corner, the odor will eventually permeate the entire space. A salt crystal going into solution is similar as the water strips away the molecules from the crystal, and we all know that it is only a matter of time until every drop of the solution becomes equally salty. This salt example differs though in that the salt requires water for its molecules to swim around in. Water, perfume and whiskey vapor require only space. They will spread as equally and as far and in the same concentration, temperatures being equal, in space as they will in air.

Now after a room is equally saturated with perfume or scotch, as you prefer, it remains that way and from our viewpoint movement stops. However the molecules are still as busy as ever, but now there are as many of them going as coming so there is no longer any change in concentration. We can conclude therefore that movement by this method simply requires that the concentration be heavier in one place than in another. Then the migration starts and proceeds from the heavy concentration to the lightly concentrated area and continues until all is equal.

Now if we have a mixture, the partial pressures of each of the gases in the mixture are in proportion to the concentrations; more pressure, more concentration. My physicist friends tell me that molecules beating against a surface make pressure, and other things being equal if there are twice as many, there is twice as much pressure. So we can say that water vapor, now that we are ready to get down to brass tacks and forget the perfume and scotch and the salt, moves from a space of higher vapor pressure to one of lower. And this is exactly what happens. If the pressure difference is suddenly created in space containing only water vapor, it moves quickly as does any gas when external pressure differences exist and the movement becomes one of total volumes. If the vapor is mixed in air, the final concentration of water vapor will be the same if the quantity of water available and the temperatures are the same, but the movement will be much slower because the molecules must work their way through those of the other gases. However, remember that like the tortoise, the movement is slow, but it is just as sure as if you were forcing the vapor along a duct with an actual pressure difference. The rate of diffusion as would be expected is in direct proportion to the difference in vapor pressure between the zone of low concentration and that of high concentration.

To most persons, diffusion is synonymous with migration and the other means are ignored. Which brings me to the third, and while not the most important, I sometimes think that most of our specifications would fail if we did not have it working in our favor.

This is "*Movement by Hygroscopic Action*". This method is associated with solids where the other two are with gases. There are a lot of materials and some insulations are included with these that would make poor wicks but still work like a wick a little bit. Then here is another way that moisture can travel through an insulation. So I say this is important enough so that we should take a quick look at how it works.

The transfer of kerosene, moisture or any other fluid through a solid involves two operations, absorption and adsorption.

Adsorption is really quite an operation. It involves a one molecule thick layer of the fluid or gas spread over the surface of the

solid. And some porous materials have a lot of surface too. It seems to me that one of our physicists told me of a solid, a one cubic centimeter cube of which contained an acre of surface—so that porous solids may have a great deal of surface on which to adsorb fluids and gases.

Now when adsorbed, a fluid is in neither a fish nor fowl state. The adsorbed fluid is not chemically combined with the solid, and neither is it free. Although this state is not completely understood, physicists have shown that the very strong adhesive forces between fluid and surface do decrease the vapor pressure.

While an adsorbed fluid is on surface, an absorbed fluid is held in pores in the liquid state. It is comparable to water in a cloth that can be wrung from it. The bond obviously is not nearly as strong as with the adsorbed fluid.

Now if we have a solid with many internal surfaces and pore spaces we can have adsorbed and absorbed fluid. If we add continuous paths, (capillaries) it should work like a wick. In a wick the adhesive forces pull the fluid along the surfaces of the paths and the cohesive forces in the fluid cause it to gradually fill the pores and bring up more molecules from the source. This is a wet film, and characterizes the wick in a lamp. But remember that moisture *can* travel along surfaces by adsorption without wetting them and probably through very small capillaries by absorption without apparent wetting. Changes in moisture content without actual wetting are well demonstrated by the expansion and contraction of the hair in the ordinary humidity gauge, and the swelling and shrinkage of furniture and interior wood trim.

We see there is movement but which way? The travel is from the zone of high humidity to the zone of low. Vapor pressure does not affect this.

APPLICATION OF THESE PRINCIPALS TO INSULATION

I have spent a lot of time on these general principles because I believe that insulation for surfaces that are, or may be below the dewpoint of the surrounding atmosphere, cannot be properly designed unless the engineer does have a good barnyard understanding of these principles. And now I will show you how they operate in cold insulations.

Since diffusion is the most talked about, we shall start with it. I previously pointed out to you that diffusion from one zone to another takes place when a difference in vapor pressure exists. Vapor pressure at a given temperature is limited by the pressure at 100% R.H. or the pressure at which water boils. Since the lower the temperature of the surface, the lower this pressure is, normally there is a pressure difference ready to drive vapor to a cold surface. Here is an example. Assume we have a cold surface at 40F sur-

rounded by an atmosphere at 100F and 30% R.H. This is a condensation problem since the dew point of this temperature is 63F. Now we insulate the surface and by greatly reducing the heat flow raise the surface temperature (on the insulation) to probably 90F or 95F. This eliminates the surface condensation but sets the stage for vapor diffusion, most insulations being highly porous. At 100F and 30% R.H., the vapor pressure is 0.58 in. of mercury. Now, if the cold surface is metal and vapor proof, I think that we can say the R.H. will be somewhat higher there with a temperature of 40F than the 30% on the outside; in fact, it can be anything up to 100% very easily. In this case let's assume 80% and see what happens; this gives a vapor pressure of .34 in. of Hg.

First water vapor starts moving by diffusion towards the cold surface because the vapor pressure is lower there. This raises the R.H. when R.H. becomes higher at cold surface than at warm, and remember, this takes very little moisture, then water vapor starts traveling back out again by hygroscopic action, so we find we probably cannot think about diffusion through insulation without including hygroscopic action. It is possible that the system will come into balance at some place. In other words the capacity of the insulation to transmit hygroscopically could conceivably equal the rate at which the vapor can diffuse through the material. We are assuming in our example that this condition is reached when the R.H. at cold surface becomes 80%. Now the system is in balance. The vapor is traveling in by diffusion and then back out again hygroscopically. When it reaches the outer surface it evaporates and some of it may start back in again. This leads us to conclude that without an outer surface which might be proof against diffusion we might well select an insulation which best combines good resistance to diffusion and greatest hygroscopic possibilities, but is a poor wick. If the material actually will readily work as a wick, then a little water somewhere will go all through the insulation. This reduces the efficiency, increases condensation and probably will result in failure.

However, if conditions are very severe, meaning high R.H. on warm side and/or low temperature on cold side, the vapor pressure differences become so great that transmission by diffusion through an insulation will greatly exceed that coming out hygroscopically. Obviously under this condition the insulation will quickly become saturated with water and fail. This is undesirable so we put over the warm surface (high pressure side) a vapor barrier. Please notice I said barrier not seal. There is almost no such thing as a vapor seal. All of the commonly used barrier materials leak a little bit. From this we might conclude then that the eventual result, even with the barrier, will be saturated insulation where the surface being insulated is vapor proof. Metal surfaces are vapor proof. But it

does not happen and the only explanation that I know of again is hygroscopicity. The barrier must have small paths through it or the vapor molecules would not filter through. Since there are paths through the membrane, vapor can also travel through it hygroscopically. To further support this thought, we know that under conditions of high humidity, vapor is transmitted more rapidly per unit of pressure difference through barriers than under conditions of low humidity.

Most of us have some general idea of diffusion. But to me, it is just as important that without hygroscopic effect our conventional systems when applied over cold metals such as pipes, tanks, ducts and exchanges would probably not work for long.

Conventional cold room construction is a different and a much more simple problem. Probably, because it is easy to do so, we recognize in our design that there is no such thing as a positive vapor seal. In a cold room, the cold side is simply cold air rather than a vapor block such as a steel pipe. We usually take advantage of this by putting as tight a barrier as practicable on warm side and some porous surface such as plaster on the cold side. With this construction, the water vapor which does get through the outer barrier diffuses on through into the room and finally collects on the cooling units. This process in all probability is accompanied by some of the hygroscopic action which may even assist it.

Now you will remember there is still another method of migration; *Movement by Total Volumes*. You may wonder how this affects you, I believe it can; I believe it can reinforce or offset migration by diffusion. Let us take a couple of examples. There is much duct insulation applied with some sort of vapor barrier. You know what I mean, an asphalt paper of some sort and with joints stripped or unstripped. But you know as well as I that stripped or not, there are many openings. Water vapor must diffuse through these openings but something else happens to it if the system is run intermittently. Each time it comes on and cools down, the air in the pores of the insulation cools and contracts drawing air in the openings. When this air is cooled, its humidity is increased and some of its moisture adsorbed and absorbed by the insulation. Then when the system shuts down and warms up the air will expand and some will leak out leaving moisture trapped behind. After a number of such cycles and with diffusion going on all the time the system is on, we would rather expect moisture to condense on the duct but it does not much of the time. It may be that counter migration by total volume is counteracting this. Many ducts leak a little bit. With these so called vapor seals all the air that leaks from the ducts must also pass through the little gaps in the vapor seals. On most jobs this apparently is more than enough to sweep out the vapor entering by diffusion and by breathing.

APPLICATION OF THE PRINCIPLES OF VAPOR MIGRATION

My story on the effect of hygroscopicity and movement by total volumes has not, so far as I know, been proven in the laboratory but is based on certain physical laws and observations of insulation under field conditions. For this reason it is impossible to give you formulae and data that will enable you to predict whether an insulation on a duct under a certain set of conditions requires a vapor barrier. But I am not too ashamed of this as I doubt that you can predict the conditions either. At our Research Center, we are starting a program, but do not count on any immediate results. Some of these vapor migration tests require months and years. I feel that some of our universities could well afford to do some work on this subject. What I will do is to give you some thoughts on different types of work that may serve as a guide. However, with your special atmosphere. I guarantee nothing.

A. Very Cold Vessels—With reasonable workmanship and proper specifications, little trouble is experienced. There is no question about the necessity of a vapor barrier. Practices are well established which are generally satisfactory.

B. Cold Storage Space—The insulation should have a reasonably good vapor barrier on the warm side and a permeable finish on the cold side. Again practices are well established and little trouble is experienced.

C. Air Conditioning Duct Insulation—There is nothing set about duct insulation practices as is true of practices for chillers, freezers or cold tanks. This is because so frequently the duct operates at a marginal temperature and may not require any vapor barrier whatsoever. Therefore I have tried to clarify generally conditions for which vapor barriers would and would not be required. I will start with those where barriers should not be needed. These are:

1. When the duct is not under the dewpoint of surrounding atmosphere for more than 30% of time during any one week and operates continuously.

2. Some borderline cases where the duct may operate below the dewpoint of the surrounding atmosphere more than 30% of time and is saved by exceptional hygroscopic qualities in the insulation. This seems to be the case with aircell sheets and some of the very closely knit high density mineral fiber materials.

3. Intermittently operated systems where the operation is limited to about 8 hrs. per day. The time the system is off permits the moisture that has diffused into the insulation to diffuse and wick back out again.

4. The only other general possibilities I can think of would result in the insulation getting wet.

Now since the type of barrier generally used on duct insulation leaves much to be desired, I want to make a few observations on

what apparently happens to an imperfectly sealed job.

1. Breathing is introduced on intermittently operated systems and unless there is sufficient duct leakage to sweep out the water vapor, condensation should eventually result. Water that works in cannot get out too readily through the vapor barrier used over the insulation.

2. On a continuously operated system, any appreciable amount of duct leakage may, by the air moving out through openings in the barrier, offset the effect of diffusion.

Some systems will operate continuously beneath the dewpoint of the surrounding atmosphere. These will need careful sealing and should be treated as cold vessels or any other cold metal surface.

In actual practice, until a great deal more research is performed, about all the engineer can do is bear in mind the basic principles of vapor migration and carefully study the arrangements that generally work on the various types of installations in his own area.

Vapor Barriers—I have already said, to control moisture in insulations over cold surfaces requires membranes on the warm surface that have low water vapor permeability. Since asphalts are cheap and plentiful and have, when properly used, good qualities as vapor barriers, they are widely used. More often than not the barrier on the warm side of a cold room wall is the asphalt in which the insulation is dipped and set up.

However, asphalt in itself is not practical for many applications and is frequently used with paper to form vapor barrier membranes. Now papers can be coated with asphalt, saturated with asphalt or both. In general, it is the coating that gives you your vapor barrier qualities. For example, 15 lb. asphalt saturated roofing felts may have permeabilities many times greater than a properly coated kraft paper. It is the continuous film of the coating that forms the effective barrier.

Now in selecting vapor seals we must have some yard stick for comparison. We do and call it Permeability. The unit is the grain of water vapor per sq. ft. per hour per inch of Hg vapor pressure difference. This should be used for purposes of comparison only and when used for that, consideration should be given to the source as the results of different investigators vary widely. Also be certain of the units if you are comparing permeabilities. The one I have given you is more commonly in use today than any other. A few years ago permeabilities were frequently expressed in mm of Hg and you may now find tables based on this unit. Other units that have been used are:

Grams per sq. ft. per day at 10.3 mm Hg.

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There also are two methods generally used which give rather widely different results. These are the dry method and the humid method.

In the dry method, the barrier material being tested is used as a cover for a container of a desiccant. The assembly is then exposed in a chamber of constant temperature and humidity. From time, vapor pressure, area of membrane and the weight pick up of the desiccant, the permeability is arrived at.

In the humid method, the procedure is the same except that water instead of a desiccant is placed in the container and there is a weight loss involved instead of a gain. The important development is that the humid method gives higher results than does the dry method. In both, the diffusion and the hygroscopic action methods of migration operate in the same direction. We believe that the conditions of higher humidity existing with the humid method results in higher transmission by hygroscopic action and that the total increase in permeability is due to this. Here are some examples. The data is based on tests made at the J-M Research Laboratories.

Membrane	Dry Method	Humid Method
30 lb. asphalt saturated Ra. Felt _____	1.8	5.4
2" J-M Rock Cork _____	2.0	2.8
1/8" Asbestos Cement board _____	5.8	16.4

Incidentally, while on the subject of permeability, it may be interesting to you that in the mastic line, generally cut-back materials are good barriers and emulsions poor. In fact emulsion types are much used as weatherproofings on hot insulation because they will permit the mixing water used in the cements and trapped behind the weatherproofings to migrate out when the heat comes on. Examples of this by the humid method are:

1/8" Cut-back mastic	.10
1/8" Emulsified mastic	2.0 to 5.0

Actually none of these figures are of much value except to enable you to compare new materials with others which have given satisfactory service in the past. You cannot with a table of permeabilities and a given set of conditions predict by formula whether or not condensation will occur in the insulation. So we can conclude by saying that the marginal job must be designed on experience; there is presently not enough data to engineer it.

Now before closing I would like to summarize the material I have covered. So to start at the beginning, to understand vapor migration:

1. You must first generally understand the makeup of the atmosphere and Dalton's Law which governs the relations of the component gases.

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2. You must be familiar with the characteristics of water vapor.
3. While diffusion is the method of vapor transmission that is of greatest concern, you must understand the other two and their effect. These are movement by total volumes and by hygroscopic action.

In applying these principles, you must understand that the effects of the three methods one on the other are not quantitatively understood. Therefore, your design must to a great degree be based on:

1. A good vapor barrier on the warm side when low temperature surfaces are being insulated.
2. The general experience in the area when marginal surfaces are being insulated.

I have talked principles in as practical a manner as I know how. I believe that an understanding of these principles will help you to select proper materials and write workable specifications. While these principles are not specific answers to any problem, they are the key to the answer to all cold insulation and condensation problems.

PERSONALS

B. Stanley Nelson Becomes Lockett Vice-President. A .M. Lockett & Co., Ltd. announces the appointment of Bernard Stanley Nelson, well-known authority on hydraulics, irrigation, and drainage, as Vice-President in charge of Engineering, effective January 1, 1952.

Mr. Nelson has been with the Lockett Organization since he was graduated from Tulane University as a mechanical and electrical engineer, in 1907. Starting as junior engineer, he served successively as draftsman, design engineer, shop superintendent, and service and test engineer. Later, he was in charge of design, estimating, and supervision of construction of the various types of plants sold by Lockett.

In 1919, he was made Chief Engineer, in which capacity he served until the present time.

Mr. Nelson has designed and supervised the construction of numerous plants throughout the South, including large pumping plants for rice irrigation in Louisiana and Texas, and many large drainage plants. Under his supervision, Lockett has also designed, furnished, and installed a number of waterworks, power plants, and creosoting plants, and designed and supervised construction of several large gas compressor stations on the Memphis Natural Gas and Southern Natural Gas pipe lines in Louisiana, Tennessee, Mississippi, and Alabama.

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pressure grease gun. He is co-inventor of a condenser system that is in almost universal use in creosoting plants.

Mr. Nelson is a Life Member of the A.S.M.E. and Louisiana Engineering Society, and a licensed engineer in Texas and Louisiana.

ENGINEERING BRIEFS

Shortage of Engineers. Every engineering magazine calls attention to the dearth of engineering graduates, and engineers. Industrial operations have continued to expand over the past few years. The shortage situation is further aggravated by the enormous rise of government employees. Many of these of course are recent engineering graduates. The following chart is a graphic illustration of increase of government employees compared to private industry.

Creosoted Lumber Glued by New Process. Creosoted pieces of lumber can be glued together to form heavy structural timbers by a method on which patent 2,563,821 was issued to Fred Denig, Pittsburgh, Pa. and Walter P. Arnold, Orrville, Ohio, assignors to the Koppers Co., Inc., Pittsburgh, Pa.

In the process, pieces of lumber which are to be glued together are creosoted in the usual manner, even to the extent of high impregnation. Then thin layers of the surfaces to be bonded are removed by dressing or planing. The procedure from then on is the same as for untreated wood.

When wood is creosoted by the pressure method, creosote coated fibers are formed near the surface. Fibers deeper within the wood have received creosote only by penetration. The dressing removes the creosote coated surface fibers, resulting in surfaces that glue will hold.—*Aminco Laboratory News.*

Anti-germ Chemicals Found in Seaweed. Anti-germ remedies of the future may come from seaweed, it appears from a recent report by R. Pratt, H. Mautner, Yi-Hshien Sha, Grace Gardner, and J. Dufrenoy of the University of California College of Pharmacy.

These researchers tested about three dozen species of marine algae from the central California coast. Material extracted from eight of these stopped the test-tube growth of three kinds of micro-organisms: *Staphylococcus aureus* familiar in boils, the *colon bacillus*, and *Pseudomonas aeruginosa*, the bacillus that produces blue pus in wounds.

The germ-stopping activity of these seaweeds was not due to their iodine content.—*Aminco Laboratory News.*

Lignite May Become Good Fuel by New Treatment. A new process developed by the U. S. Bureau of Mines, Denver, Colo., reduces lignite to a char of high heating value and at the same time yields crude coal tar from which many coal tar products can be obtained.



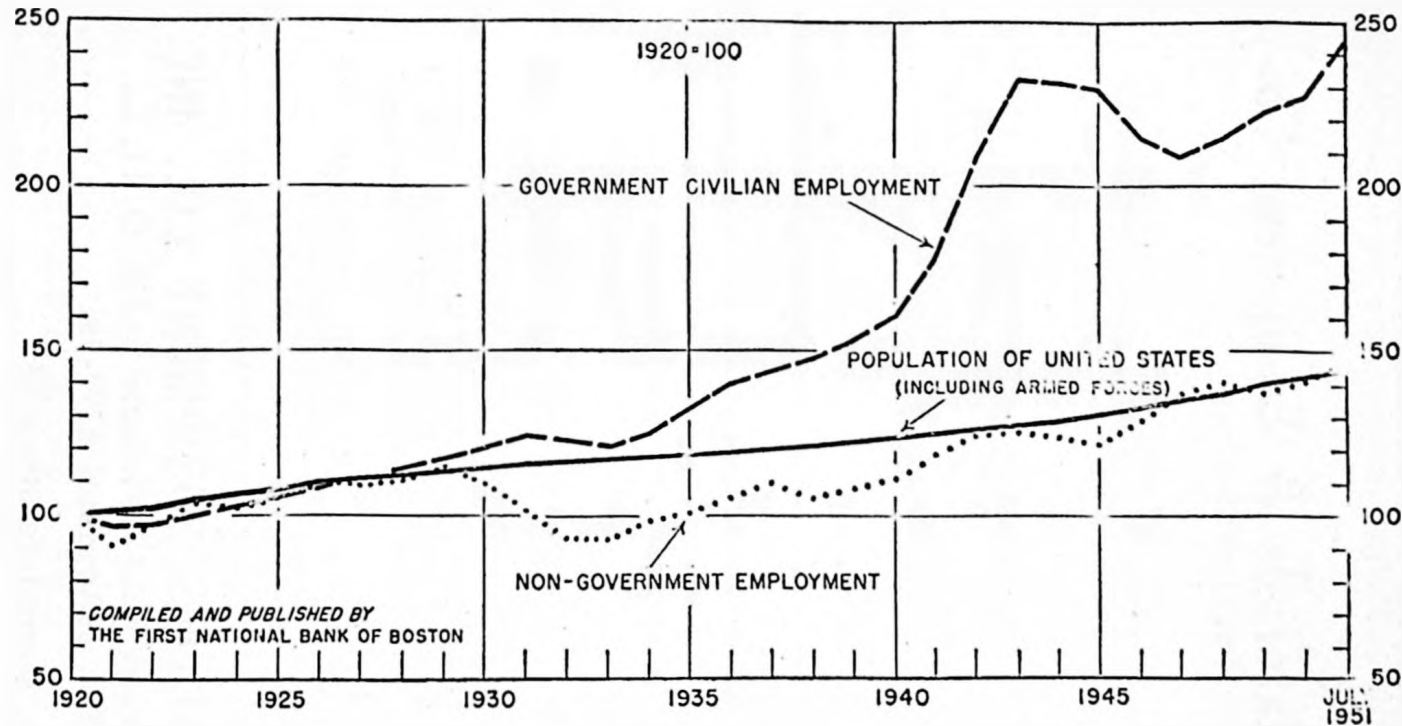
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THE RISING TIDE OF BUREAUCRACY



From 1920 to 1930 the trend of government civilian employment ran practically parallel with the growth of the country's population and of non-government workers. Since the early 1930's, however, government employment has moved sharply above the other two factors, as is shown on the accompanying chart. The aggregate number of persons employed by Federal, state, and local governments in July, 1951, not including the armed forces, is estimated at around 6,356,000. This represents a gain of more than 100 percent since 1930, or four times the rate of growth of the United States population during this period. The most spectacular gains have been made in Federal civilian employment in the executive branch, which in the last two decades has increased by 320 percent, or ten times the rate of increase in total non-government employment. Total government civilian employment is equal to all non-governmental workers in the following states: Washington, Oregon, California, Nevada, Idaho, Utah, Arizona, Montana, Wyoming, Colorado, New Mexico, North Dakota, South Dakota, and part of Nebraska.

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The process can be used also to make valuable fuel and obtain coal tar products from low-grade non-coking bituminous coal. According to V. F. Parry, chief of the Bureau's laboratories, the process is applicable to any coal of lesser rank than high volatile bituminous B.

The process consists in crushing the lignite or other non-coking coal into particles of one-quarter inch or less in size. The material is then "boiled" at 350 degrees F. in a fluidized dryer that uses the hot products of combustion or flue gas as the heating medium. Then the hot dry fuel is moved to a carbonizing reactor, where it is burned with air at a temperature of 950 degrees F. to extract the coal tar and obtain bone-dry char, which has a heating value about 50% moisture. The char has a weight of only 45% of the raw lignite.

The new process will be given its first commercial application at a new aluminum smelting plant in Texas, where the char will be used to provide power to drive generators.—*Aminco Laboratory News*.

To Stay Decay. Protection of the equipment and supplies of the Armed Services is the chief function of the Prevention of Deterioration Center of the National Research Council in Washington, but much of the wealth of information now available can be used by industry as well. The Center acts as a clearing house and consultative agency on technical problems of deterioration, and through its extensive abstracting and publication service offers government agencies, industry, and libraries information on the results of research in a wide number of fields carried on in laboratories throughout the world.

The over-all cost of deterioration in the United States is estimated at about \$12 billion annually, exclusive of losses of food-stuffs; moth damage to fabrics costs \$100 million and corrosion of metals does between \$5 and \$6 billion worth of damage. While such losses are of great economic importance to industry, deterioration of military supplies and equipment can be a matter of life or death. The Center was set up as the Tropical Deterioration Information Center under the National Defense Research Committee during World War II, when equipment in wide extremes of environment deteriorated much faster than had been expected. Equipment expected to last for months or years in a temperate climate became inoperable in weeks in the tropics. Emergency measures provided better protection without interfering with war-time production and transportation, but the need for longer-term planning was evident. The present Center, under contract with the Office of Naval Research, and with the financial support of the Army, Navy, and Air Forces, integrates individual research projects and coordinates the attack on broad problems. It also operates a scientific screening program for evaluating such compounds as fungicides and bactericides.

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Over 15,000 reports on research and development concerning deterioration both of assembled equipment and of individual materials, such as wood, leather, metals, and fabrics, have been indexed. The Center annually issues 2000 pages of abstracts of these reports to 500 subscribers in Government, industry, and universities. Much of this information is of direct interest to industry. For example, termite damage to wood is estimated to cost \$40 million annually, and a railroad using a million ties could save \$150,000 by increasing the life of these ties by only one year. Losses resulting from marine borer attack on wooden structures amount to \$50 million annually; prevention of only a fraction of this damage could mean substantial savings for companies owning docks or waterfront installations.

Efforts to overcome deterioration include utilization or development of new resistant materials, such as nylon or glass fibers, to decrease fungus damage; control of the immediate environment, such as air-conditioned storage, or resistant coatings for pipelines carrying fuel; use of preservatives or agents which protect against, for instance, shrinkage, fire, rodents, or fungus; and chemical modification of old materials, such as treatment of cotton to provide mildew resistance.—*Industrial Bulletin of Arthur D. Little, Inc.*

MINUTES OF THE MEETING AND BUSINESS OF THE SOCIETY

Minutes of Meeting of the Board of Direction held on Monday, Nov. 12, 1951

The meeting was called to order by Acting President McNiven, with Messrs. Abraham, Cucullu, Knost, Hannaman, Molaison, Seago and Fernandez present. Mr. Seago moved that the minutes of the preceding meeting be accepted as read, seconded by Mr. Abraham and carried. Mr. Cucullu reported on the activities of the Vocational Guidance Committee.

Mr. McNiven reported that he had contacted a speaker for the Thursday night General Interest Program of the Annual Meeting. It was announced that those appointed to the Nominating Committee had accepted, and board members were urged to recommend possible nominees to the committee.

A letter from the Real Estate Board of New Orleans concerning the existing traffic hazard on the Maestri Bridge was read. Mr. Cucullu moved that the secretary acknowledge receipt of same and forward it to the Committee on Professional, Civic and Industrial Affairs for proper recommendation.

Correspondence from the Louisiana Agricultural Engineers' Association and from the Committee on Revision of the Constitution and By-Laws was read, and it was decided to bring the matter before the membership at the Society's meeting of this date.

Mr. Knost moved that Mr. Albert A. Glodt's resignation as Chairman of the Technical Exhibits Committee for the annual meeting be accepted, and that Mr. Albert L. Soule III, be appointed to succeed him, with Mr. Daniel H. Vliet as vice-chairman. The motion was seconded by Mr. Molaison and carried.

Mr. Cucullu moved that Mr. John K. Mayer be appointed vice-chairman of the contact with Woman's Auxiliary Committee, seconded by Mr. Seago and carried.

Mr. Hannaman moved that the resignation of Mr. T. Ellis Peak, Jr. be accepted with regret, seconded by Mr. Abraham and carried.

Discussion followed concerning Presidents' Night to be held in December, and Acting President McNiven appointed Messrs. Knost, chairman, Abraham and Fernandez a committee to make preparation for the meeting.

Mr. Seago moved that the recommendations of the committee on Awards and Honors be approved, seconded by Mr. Abraham and carried. Said recommendations are as follows:

That the L.E.S. Technological Accomplishment Medal be awarded to Mr. Edwin L. Dennis of New Orleans, and

That the L.E.S. Civic Activities Medal—Andrew M. Lockett Award be presented to Mr. Harold Colegrove Leonard of Baton Rouge.

There being no further business, the meeting adjourned.

JOHN P. FERNANDEZ, Secretary-Treasurer

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Minutes of Meeting of the L.E.S. Held Jointly With the New Orleans Chapter, American Society of Safety Engineers on Monday, November 12, 1951

The meeting was called to order by Acting President McNiven, who welcomed members and guests of the American Society of Safety Engineers. Mr. Knost moved that the reading of minutes of the preceding meeting be dispensed with, seconded by Mr. Montgomery and carried. The secretary then read minutes of the October meeting of the Board of Direction.

It was announced that a letter had been received from the Louisiana Agricultural Engineers' Association requesting that the name of the American Association of Agricultural Engineers be included in Section 3-d, Article II, of the proposed revision to the constitution. Abstracts from a letter written by Mr. K. P. Kammer, chairman of the Society's Committee on Revision of the Constitution, also was read, in which he pointed out that the proposed listing included only the five founder societies, and if the A.S.A.E. is added many other national societies also must be added, thus defeating the aim of the revision, which is to clarify the requirements for membership and simplify the work of the Membership Qualifications Committee.

Mr. F. W. Macdonald objected to Section 3-c and 3-e of Article II of the proposed revision, but after some discussion the objection was withdrawn.

Mr. A. Lee Dunlap moved that the A.S.A.E. be not included in the proposed revision and that said revision be submitted to the membership at large as recommended by the committee.

Mr. Edwin L. Dennis then read the obituary of the late esteemed member, Jules Godchaux, following which a moment of silence was observed in memory of the deceased.

Mr. McNiven announced that the Nominating Committee for the 1952 election of officers consisted of Messrs. L. J. Cucullu, Chairman, Leo J. Lassalle and R. A. Steinmayer. He urged the membership at large to submit recommendations to the committee within the next ten days.

The chair then was relinquished to Mr. Clarence Cohen, Chairman, New Orleans Chapter, American Society of Safety Engineers, who requested Mr. Arthur A. Naquin to introduce the main speaker of the evening, Mr. A. D. Carrel, National Secretary and Managing Director of ASSE, who spoke on "The Engineering Phases of Safety Work." Following the lecture, two short films on safety were shown, and the chair was returned to Acting President McNiven, who adjourned the meeting with a rising vote of thanks to the speaker.

JOHN P. FERNANDEZ, Secretary-Treasurer

Minutes of Meeting of the Board of Direction, Monday, December 10, 1951

The meeting was called to order by Acting President McNiven, with Messrs. Abraham, Butler, Cucullu, Knost, Molaison, Seago and Fernandez present. Mr. Cucullu moved that the minutes of the preceding meeting be accepted as read, seconded by Mr. Knost and carried. Acting President McNiven then appointed Messrs. Seago and Butler to count the ballots on the constitutional revision vote recently taken.

Mr. Cucullu then presented the report of the Nominating Committee, as follows: For president, John A. McNiven; for 1st vice-president, Michael C. Abraham; for 2nd vice-president, Frank W. Macdonald; for secretary-treasurer, John P. Fernandez; for director for 2 years, R. Mallard Seago; for director for 2 years, Wayne P. Wallace.

Mr. Knost reported on the arrangements made by his committee for the observance of Presidents' Night. Mr. Cucullu reported on the activities of the Vocational Guidance Committee.

A letter from Mr. W. H. Carter of the Louisiana Agricultural Engineers' Association concerning the revision to the constitution was read.

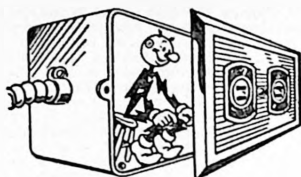
The secretary reported on the progress of plans for the 1952 annual meeting.

Mr. Molaison moved that the resignations of Messrs. R. L. Theaux and W. T. Turner be accepted with regret, seconded by Mr. Cucullu and carried. Mr. Cucullu moved that Mr. William B. Spalsbury be dropped for non-payment of dues, seconded by Mr. Abraham and carried.

It was reported that the Louisiana Polytechnic Institute's student paper would like to publish an article on the history of the Louisiana Engineering Society. Mr. McNiven appointed the secretary to contact Mr. Charles M. Kerr and request him to prepare a history for this purpose.

A petition for the election of Major General Edward S. Bres to honorary membership in the Society, prepared by Mr. Kerr, was presented to the board. Since the petition was in order and the signers included more than 80% of the Honorary Membership Committee as required by the constitution, it was decided that Major General Bres would be presented with honorary membership at the annual meeting.

Mr. Butler called attention to the wording of certificates of registration issued by the State Board of Registration for Professional Engineers and Land Surveyors, which state that the persons receiving same are entitled to practice in the State of Louisiana "Contingent upon the payment of the annual license fee provided by law." Mr. Butler believed that this phrase is unnecessary, and pointed out that the law profession did not use such word-



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NEW ORLEANS

ing in their certificates. He wondered if this could be removed. It also was his belief that each certificate should carry the owner's registration number. It was decided that Mr. Butler's suggestions should be carried as old business to the Society's new Board of Direction for 1952.

Mr. Molaison announced that the National Society of Professional Engineers had designated February 17-23 as "Engineers Week", and that he had literature available for publicizing the matter. He added that he would like to see the L.E.S. participate in advertising Engineers Week. The literature was given to the secretary for delivery to the Publicity Committee.

There being no further business, the meeting adjourned.

JOHN P. FERNANDEZ, Secretary-Treasurer

Minutes of Meeting of the Louisiana Engineering Society Monday, Dec. 10, 1951

The meeting was called to order by Acting President McNiven in the Jackson Room of the St. Charles Hotel, with approximately 100 members and guests present. Mr. Knost moved that the reading of minutes of the preceding meeting be dispensed with; the motion was seconded and carried. The secretary then read minutes of the meeting of the Board of Direction held in November.

Mr. R. P. Lockett then introduced each of the Society's former presidents in attendance and gave a few personal remarks about each.

The secretary reported that Messrs. Seago and Butler had counted the ballots in the recent vote taken on the revision of the constitution, and the following results had been tabulated: 468 votes cast, 434 in favor of the revision, 34 against. Therefore the revision is now effective.

Mr. Cucullu, chairman of the Nominating Committee, presented the following report and moved that it be accepted and the names placed on the ballot:

For president, John A. McNiven; for 1st vice-president, Michael C. Abraham; for 2nd vice-president, Frank W. Macdonald; for secretary-treasurer, John P. Fernandez; for director for 2 years, R. Mallard Seago; for director for 2 years, Wayne P. Wallace.

The motion was seconded by Col. Garsaud and carried. Mr. Cappel then moved that the nominations be closed, seconded by Mr. Stewart and carried.

Acting President McNiven then announced that he had secured Mr. Nathaniel Leverone to speak at the Thursday Night General Interest Program and urged members to attend and bring their wives.

Mr. Charles Cassagne then introduced the main speaker of the evening, Mr. C. J. Wallace, Chief Engineer and Terminal Manager of the New Orleans Union Passenger Terminal, who spoke on "Some Facts concerning the New Orleans Union Passenger Terminal." An interesting question period followed, and the meeting adjourned with a rising vote of thanks to the speaker.

JOHN P. FERNANDEZ, Secretary-Treasurer

Minutes of Meeting Baton Rouge Section, Louisiana Engineering Society December 10, 1951

The meeting was held on December 10, at La Tropicana. President F. A. Hannaman, Jr.; 1st vice-president, Louis Duclos; 2nd vice-president, H. L. Landry; and secretary-treasurer, T. J. Innes, Jr., were among those present.

After eating dinner, Mr. Hannaman opened the meeting. Eighty-six members, wives, and guests were present. Mr. Hannaman advised that the A. M. Lockett award had been given to Mr. H. P. Leonard for the year 1951. Mr. Hannaman then requested each of the committee chairmen to report on their activities. A summary of these reports follows:

1. Program Committee—Mr. H. L. Landry, chairman. Nine meetings were held during 1951 with attendance varying from 35 to 90 members and guests. Mr. Landry commented that attendance could be improved.

2. Membership Committee—Mr. L. V. Willey, chairman. In Mr. Willey's absence, the secretary presented this report. During 1951, the Baton Rouge Section lost nine Junior members and 15 members while gaining 11 Junior members and 22 members. The net gain was two Junior members and seven members or a total of nine.

3. Publicity Chairman—Mr. E. W. McNeil, chairman. Mr. McNeil was absent and no report was available from this committee.

4. Entertainment and Arrangements Committee—Mr. F. J. Warren, chairman. There was no report from this committee.

5. Student Activities Committee—Mr. E. E. Evans, chairman. There was no report from this committee.

Mr. T. J. Innes presented a report on the financial condition of the organization.

On hand at beginning of the year	\$187.71	
Receipts during year	\$518.25	
Total income for 1951		\$705.96
Total expenses prior to this meeting		\$475.55
Balance		\$230.41

Mr. Hannaman advised the group that the principal purpose of the meeting was to honor the past presidents of the Baton Rouge Section. Mr. Hannaman presented Mr. A. J. Mary, president for 1950, with an engraved scroll acknowl-

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edging his tenure of office and requested Mr. Mary to present a similar scroll to the President who preceded him. This practice was followed until Dr. LaSalle, the first President received his scroll. The Past Presidents who were honored are as follows: Mr. A. J. Mary, 1950; Dr. W. P. Wallace, 1949; Mr. J. J. Saurage, 1948; Mr. T. E. Peak, 1947; Mr. P. J. Gueffé, 1946; Mr. J. T. O'Brien, 1945; Mr. H. L. Lehmann, 1944; Mr. F. F. Pillet, 1943; Mr. N. E. Lant, 1942; Mr. W. W. Tennant, 1941; Mr. B. W. Pegues, 1940; and Dr. L. J. LaSalle, 1939.

Mr. A. J. Mary, chairman of the Nominating Committee, presented the following recommendations for officers for 1952: For president, Mr. Louis Duclos; for 1st vice-president, Mr. H. L. Landry; for 2nd vice-president, Mr. T. J. Inness; for secretary-treasurer, Mr. W. D. Poole.

These candidates were duly nominated. There being no other nominations from the floor the proposed candidates were unanimously elected without opposition.

There being no further business, Mr. Hannaman expressed his thanks to the membership for their assistance during his term of office and ended the business session.

A movie on the construction of the Inter-American highway was shown for the entertainment of those desiring to stay.

T. J. INNES, Secretary-Treasurer,
Baton Rouge Section L.E.S.

Minutes of Meeting Baton Rouge Section, Louisiana Engineering Society November 7, 1951

On November 7 a meeting was held at 7:30 p. m. at the Louisiana State Testing Laboratory.

The meeting was called to order by Mr. F. A. Hannaman, Jr., with 33 members and visitors present. A motion was passed to dispense with the reading of the minutes of the previous meeting. There being no old or new business, Mr. Hannaman turned the meeting over to Mr. Landry who introduced Mr. P. R. Ferguson, Division Engineer of the Plantation Pipe Line Company. Mr. Ferguson gave a very interesting talk on the construction and operation of the Plantation pipe line system. The meeting adjourned at 9:00 p. m. and refreshments were served.

T. J. INNES, Secretary-Treasurer,
Baton Rouge Section L.E.S.

Minutes of Meeting, Lafayette Section, Louisiana Engineering Society January 15, 1952

The January meeting was held at the F. M. Hamilton Training School Auditorium on Wednesday, January 15, 1952.

President A. M. Bujard called the meeting to order and gave a report on the L. E. S. meeting in New Orleans held the previous week. In this report he stressed the need of new membership expressed at the meeting.

Mr. R. F. Helms, chairman of the membership committee, then gave his plans in trying to secure new members.

The President then stated the names of the members appointed to the membership committee and the program and entertainment committees and the appointment of Mr. Hiram Masan as contact representative. Mr. Russel made a motion that these appointments be confirmed. He was duly seconded by Mr. Hunter and unanimously approved.

Mr. Felix Boudreaux then gave a brief report on the work of the vocational guidance committee and stated that another open house to High School students would be held at S. L. I. on May 3, Engineers' Day.

Following Mr. Boudreaux's report, Mr. Bujard stated that it had been suggested that parts of the constitution and by-laws be changed. A copy of the constitution and by-laws was given to each member and a detailed discussion followed. Mr. Louis C. Landry, Jr., then made a motion to tentatively approve and recommend the changes in the Constitution and By-Laws. Mr. Russel seconded this motion and it was unanimously approved.

There being no further business the meeting was adjourned.

Refreshments were served following the meeting.

EMERY DOMINGUE, Secretary-Treasurer,
Lafayette Section, L. E. S.

Minutes of Meeting, Lake Charles Section, Louisiana Engineering Society Nov. 26, 1951

The regular bi-monthly meeting of the Lake Charles Section of the Louisiana Engineering Society was held at McNeese State College at 7:45 p. m., with the President presiding. There were twenty-five members and guests present.

Upon motion by Mr. Burgess, and second by Mr. Wooster, it was voted to dispense with the reading of the minutes of the last meeting.

The Secretary gave the report of the Nominating Committee as follows: V. E. Sicks for president; W. M. Davis for vice-president, and G. B. S. Ricketts for secretary-treasurer. There were no nominations from the floor.

Mr. R. R. L. Ward reported for the Civic Affairs Committee on their work on the proposed library. They will have a further report when the Corpus

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Christi and Denver Libraries are heard from. There were no further committee reports.

Mr. W. W. Barnes, Jr., introduced Mr. LeMieux of the Raymond Concrete Pile Company, and Prof. Walter E. Blessey of Tulane University. Prof. Blessey spoke on "Prestressed Concrete."

The meeting adjourned at 10:00 p. m.

W. M. DAVIS, Secretary-Treasurer
Lake Charles Section, L. E. S.

Minutes of Meeting, Shreveport Section, Louisiana Engineering Society December 4, 1951

The meeting held at the Hostell Room of Continental Baking Company was called to order at 7:30 p. m. by J. P. McCullough, President. Minutes of the preceding meeting were read and approved.

The President welcomed the members and guests, and visitors were introduced to the membership by their hosts.

As the meeting was for the purpose of nomination and election of officers for the coming year, the Chairman of the Nominating Committee, Ralph Segal, presented the following names: Louis H. Roeger, president; Ernest M. Gillen, 1st vice-president; Carl Hadra, 2nd vice-president, and W. W. Alsop, secretary-treasurer.

On the motion of E. M. Freeman and seconded by Paul Barber, the nominations were closed and the nominees elected by accumulation. Passed.

A discussion on securing new members, especially from the Petroleum industry, was conducted but no action was taken.

A motion by Ralph Segal and seconded by John Ellis that the Section allow the amount of \$60.00 be used for expenses of the President or other representation to the New Orleans meeting. Passed.

A motion by A. A. Lyons, seconded by E. M. Freeman, that dinner meetings be held at a definite hour, with the option on the part of members to attend the dinner or the business meeting after the dinner at a late hour. (Reservation to be made by the members attending the dinner). Passed.

The next meeting of the Section is to be held Tuesday, January 15, 1952 for installation of new officers.

Wendell Sorensen presented the entertainment for the evening consisting of a short talk by C. C. Boyd of the Portland Cement Association, followed by a motion picture entitled "The Drama of Portland Cement".

There being no further business, the meeting was adjourned followed by a social period.

Coffee and cakes were served.

L. H. ROEGER, Secretary-Treasurer

REPORT OF THE SECRETARY-TREASURER

INCOME:

Annual meeting	\$2,051.59	
Annual Outing	643.80	
Advertising	678.84	
Certificates, sales of	56.00	
Dividends and Interest	227.69	
Dues received	8,226.00	
Miscellaneous	25.40	
Monthly Meetings	17.07	
Proceedings, Sale of	4.00	
Total		\$11,930.39

EXPENDITURES:

Annual Meeting	\$2,174.92	
Annual Outing	637.32	
Certificates, cost of	31.90	
Dues rebated	1,440.50	
Floral Offerings	20.60	
Library Service	48.00	
Miscellaneous	25.40	
Monthly Meetings, cost of	578.91	
Proceedings, cost of publishing	2,683.22	
Salaries	2,325.00	
Stationery, Printing and Postage	1,173.20	
Taxes	46.49	
Total		\$11,749.33

Operating Increase for 1951 \$ 181.06

CAPITAL ACCOUNT:

Final payments on furniture for Headquarters and Award Medals	\$ 703.10
Decrease in Liquid Assets	\$ 522.04

The St. Charles Hotel

NEW ORLEANS, LA.

ROOMS WITH BATH FROM \$3.00

The St. Charles Bar is famous from coast to coast for its delicious, old-time mixed drinks. Everything in the bar has been modernized, EXCEPT the bartenders—they're old-timers!

Make the St. Charles your home in New Orleans for comfort, convenience, refreshing sleep, modern service.

The St. Charles Hotel

JOHN J. ("MIKE") O'LEARY, Vice-Pres. and Mgr.

Direction

DINKLER HOTELS COMPANY, INC.

CARLING DINKLER, President

OPERATING:

TUTWILER
Birmingham, Ala.

JEFFERSON DAVIS
Montgomery, Ala.

ANSLEY
Atlanta, Ga.

ANDREW JACKSON
Nashville, Tenn.

ST. CHARLES, New Orleans, La.

SAVANNAH
Savannah, Ga.

O. HENRY
Greensboro, N. C.

STATEMENT OF ASSETS

Cash, Whitney National Bank Checking Account		\$ 3,308.48
U. S. Savings Bonds, Series F:		
1942	\$ 900.00	
1943	887.00	
1945	835.00	
1946	809.00	
1950	1,490.00	
Total		\$ 4,921.00
Homestead Investments:		
Columbia Homestead Association	\$ 370.29	
Commonwealth Bldg. & Loan Association	306.33	
Greater N. O. Homestead Association	1,753.65	
Security Bldg. & Loan Association	500.00	
Sixth District Bldg. & Loan Association	500.00	
Union Savings & Loan Association	500.00	
Total		\$ 3,930.27
Total Liquid Assets, Dec. 31, 1952		\$12,159.75
Total Liquid Assets, Jan. 1, 1951		\$12,681.79
Decrease in Liquid Assets during 1951		\$ 522.04

1951 MEMBERSHIP REPORT**GAINS**

Members Elected:		
Members (79 - 1)	78	
Juniors (41 - 2)	39	
Affiliates (15 - 1)	14	
Students	14	
Total Elected		145
Members Reinstated:		
Members	3	
Juniors	2	
Total Reinstated		5
Total Gains		150
CHANGES IN GRADES		
Transferred from Affiliate to Member	2	
Transferred from Junior to Member	22	
Transferred from Student to Junior Member	37	
Total		61
LOSSES		
Resignations	34	
Dropped for Delinquent Dues	37	
Deceased	4	
Students—did not renew membership	19	
Total Losses		94
Net Gain		56
Total Membership at beginning of year		1,394
Total Membership at end of year		1,450

PROCEEDINGS OF THE LOUISIANA ENGINEERING SOCIETY

MARCH, 1952

"PATRONIZE OUR ADVERTISERS"

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This Journal reaches the officials with whom rests the responsibility for the bulk of the municipal, state and industrial works in Louisiana and the surrounding territory. Its advertising pages afford you an effective and dignified means of cultivating a wider acquaintance among prospective buyers.

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PROCEEDINGS

OF THE

LOUISIANA ENGINEERING SOCIETY

Vol. XXXVIII

JUNE, 1952

No. 2

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EDITORIAL NOTES AND COMMENTS

History of the Society. The minutes of the meetings constitute a running history of the accomplishments and plans of our Society. Keep up to date about your Society's activity by reading the minutes.

The New Orleans City Charter. A number of engineers have devoted much time to the study of the proposed charter. The community should be grateful for their critical appraisal. The comments are herein presented.

The Honorable Mayor and Commission Council
of the City of New Orleans
New Orleans, Louisiana
Gentlemen:

Inasmuch as matters in the proposed city charter are intended to provide for the City of New Orleans a more responsible efficient and economical government, and inasmuch as the Louisiana Council of Engineers is the overall spokesman for the herein after listed Engineer Societies of the State in matters pertaining to the public welfare and safety, we beg leave to present to the Commission Council and its honorable members a suggested revision to the Charter for their consideration. This revision pertains to the

Engineering functions of the City Government under which the bulk of the capital funds of the City are expended and which in conjunction with the Department of Health exercises the primary functions affecting the welfare and safety of the general public.

These recommendations are made:

- (1) with respect to construction and maintenance of public works;
- (2) with respect to improving the movement of traffic within the City, and controlling the cutting or obstructing of City streets;
- (3) with respect to establishment of street, right-of-way, and other public property lines and grades;
- (4) with respect to protection of property owners and public agencies through enforcement of the building code and zoning ordinances;
- (5) with respect to the efficient operation of municipal sanitation functions;
- (6) with respect to protection of the public through inspection of, and licensing the operators and installers of mechanical and electrical equipment.

The following member organizations of the Louisiana Council of Engineers were represented in the discussions of this Council that unanimously approved the attached recommendations.

Louisiana Engineering Society

American Society of Civil Engineers, Louisiana Section

American Institute of Electrical Engineers, New Orleans Section

American Society of Mechanical Engineers, New Orleans Section

American Institute of Chemical Engineers, New Orleans Section

American Institute of Mining and Metallurgical Engineers, Delta Section

Gulf Institute of Consulting Engineers

American Society of Refrigerating Engineers, New Orleans Section

Louisiana Institute of Civil Engineers

American Society of Heating and Ventilating Engineers, Delta Chapter

Society of Plastics Engineers, Inc., New Orleans Section

American Society of Safety Engineers, New Orleans Section

Illuminating Engineers Society, New Orleans Chapter,

We will be glad to send delegations to the Commission Council to be heard in support of the recommendations should the Council wish to hear them.

Respectfully submitted,

J. A. McNiven, President

Louisiana Council of Engineers

**RECOMMENDATIONS
SUBMITTED TO
THE HONORABLE MAYOR AND COMMISSION COUNCIL OF
THE CITY OF NEW ORLEANS
by
THE LOUISIANA COUNCIL OF ENGINEERS**

(1) In the interest of coordination and efficient administration, the engineering functions of the City government should be consolidated in a single department, to be designated the Department of Engineering, headed by a City Engineer.

(2) The City Engineer, and the heads of all divisions performing engineering, should be registered professional engineers.

A tentative draft of a Chapter of the City Charter setting up such a Department follows:

**CHAPTER 7
DEPARTMENT OF ENGINEERING**

Section 4-701—Functions

Section 4-702—City Engineer and Staff

Section 4-703—Board of Zoning Adjustments

Section 4-704—Board of Building Standards and Appeals

Section 4-705—Examining and Licensing Boards

Section 4-706—Improvements by Contract

Section 4-701—FUNCTIONS. The Department of Engineering headed by a City Engineer, shall:

- (1) Direct and supervise the engineering affairs of the City.
- (2) Provide engineering advice to the Mayor and Council when requested and when directed by the Mayor or the Chief Administrative Officer, to all officers, departments, and boards concerning any matter affecting the interests of the City.
- (3) Design, construct, pave, maintain and mark streets, bridges, and related structures and approaches.
- (4) Design, install and maintain the street lighting system.
- (5) Supervise, regulate, and control installations in, above or under streets.
- (6) Establish elevations and control grades of streets.

(7) Establish street, right-of-way, and other public property lines, and permanently monument them.

(8) Survey, when necessary, all property to be acquired or sold by the City.

(9) Determine by engineering methods, the most efficient movement of traffic in the City streets, and specify, provide and maintain the measures necessary thereto.

(10) Administer and enforce the zoning and building code ordinances, and all laws, ordinances, and regulations under which building, zoning and construction permits are required, as to all municipal officers, departments, boards and governmental agencies and to all persons, firms, and corporations, public and private, except as may be otherwise provided herein or by applicable state law.

(11) Receive applications, and promptly after due process, issue, refuse, revoke, suspend, or cancel permits. Refusals, revocations, suspensions or cancellations shall be in writing, for cause, and shall state the reasons therefor.

(12) Collect and dispose of garbage and other refuse, manage and operate all incineration and disposal facilities, enforce ordinances for the keeping of streets, vacant lots, and other places free from weeds and deleterious matter.

(13) Cooperate with the City Planning Commission in the determination of the official map of the City, and in the planning of the capital program with respect to the budget for those functions under jurisdiction of this department.

(14) Maintain, repair, alter and improve all buildings owned or operated by the City.

Section 4-702. CITY ENGINEER and STAFF

(1) The City Engineer shall be a Registered Professional Engineer who shall have been in the active practice of this profession for not less than twelve (12) years and have been in responsible charge of important engineering work for not less than five (5) years and shall be qualified to direct, conceive, plan and design engineering work.

(2) The professional staff of the Department of Engineering shall consist of senior and junior registered professional Engineers and registered Architects. Engineers in charge of various divisions of the Department shall have had not less than five (5) years experience in the branch of engineering embraced by that department.

Section 4-703 BOARD of ZONING ADJUSTMENTS

(1) Composition: There shall be attached to the Department a Board of Zoning Adjustments to consist of five members to be ap-

pointed by the Mayor with the approval of the Council, for five (5) year terms, provided that the members of the first board shall be appointed in such manner that the terms of only one member shall expire each year. The City Engineer shall not be a member of this Board, nor shall any member of his staff.

(2) Functions. The Board shall:

(a) Hear and determine appeals from applicants who have been refused building permits because of a violation or conflict with the zoning ordinance or the official map of the city.

(b) Hear and decide appeals where it is alleged there is an error in any order, requirement, decision, or determination made by an administrative official in the enforcement of the zoning ordinance of the City.

(c) Have the power to permit exceptions to or variations from the zoning regulations in classes of cases or situations and in accordance with the principles, conditions and procedures specified in and subject to the limitations imposed by the zoning ordinances of the City.

Section 4-704 BOARD of BUILDING STANDARDS and
APPEALS

(1) Composition. There shall be attached to the Department a Board of Building Standards and Appeals to consist of five (5) members to be appointed by the Mayor with the approval of the Council, for five (5) year terms, as follows:

A registered Architect of the State;

A registered Civil Engineer of the State;

A registered Mechanical or Electrical Engineer of the State;

A General Contractor of the State;

A person to be nominated by the Louisiana Rating and Fire Prevention Bureau.

The City Engineer shall not be a member of this board, nor shall any member of his staff.

(2) Functions. The Board shall:

(a) Hear and determine appeals on all matters arising under ordinances or regulations pertaining to the design, construction, alteration and demolition of buildings.

(b) Hear and determine appeals where it is alleged there is an error in any order, requirement, decision, or determination made by an administrative official in the enforcement of building regulations of the City.

Section 4-705 EXAMINING and LICENSING BOARDS

The board of Electrical Examiners ,the Board of Mechanical Examiners and the Board of Examiners of Operating Engineers may be continued in the discretion of the Council, and if continued, shall be part of this Department. Such boards shall perform such functions assigned to them by ordinance relating to the issuance of permits for electricians, operating engineers, gasfitters and installers of mechanical equipment. These boards shall exercise only those powers germane to the performance of their duties and shall not exercise the general power of department heads conferred upon other boards.

Section 4-705. IMPROVEMENT by CONTRACT

Any paving, building or other construction, maintenance, or repair estimated to cost more than \$2,000 shall be awarded under written contract in conformity with the requirements of this Charter, except when such construction is authorized by the Council to be done by the Department. All construction shall conform to detailed plans, specifications, and estimates, prepared under direction of the City Engineer and approved for each project by the Chief Administrative Officer or the Mayor.

p. 39.

UPADI will meet in New Orlean in August. The Union Pan-americana de Asociaciones de Ingenieros, with a membership of engineering societies in Latin American countries, Canada, and the United States, will meet in New Orleans August 25-29, 1952. It is anticipated that there will be engineers of all branches from at least twenty different nations in the Western Hemisphere. UPADI Director, Mr. James M. Todd, former chairman of EJC ,has been largely instrumental in bringing the meeting to New Orleans.

Present plans are to hold the sessions in McAlister Auditorium on the Tulane Campus. The 5-day program includes a number of plenary sessions for working out a constitution and by-laws, technical program on engineering education, panel on industrial development in Latin America, harbor tours on the Good Neighbor, inspection trips and several social functions.

PAPERS AND DISCUSSIONS

PLASTICS AND THEIR VALUE TO THE ENGINEER*

In the present period of metal shortages, many engineers and manufacturers are again wondering which materials can adequately take the place of the copper, tin, chromium, and stainless steel which are no longer obtainable. The solution to the problem may come from the glamorous array of bright, sparkling materials known as "plastics".

During the last war, however, overenthusiastic sales publicity combined with limited consumer knowledge of the properties of plastics resulted in a widespread misuse of these materials. Such misapplications were responsible for sleazy shower curtains, sink strainers which disintegrated in hot water, and buttons which became sticky blobs when the attached garments were dry cleaned.

One manufacturer of stainless steel cutlery reasoned that he could increase his sales volume by using bright plastic handles for his stainless steel knives, forks, and spoons. He selected cellulose acetate plastic because it is tough and fairly cheap. His resulting product, with vivid red, blue, and yellow handles contrasting with the silver gleam of the stainless steel, was most attractive and sold in large volumes—for several months. Then suddenly the sales dropped way below normal value.

An investigation revealed that after several weeks of normal use, the handles began to drop from the utensils. The word had gotten around and new customers were scarce. The basic cause of the trouble was in the properties of cellulose acetate plastic. This material has many fine properties but does have a high water absorption. This plastic swells when it is immersed in water and contracts when it dries out. A knife or fork which is washed and dried three times a day should never have been made of the particular material. The manufacturer corrected his design error by switching to polystyrene, which absorbs no moisture, but had in the meantime lost much customer goodwill and a considerable amount of money through not knowing the limitations of plastic materials.

With scores of plastic materials available and with their hundreds of trade names, it is small wonder that the average consumer knows little of their proper applications and limitations.

* By R. N. Miller, Assoc. Research Professor, Georgia Institute of Technology. Presented at L.E.S. Annual Meeting Jan. 11, 1952, sponsored by Society of Plastic Engineers Inc., American Inst. of Chemical Engineers, and American Institute of Mining and Metallurgical Engineers.

Each type of plastic has its own set of properties, advantages, and disadvantages. Each, if properly used, will do certain jobs well.

Before discussing specific types of plastics, I would like to bring you some of the highlights in the development of the plastics industry, which had a production last year of 750,000 tons, with a value of over 500 million dollars.

Even though most of the remarkable growth of this new industry has taken place in the last twenty years, plastics have been known since the early 1800's. The first resins created in a test tube were formed accidentally through the overheating of reagents in chemical reactions. Usually the gummy mass which formed was a nuisance and the chemist discarded his reagents, made a notation in his notebook that a tarry residue was formed, and started over again with fresh ingredients.

In 1868, as a result of the Boer War in Africa, the world supply of elephant ivory ran low. One of the principal uses of ivory at that time was for making billiard balls. A wealthy billiard enthusiast was alarmed over the shortage of billiard balls and offered a prize of \$10,000 to anyone who developed a substitute for ivory. With this incentive many chemists, scientists, and even basement experimenters attacked the problem. A young printer named John Wesley Hyatt won the prize by developing a new material formed by treating cotton cellulose with nitric acid. This new substance he called celluloid and, at the time, it was one of the very few materials not found in nature. Celluloid, in addition to being the first American plastic, was one of the first consciously developed synthetic materials.

For 22 years the world accepted celluloid as a rather remarkable new material but made no attempt to use the principle of its origin for the production of other plastics. In 1890 a German scientist mixed cows milk with formaldehyde and obtained a shiny hornlike substance which became the world's second important plastic.

Then in 1909, Dr. Leo Baekeland of Yonkers, after six years of searching for a practical synthetic resin, discovered a way to make one. He found that when phenol and formaldehyde were brought together under the right conditions of temperature and pressure and in the presence of a catalyst, a remarkable substance was produced which could be drilled and machined, which had good water and heat resistance, which was a good electrical insulator, and which was not too expensive to produce commercially. This material he called Bakelite and even today it is one of the most important of the plastics.

As a result of Baekeland's work, chemists began to realize the potentialities of these new synthetic materials and hundreds of new resins were developed and are still being developed. These new resins had widely different properties. Today scientists know that it is the structure of a plastic which is primarily responsible for its characteristics.

All plastics are formed by the linking up of individual molecules to form long chains. This process is called "polymerization". A typical example is the formation of polystyrene from styrene. Styrene is a clear colorless liquid and is made up of many individual molecules in constant and continuous motion. If we heat this liquid and subject it to moderate pressure, the individual molecules begin to link up with adjacent molecules to form first short chains and then long ones. As the chains lengthen, freedom of motion decreases, so the liquid first becomes viscous and finally changes into a more or less rigid solid.

If the chains are linear and are not interconnected, the resulting plastic may be softened by the application of heat and is referred to as a "thermoplastic" resin. Some of the commercially important thermoplastic resins are cellulose nitrate, cellulose acetate, polystyrene, and nylon.

If the chains resulting from the polymerization reaction are connected with linking molecules, the entire structure becomes quite rigid and no longer softens when heated. This type of resin belongs to the "thermosetting" group which includes phenol formaldehyde, urea formaldehyde, the melamine resins, and the polyesters.

THE SYNTHETIC FIBERS

Investigation in the field of synthetic fibers has contributed a great deal to our knowledge of the laws of resin formation, since a synthetic fiber is merely a plastic in filament form. Acetate rayon, for example, is cellulose acetate which has been extruded in fine filaments and then woven into cloth.

Carothers was assigned the task of developing a new synthetic fiber which had properties superior to the natural fibers such as cotton, silk, and wool. He began his efforts to create such a fiber by working with the polyesters, which form when organic acids react with alcohols. After many experiments he was able to make a resin with a linear chain structure and a molecular weight of about 10,000. This resin, however, was so weak that it could not be spun into a fiber. Further work showed that the length of the molecular chains could be increased by using higher reaction temperatures and pressures and by blanketing the reagents in a

nitrogen atmosphere to prevent oxidation. This improved resin could be spun into a thread but its properties were disappointing in comparison with silk, cotton, and wool.

Finally Carothers abandoned his work on the polyesters and tried a new plan of attack. He investigated the chemical structure of silk and eventually was able to synthesize a fiber having a similar structure. The resulting fiber was nylon, most glamorous of all our modern fibers. It is stronger than any of the natural fibers, has a much lower water absorption and therefore dries more rapidly, and will not mildew or rot in moist surroundings. During the last war the rotting of leather boots and shoes worn by soldiers and sailors in the South Pacific was a serious problem. The Quartermaster Corps solved the problem by developing a boot with rubber soles and bottoms and with nylon uppers.

The tensile strength of nylon is greatly increased by a very interesting production step. After the resin has polymerized it is chilled into a ribbon on a water cooled wheel and is then broken up into small fragments. The fragments are then remelted and extruded through fine spinnerets to form continuous fibers. These fibers have only a moderate tensile strength. The tensile strength is then almost doubled by stretching the fibers to four times their original length. The stretch treatment aligns the molecular chains so they all run in the same direction instead of having a random arrangement. As a result, it is necessary to actually rupture the chains in order to break a nylon filament.

Nylon is used not only for women's stockings, but also tooth brushes, paint brushes, and small molded bearings and gears. The du Pont Company had to solve a number of problems before Nylon paint brushes which would compete with bristle brushes could be produced. A paint brush made of hog bristle holds paint well and yet had a thin end because hog bristles are tapered and they are mounted with the thick end imbedded in the brush handle. Nylon brushes made of filaments having a uniform diameter were either stubby at the tip, or, if the tapering effect was produced by cutting off some of the filaments, would not hold paint. Finally, a machine was developed which subjected the filaments to an intermittent stretching operation which produced a variable cross-section. The solution of one problem led to another because it was then necessary to develop a complicated machine incorporating photoelectric cells to cut the variable filament at the thickest and thinnest points. Today you can buy tapered nylon paint brushes in any hardware store. They are ideal for the average householder because they do not require the care that bristle brushes do. Professional painters, however, still prefer the bristle brushes because they hold paint a little better.

Orlon was developed by du Pont in 1945 and is an acrylic fiber chemically related to Lucite and Plexiglas. Because of its soft and luxurious "feel", it is used in blouses, girdles, slips, dresses, and men's shirts. Its acid resistance makes it ideal for certain types of work clothes. It is also used for curtains in the home and filter cloths in industry. The biggest disadvantage of Orlon over Nylon is that it will not stretch under load.

Dacron, the latest du Pont fiber, is a polyester resin and may do for men what nylon did for women. After Carothers abandoned his work with the polyesters a British scientist continued where Carothers left off and developed a polyester fiber of outstanding properties. The du Pont Company then bought up the British process rights. Suits made of Dacron resist wrinkling, water, and moths. They may be worn through rainstorms without losing their crease and may be slept in and look perfectly pressed the next morning. Men's shirts made of Dacron can go through scores of home launderings with little or no ironing. Frequent dry cleaning of suits is unnecessary because spots may be washed out with soap and water. In spite of its wonderful properties, Dacron is actually cheaper than wool and many textile manufacturers are beginning to use blends of Dacron and wool.

THE CELLULOSE RESINS

The cellulose resin group includes Cellulose Acetate, Cellulose Nitrate, Cellulose Acetate-Butyrate, and Ethyl Cellulose. All are thermoplastic and are outstanding in their toughness and impact resistance. Cellulose Nitrate is the cheapest of the group but has the disadvantage of being highly inflammable. This is not too surprising since, chemically, the only difference between Dyanamite, Gun Cotton, and Cellulose Nitrate is in the degree of nitration of the cellulose. Today the chief use of cellulose nitrate is in the production of commercial motion picture film. Such film may not be used in homes or educational institutions and may not be shipped through the mails. Films for home use are made of Cellulose Acetate and are sometimes called safety film. Cellulose Acetate is more expensive but is slow burning and has the additional advantage of not darkening with age.

Cellulose acetate was recently used to solve a rather difficult packaging problem. Gordon Foods, Inc., of Atlanta, one of the largest potato chip producers in the Southeast, found that the shelf life of potato chips could be more than doubled during the hot humid summer months by sealing activated carbon and silica gel in each package. The big problem was to incorporate the ingredients into the package without danger of their being eaten with the potato

chips. They activated materials were first sealed in little envelopes made of porous tea bag paper. This method was not successful because the oil from the potato chips either closed the tiny pores in the paper or else weakened the paper so that it would tear open very readily. The problem was finally solved by using an envelope made of cellulose acetate film perforated with tiny holes. The cellulose acetate is completely impervious to oil and the perforations permit the package atmosphere to diffuse through the packet to keep the potato chips crisp and fresh. Incidentally, this protective packet is remarkably effective on many types of food products and is now available to all food packers.

One of the very important applications of Ethyl Cellulose is in the strip coating of machines, machine parts, and whole airplanes. Before the development of the strip coating technique, engines, tanks, motors, and machine parts were heavily greased to protect them from corrosive salt atmospheres while being shipped overseas. At the receiving ends, hundreds of man hours of labor were required to clean the grease from the parts and make them ready for service. Today a protective film of ethyl cellulose is sprayed over parts of any size. In going to the Orange Bowl, the train passed Warner Robbins Field in Georgia where hundreds of B-29 bombers were stored outdoors in their protective cocoon of plastic. It takes just a few hours to strip the plastic layer from these aircraft and put them back into active service.

THE ACRYLIC RESINS

The Acrylic resins, better known by their trade names of Lucite and Plexiglas, are one of the most fascinating of the new materials created by chemical science. This material has proven itself on far flung battle fronts in such applications as bomber noses, gun turrets, and astradomes where its perfect transparency, stability against weather and aging, and high impact strength are of vital importance.

Its sparkling brilliance and gem-like beauty make it a perfect material for jewelry, display fixtures, brush and comb sets, and edelighted signs. Its crystal clearness and fine optical properties make it ideal for contact lenses and lenses for inexpensive cameras and telescopes.

Heated, it is pliable as rubber and may be bent or rolled into any desired shape. When it cools off it become rigid and retains its new form. The objects so formed have one striking eccentricity. When reheated they regain their original shape. This property is called "elastic memory". A cast cube of Acrylic resin may be formed into perfect cylinder by heating and pressing. The forming opera-

tion sets up internal stresses. When the cylinder is placed on a hot plate for about twenty minutes the stresses are released and the cylinder transforms back into a perfect cube.

One of the more spectacular properties of the Acrylic resins is the ability to transmit cool light around intricate curves. The light is reflected from the polished sides and finally the light, but not the heat of the light source, emerges from the end of a bent rod. This phenomenon is utilized in modern surgical and dental instruments which conduct the light to the point where it is needed.

This material like most plastics can be shaped with ordinary metal and wood working tools. It can be sawed, carved or drilled and sheets of the material can be cemented or heat welded together. When it does break, it forms large dull edged fragments which will not cut.

No material can have so many good features without having a couple of disadvantages. It has a high expansion coefficient and should not be rigidly mounted. This point was emphatically made when the navigator of a B-29 bomber was exploded into space over Japan. The Plexiglas navigator's dome had been rigidly mounted in position. When the bomber rose from the warm earth to the sub-zero stratosphere, sufficient stress was created to crack the dome and the unfortunate navigator was literally blown out of the pressurized cabin. Thereafter gun turrets, domes and canopies were mounted in a rubber gasket material which allowed ample expansion and contraction space.

The surface of Lucite or Plexiglas is only moderately hard and will scratch quite easily. When dust and dirt from takeoffs and landings mar the surface of aircraft canopies enough to interfere with visibility, the scratches must be polished out or the canopy must be replaced.

The cost of this material is approximately \$1.00 per pound so it is not an economical substitute for glass as far as material is concerned.

TEFLON

Another remarkable new plastic is Teflon. This material gets its name by abbreviating the chemical name Tetra-Fluoro-Ethylene and was discovered quite by accident. A du Pont chemist had occasion to use some tetrafluoroethylene gas and broke the seal on a fresh cylinder of the material. He opened the valve but no gas came out. The seal and cylinder had been in perfect condition so the chemist weighed the cylinder and found it weighed exactly as much as a full cylinder. This seemed very strange.

He cracked open the steel cylinder and found a resinous deposit at the bottom. When the new material was tested it was found to have amazing heat resistance and would withstand temperatures up to 500 F. It was also found to be remarkably inert to all chemicals and has no known solvents. Today it is used for printing rolls, and for high temperature packing and gaskets.

One of the most striking and exciting group of new materials are the luminescent plastics which include both the fluorescent and phosphorescent types. They have the appeal of the mysterious, the magical, and colorful and are making a glowing history in the sign, display and decorative field.

These unusual materials are made by dispersing special pigments in transparent plastics such as Lucite. The pigments have the ability to absorb light and then immediately or slowly to re-emit visible light of another color. Thus the pigments are not just ordinary coloring matter, but are really lights, billions of tiny lights, spread uniformly over the area covered.

Fluorescent plastics are those which emit light only while activated by some source of light energy. The glow from these plastics is especially noticeable in a dim light. One of the common applications of this material is in modern display signs. Although no artificial light source is used, the signs appear to light up and catch the eye with their brilliant light emission. Fluorescent pigments were first developed for improving the visibility of signal flags. Today they are widely used in all forms of advertising and, on the beach, you can see fluorescent bathing suits advertising all kinds of forms.

Phosphorescent plastics contain pigments which absorb light energy and then emit light of a different wave length over a considerable period of time. These plastics are useful for doorbell buttons, electric light buttons, theatre seat markings, as well as for toys and novelties. A moon and stars made of this material and fastening to the ceiling of a child's bedroom will absorb enough light during the day to shine down throughout the night.

THE SILICONES

At a news conference in 1944, a General Electric representative tore open a pack of cigarettes and threw them into a bowl of water. "Have a smoke, boys" he told the reporters. When they fished the cigarettes out, the water rolled off them in little beads and they weren't even damp.

In 1945 Westinghouse engineers took apart a three horsepower electric motor and rewound it with a new type insulation.

Tests showed that the motor would then deliver ten horsepower, more than three times the original power output.

When our B-29's were soaring over Tokyo during the last war, their supercharges were equipped with a special, rubberlike gasket which stood up under a heat which caused all other gasket materials to decompose.

These remarkable accomplishments are typical of the Silicones, a new family of synthetic resins which range in form from gases to solid substances as hard as rock. They can be made in the form of watery liquids, thick oils, and pliable rubber. Each form has unexpected and important merits.

The unusual combination of properties characteristic of the Silicones is due to their unique chemical structure. Most plastics are composed chiefly of carbon and hydrogen atoms. The Silicones also contain a large percentage of Silicon atoms. Thus the Silicones are semi-organic materials and possess much of the stability and the good dielectric properties of the glass, quartz, and the mineral silicates to which they are chemically related. They acquire flexibility, ease of handling, and water repellency from the organic materials to which they are also related.

Ceramic and other materials develop a high degree of water repellency when subjected to Silicone vapors. Moisture in contact with the treated surface runs off, or forms tiny spherical droplets instead of continuous films. This vapor treatment prevents communication blackouts in fighting planes. When a plane dives into a rain cloud, moisture often condenses on the porcelain insulators of the radio set, short circuiting the terminals and killing the set. If the insulators are treated with Silicone vapors they shed the moisture like a duck.

Silicone oils will stand temperatures up to 400 F. and show little viscosity change from -40 F. to 400 F. They are important both as high and low temperature lubricants. They are used as liquid dielectrics in capacitors and small transformers because of their heat and moisture resistance. They serve as mold agents in metal die casting, improving surface polish and keeping dies clean longer. On heat sealing devices these fluids prevent adherence of melted plastic or paraffin on the heating surfaces.

One type of Silicone oil is known commercially as Pan Glaze and is applied to pans in the commercial baking of bread, buns and other bakery products to eliminate the need for greasing pans. One application gives easy release for 100 to 200 bakings.

Another fascinating Silicone compound is sometimes called "bouncing putty". It looks like putty, acts like putty under slowly

applied force but acts like rubber when a force is suddenly applied. A ball of this strange material, when thrown to the ground, will rebound like a tennis ball.

The rubberlike Silicones are used as gasket material. When the Navy needed a resilient gasket to cushion searchlight lenses against the shock of gunfire, the only material which would meet the severe requirement was Silicone rubber. Some of the searchlights are exposed to temperatures from 40 below zero to 350 F. above and the gaskets did not char, harden or crack.

Silicone insulating varnishes have made possible a new class of electrical insulation that has ten times the life and ten times the insulating value of the best class of insulation previously used. Because Silicone insulated motors can be run at much higher temperatures than ordinary motors, the horsepower available from a motor of a given size is tripled.

Silicone base aluminum paints have been developed which will withstand temperatures of the order of 1000 F. for use on boilers, stacks, ovens, and other hot metal surfaces.

Unfortunately, there is one drawback to the use of these almost magical compounds created by the juggling of Silicone, Carbon, and Hydrogen atoms. At the present time most of them cost from \$5.00 to \$6.00 per pound. However, in many of their applications, the Silicones are the only material which will be the job so the cost becomes a secondary factor.

The examples cited have shown some of the remarkable properties of the synthetic materials which we know as "plastics". Plastics are no longer a group of decorative materials used chiefly for their eye appeal. They are an entire new field of engineering materials and should be used not only for their ability to take the place of scarce substances but also for the properties which they alone possess.

ENGINEERING BRIEFS

New Concrete Wall Panel Has Center Layer of Fiber Glass. Concrete slabs with center layers of glass fiber, already in experimental use, are designed to lessen the cost of masonry construction and provide an insulating sandwich wall for commercial, industrial, and residential use.

The slabs are factory-made and shipped to the job after a 12-day curing period(ready for installation. They are five inches thick and are made in sizes from 8 by 8 feet to 8 by 30 feet. Standard panels have tongue-and-groove edges on all four sides to produce an interlocking joint, the other a rough broom finish.

The slabs are cast in a flat position with the muslin on the bottom form plate. A concrete mixture and wire mesh are placed on this over which is put a layer of pre-formed glass fiber setting, the slabs are cured for two days in a chamber at 120-degree temperature and 100% humidity, and later cured in the factory yard for ten days.

These slabs can be used as a curtain wall to be attached to structural iron or as a load-bearing wall.

Owens- Corning Fiberglas Corp., Toledo, Ohio, whose product is used for the center layer, states this new sandwich wall is meeting with great favor among builders because of the speed with which it can be erected. It saves up to 40% in masonry cost ,it is claimed, and is highly durable because of less joints. Because it is insulating, it reduces heating costs in winter and helps keep out the heat in summer.—*Aminco Laboratory News.*

* * *

New Heat-absorbing Plate Glass Discovered. New heat-absorbing plate glass, when used with one light of the conventional quarter-inch thick type, will exclude 61% of the total sun radiation but transmit 71% of average daylight, according to an announcement by G. P. MacNichol, Jr. of the Libbey-Owens-Ford Glass Co., Toledo, Ohio. A combination of two lights with a sealed air-space between will exclude 78% of the solar radiation and transmit 62% of the light.

The new glass is particularly suitable for use in large insulating windows in air-conditioned structures, since its use permits smaller air-conditioning units and saves initial cost and operating expense.

Heat-absorbing glass of various types is already in use but the new low-expansion type of glass is claimed as superior in its

ratio of daylight transmission to solar heat reduction. This gives it optical advantages and improved performance in its dual function of glare reduction and temperature reduction.—*Aminco Laboratory News.*

* * *

Aluminum Colored by New Process. A new chemical process called Alumox 44 protects and colors aluminum in such colors as yellow, blue, green, gold, brass, and many others, in one operation.

The procedure for coloring consists of cleaning the aluminum part and then immersing it in a solution consisting of 1 lb. of Alumox 44 salts per gallon of water. Dyes can be added to the processing solution so that coating and dyeing occurs simultaneously.

With Alumox 44 it is claimed that clear coatings can be produced on aluminum to reduce finger marking and protect the aluminum against weathering. The coatings are relatively non-conductive and have a thickness of approximately 0.0001 inch. The process is not meant to be a substitute for electroanodizing and was designed as a means of producing rapidly beautiful colors on aluminum. In most cases, the finish is covered with clear lacquer. Almost all aluminum alloys can be processed successfully including the wrought and the cast alloys. The bath operates in the temperature range from 190 degrees to 210 degrees F. Coloring is accomplished in from 15 seconds to 2 minutes.

Full information can be obtained by addressing Dr. Walter R. Meyer, Dept. AIC, Enthone, Inc., 450 Elm St., New Haven, Conn.—*Aminco Laboratory News.*

* * *

Important Scientific Developments of 1951. Foremost among the advances made in science during 1951, as reported to this paper, are the following:

CHEMISTRY AND PHYSICS

1. Primary cosmic radiation high above the earth's surface was found to consist of nuclei of the elements, from hydrogen to iron and heavier, with hydrogen predominating.
2. Discovery of a new cosmic ray particle called the K meson.
3. The two heaviest atoms, berkelium 245 and californium 246, were made in the laboratory.
4. Softly penetrating gamma rays from thulium were used for inspection of light alloy castings.
5. New 1000-curie sources of intense gamma radiation were made of cobalt 60 and tantalum 182 isotopes from the nuclear reactor.
6. A new method of analyzing lead to determine the quantities of various isotopes in a sample made it possible to calculate the age

at which sample rock was formed; this lead-uranium "clock" improved the accuracy of measurement of lead isotopes.

7. The "chronotron", an instrument which measures the masses of heavy nuclei more accurately, was developed.

8. A technically feasible process was developed for extracting uranium from phosphate rock as a by-product of fertilizer manufacture.

9. Stable solid crystalline substances were formed when argon and other inert gases were trapped in a lattice of quinol.

10. The temperature of the hottest flame on earth, fluorine burning in hydrogen at 8000 degrees Fahrenheit, was measured by comparing its light to that of the sun.

11. Zirconium was obtained by extracting it from hafnium through use of the fluorine-containing organic chemical, thenoyl tri-fluoroacetone.

12. First total synthesis of a complete steroid was announced.

13. Adrenal gland hormone called compound F, of potential value as an antiarthritis medicine, was synthesized.

14. Cholesterol, important body chemical, was synthesized.

15. Final steps in synthesizing cortisone from ergosterol, diosgenin, stigmasterol and cholesterol, were accomplished.

16. A practical method of making cortisone from a wild Mexican plant root instead of from ox bile, was developed.

17. Cathode rays were used to initiate polymerization in the manufacture of plastics, causing them to change from liquid to solid.

18. An improved electrolytic method for producing high-concentration ozone was reported.

19. Use of concentrated liquid ozone for rocket fuel was proposed.

20. Helium 3 was solidified by subjecting it to a pressure of 600 pounds per square inch at 457 degrees below zero Fahrenheit.

21. Organosiloxanes, a new class of chemicals of potential use, were made by combining silicones with older type carbon compounds.

22. Sugar-beet molasses was fermented into butylene glycol (a chemical promising for industrial uses) and butanediol (source material for synthetic rubber).

23. A new process was developed by which nitric acid can replace some of the scarce sulfuric acid in making superphosphate fertilizers.

24. Finest (thinnest) glass fibers yet made were used to make paper for filtering dust and particles that would result from atomic bomb explosions.

BIOLOGICAL SCIENCES

25. Discovery was made of the key mechanism by which the green plant converts the energy of sunshine into food and in which a single quantum of light is effective.

26. Antibiotics such as aureomycin and terramycin, added to the food of poultry and pigs with vitamin B₁₂, greatly increased their rate of growth.

27. A conventional high-powered microscope used in combination with a color-sensitive television camera provided an effective technique for the study of living cells.

28. A new blood type, Jka, the tenth human character for which the manner of inheritance is known, was discovered.

29. A weed killer known as CMU was developed. It attacks both grasses and broad-leaved weeds, leaving only bare soil in its wake.

30. A tiny sensing element for installation in sealed packages, was developed to indicate safe or unsafe moisture conditions within the packages without opening them.

ENGINEERING AND TECHNOLOGY

31. Transcontinental home-to-home long-distance dialing of telephone calls was initiated from one city to certain others.

32. Coast-to-coast television was begun with the inauguration of a transcontinental radio-relay system with 107 relay towers spaced about 30 miles apart.

33. Relatively cold light production from flat glass plates was developed through use of electroluminescence, produced by current alternations in a luminous condenser containing a phosphor mixed with a plastic.

34. A tiny eraser-size cobalt-platinum magnet, extremely powerful, was made.

35. A crystal clutch was developed for use in high-speed computers, using chemical crystals which bend when excited by direct-current voltage.

36. A tiny junction transistor, only half the size of a pea, was developed to amplify electrical signals about 100,000 times.

37. New uses in servo-mechanisms, shock absorbers, recoil mechanisms, and brakes, were found for the magnetic fluid clutch.

38. A synthetic fiber treated with 275-degree heat was made able to withstand temperatures as high as 1400 degrees F.

39. Two bonding methods were developed; one for joining metal and glass or ceramics, and the other to unite silicone rubbers with steel and other metals, glass or ceramics.

40. The feasibility was demonstrated of protecting a cobalt-bonded titanium-carbide ceramal against oxidation by the applica-

tion of a ceramic-metal coating, promising better heat-resistant turbine blades.

41. An air-gravel concrete was developed in which sand is replaced by tiny air bubbles produced by a resin or detergent.

42. A crystal which will amplify X-ray energy a million times was grown in the laboratory.

43. An improved process for extracting liquid fuels from shale oil was developed, promising an ample supply of synthetic gasoline.

44. A magnetic "logging" device, which measures the magnetic properties of the underground geological formations through which it is passed, was developed to aid in locating oil.

45. A new method for recovering manganese from low-grade ore was developed.

AERONAUTICS

46. A small, hand-held instrument known as the Magne-Probe, about the size of a watch, was developed to detect weak spots in aircraft manifolds, tail pipes, collector rings, headers, etc. caused by high-temperature corrosion.

47. The B-61 Matador, radio-radar controlled guided missile, was put into production.

48. A composite aircraft engine with both piston and jet power was developed.

49. A new mass-production method of producing one-piece hollow-steel propeller blades by extrusion was developed.

50. Soil density and moisture content was successfully measured by use of a radio-active material and a detector to determine airfield subsoil stability.

MEDICAL SCIENCES

51. Infected wounds, tuberculosis abscesses and diabetic gangrene were found to heal faster when treated with two chemicals from hemolytic streptococci—streptokinase and streptodornase.

52. Prevention of one kind of cancer by aureomycin treatment of its precancerous stage, believed to be an infection, was reported.

53. The following chemicals were reported for reducing high blood pressure: synthetic, Amphenone B, acting through pituitary, thyroid, and adrenal glands; sulfhydryl-containing compounds such as BAL; methonium halides; Protoveratrine; two phthalazine compounds; and alkyl-sugar derivatives which promote diuresis.

54. Large doses of radiocative iodine were reported effective in severe, intractable heart disease.

55. Triethanolamine trinitrate, and a drug extracted from beef hearts (trade-named Myocardone) were reported effective for heart disease.

56. Two cyclotron-produced chemicals, radioactive gallium and astatine (element 87), were reported promising new weapons against cancer.

57. First proof was obtained that nickel has cancer-causing properties.

58. Eight cancer-causing chemicals were discovered in processed rubber and carbon black.

59. Corticosterone, newly manufactured drug related to cortisone, provided successful in its first trials as a treatment for Addison's disease.

60. A new synthetic pain-killing drug, more powerful and longer acting than morphine and only three steps chemically from being synthetic morphine, was announced under the trade name Dromoran.

61. A faster, long-lasting local anesthetic known as 2-chlorprocaine, was reported.

62. N-allylnormorphine was reported an antagonist to opiate drugs.

63. Acetylmethadol, related to pain-relieving methadon, was reported successful in treating morphine addicts and promising as pain-reliever in first aid treatment.

64. Tibione, German-developed tuberculosis drug, was reported most promising new drug for leprosy.

65. A new quick, simple cheap test, called a flocculation test, for diagnosing trichinosis, brucellosis, tularemia, and possible other parasitic diseases, was developed.

66. Successful transplantation of the heart from one body to another was achieved in laboratory animals.

67. A new family of B vitamins, called lipoic acids, was discovered. One of them, alpha lipoic acid, was isolated.—*Aminco Laboratory News*.

* * *

Dirts A La Carte. Soils now can often be altered to suit a specific purpose. One new product for agricultural use binds the soil particles into aggregates, enhancing aeration and moisture retention. Other compounds are mixed with soil to form a solid surface, suitable for roadbuilding and similar uses.

The agricultural compound, a synthetic material, has much the same effect in improving soil structure as organic humus. Apparently the negatively charged particles in the compound serve as links between the positively charged soil particles, and bond them together. While the material is not itself a fertilizer, its use is

said to prevent the soil from becoming heavy and sticky when wet, or dusty and hard when dry, and so can increase crop yields on poor soil. By stabilizing the soil against the impact of rain or running surface water, the product may be useful in controlling erosion. Mixed with grass seed, it forms a film which will hold the soil until the grass roots become established.

In the control of erosion, about one pound of the compound to 100 square feet of land is the equivalent of mulching with 10 to 20 pounds of straw. For conditioning soil for agriculture, the material is worked into the soil; for optimum effectiveness, this would take from 200 pounds to a ton to the acre, depending on the condition of the soil. The new product, derived from the synthetic chemical acrylonitrile, now costs under \$2 a pound, compared with peat moss at 4 cents, but it is said to be 200 to 500 times more effective, and present indications are that it may last at least 10 times as long as natural organic matter. Current costs limit the market to special applications, as in greenhouses or for lawns or tennis courts. Further work on methods of application will determine its suitability for widespread agricultural use. The manufacturers plan to produce about 500,000 pounds for experiment this year, and considerably more for commercial use in 1953.

SOIL STABILIZERS

A related compound, calcium acrylate, has been used successfully in experiments for soil solidification. In this case, the acrylate is added to the soil with a catalyst which causes it to polymerize, forming a tough, solid surface in which the soil acts as an integral part. From four to ten per cent acrylate is used. Soils containing as much as 90 per cent moisture—a "soupy" mud—have been treated successfully. Bonding of the soil begins within two minutes after mixing, to form an elastic mass with a tensile strength up to a hundred pounds per square inch. When the treated surface has dried out thoroughly, tensile strength may increase to over 500 pounds to the square inch, but there is an accompanying loss in elasticity. Rewetting, however, will cause the surface to regain its flexibility.

Calcium acrylate now sells for about 75 cents a pound, and about 12 pounds per square yard is needed. Machinery to mix the acrylate and the catalyst with the soil and to lay down the mixture is still under development. Cost will therefore limit application for some time to such special uses as roads, airports, dams or reservoirs, where lack of conventional materials or special urgency justifies the expense. Several companies are now producing the acrylate, some of them on a commercial scale, and it is expected that as

supplies become more widely available—production of about 500,000 pounds is planned for 1952—costs will decrease and new markets may open up.

In another method of soil stabilization, an aniline-furfural mixture bonds to the soil particles to form a compact, though sometimes inflexible, surface. Early work was directed to stabilization of invasion beaches for carrying men and equipment from landing craft to solid ground. Equipment has been developed to lay down a roadway 11 feet wide and six inches deep which will support a two-ton tractor after two hours, and a 19-ton truck after 24 hours. By laying out parallel strips, it is possible to build an airfield. Further work is now underway to reduce the size of the equipment needed. It takes from 45 to 63 pounds of the aniline-furfural mixture to treat a square yard of soil, but the raw materials are relatively low in cost.

Waste liquor from sulfite pulp mills and small amount of sodium- or potassium bichromate are the basis for yet another soil-stabilizing treatment. The lignin in the liquor reacts with the bichromate to form a water-insoluble gel to bind the soil particles together. With loose dry beach sand, the materials, in the form of thin liquids, are poured on the surface, and penetrate to depths of four to six inches. The tough surface layer, which is sometimes inflexible, will support a truck within an hour. With clay or loam, the chemicals are applied in powder form; some 20 to 40 pounds of mixture, at 5 to 8 cents a pound, is required to treat a square yard of soil. Pellets of the soil mixture may be formed in the same type of machines that are used to make coal or coke briquets; this holds promise for use where gravel is not available.—*Industrial Bulletin of Arthur D. Little, Inc.*

* * *

Meetings of Minds. The problem of how to organize people—an age-old subject for argument and innovation—is now also being attacked scientifically. This work is treated as part of the larger field of communication theory, which includes such diverse efforts as semantics and cybernetics, and employs psychologists, anthropologists, economists, and sociologists, as well as workers in the natural sciences. Its objective is to organize groups—small or large—to do the job at hand as well as possible with a minimum of friction. One study reveals that efficiency in research and development depends primarily upon the pattern and flow of information among the research workers.

The best method of organization depends, of course, on the particular circumstances. When lines of communication within the functioning group are arranged in a "circle," with each individual

able to communicate only with his immediate neighbors, no central authority or leadership develops. This arrangement results in some inefficiency; it takes longer for all the members to collect information and decide upon a course of action. On the other hand, every member of the group contributes equally to its progress; the personal satisfaction of each member offsets the loss in efficiency rising from lack of central authority.

In a "line" organization, the person in the middle, who can communicate more freely with those on either side of him, becomes the natural leader of the group. By correlating data, noting trends, and seeking specific information from those at the ends of the line—who can communicate only with one person—he gets the job done more quickly and with fewer errors. Other members of the group, however, lose interest in the job as they lose communication with each other, and the efficiency of the group drops.

MEASURING WORK PATTERNS

Another investigation showed that the pattern of communication in a business, for example, may actually be quite different from that to be expected from an organizational chart. By analyzing an executive's contacts with other members of the organization, and the pattern of his work, it is possible to describe his exact function as a member of the group. This may be valuable in planning for replacements; a new member with a similar work pattern would fit smoothly into the group. Data on who talks to whom, and why, within a group are also valuable for other purposes—for instance, to find out how much communication is directed at solving the problems at hand and how much arises from individual emotional tensions created within the group.

The size of a group is also important, especially when communication is to be two-way. If a meeting of 200 people is followed with a question-and-answer period, questions will be halting and often of little value to the group. If the assembly is split into several smaller groups—six is believed to be a good committee size—the small groups, after discussing the subject, will bring forth a number of pertinent questions. Such a small group is reported as being effective, not only for questions in a large meeting, but for the upward flow of communication in a business, or for stimulating group thinking on a course of action.—*Industrial Bulletin of Arthur D. Little, Inc.*

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MEMBERSHIP LIST

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

C. E.—Civil Engineer
Ch. E.—Chemical Engineer
E. E.—Electrical Engineer
M. E.—Mechanical Engineer
R.—Registered, La.

A

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- CHAILLE CLAUDE BERNARD, (1943), C. E., R., La., Miss., La. Dept. of Highways. 2040 Oleander St., Baton Rouge 6.
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 CLAUDE J. KELLY, (1936), C. E., 4139 Walmsley Ave., New Orleans 15, La.
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 GERALD C. KERR, (1937), Acoustical E., Johns-Manville Co., P. O. Box 1050, New Orleans 11, La.
 ROY C. KETCHUM, (1950), C. E., 8th Naval Dist., U.S. Navy. 106 Finland Place, New Orleans 14, La.
 BERNARD L. KIERNAN, JR., (J), (1944), M. E., Asbestone Corp. 5315 St. Anthony St., New Orleans 22, La.
 BERNARD L. KIERNAN, SR., (1944), M. E., R. Jackson Brewing Co. 1622 Mirabeau Ave., New Orleans 22, La.
 CLIFFORD A. KING, (A), (1948), Contractor. 219 Dryades St., New Orleans 12, La.
 HERBERT M. KING, JR., (J), (1951), E. E., Gulf States Utilities Co., 2539 South St., Beaumont, Tex.
 KENNETH M. KING, (1949), Traffic E., City of New Orleans. 1232 Lowerline St., New Orleans 18, La.
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 WILLIAM F. KING, (J), (1951), M. E., E. E., R. U.S. Navy 2120 Audubon St., New Orleans 18, La.
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 MILTON E. KIRKPATRICK, JR., (1948), M. E., R. Henderson Sugar Ref. Inc. 2217 Treasure St., New Orleans 22, La.
 LEONARD R. KIRST, (1929), C. E., R. La. State Dept. of Public Works. 317 East Drive, Baton Rouge 12, La.
 SAMUEL B. KNAPP, (1951), Ch. E., Gaylord Container Corp., 420 Mississippi Ave., Ruston, La.
 JOHN T. KNIGHT, JR., (1940), M. E., R. Equitable Equipment Company, 410 Camp Street, New Orleans, La.
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 CHARLES P. KNOST, (1944), E. E., R. Moloney Electric Company. 4018 Thalia St., New Orleans, La.

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 RICHARD B. KOHNKE, (L. M.), (1911), C. E., R. City of New Orleans. 932 Picheloup Place, New Orleans 19, La.
 STANLEY P. KOLTUN, (J), (1952), Ch. E., U.S. Corps of Engineers, N. O. District. 1013 Pine St., New Orleans 18, La.
 BOLESLAUS M. KOPACZ, (1949), Ch. E., Process Equipment Co. 5341 St. Charles Ave., New Orleans 15, La.
 LOUIS I. KORN, (1933), M. E., E. E., R. U. S. Navy. 2201 Octavia St., New Orleans 15, La.
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 ROBERT J. KUHN, (1925), E. E., M. E., R. Consulting Engineer, 1643 Octavia St., New Orleans 15, La.
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 PAUL M. LAGARDE, (1947), C. E., Standard Fruit & S. S. Co., LeCeiba, Honduras.
 THEODORE J. LALA, (J), (1951), M. E., Hepinstall Steel Works. 5412 Milne St., New Orleans 19, La.
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 EARLE A. LANDRY, (1942), C. E., R. Gulf States Utilities Co. 2222 Cedardale Ave., Baton Rouge, La.
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 HERRICK J. LANE, (1929), C. E., W. Horace Williams Co. 833 Howard Ave., New Orleans, 13, La.
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 EDMOND J. LANGHETEE, JR., (J), (1951), Petroleum E., R. La. Land & Exploration Co., 4405 Cartier Ave., New Orleans 22, La.
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 MAXWELL A. LEA, (1948), M. E., R. Ethyl Corp., 528 Kenmore Ave., Baton Rouge 11, La.

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- SIDNEY J. LEMOINE, (1950), M. E., S. J. Lemoine & Co., Box 298, Bunkie, La.
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 SPALDING KENAN MANSON, JR., (1942), C.E., R. Building Specialties Sales, Clifford A. King, 401 Park Road, New Orleans 20, La.
 MICHAEL J. MARCHESE, (1948), C.E., U.S. Engineer Corps, N. O. Dist. 1716 St. Roch Ave., New Orleans 17, La.
 GODFREY L. MARINE, (J), (1951), E.E., Marine Electric Co. 741 St. Louis St., Lafayette, La.
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- WILLIAM G. MAYER, (J), (1950), C. E., R. La. Dept. of Highways. 301 Westfield, Bossier City, La.
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- SAMUEL H. McAFEE, JR., (1950), M. E., New Orleans Public Service Inc. 2838 Iberville St., New Orleans, La.
- C. R. McBRIDE, JR., (1950), M. and E. E., R. Firestone Tire & Rubber Co. 1711 Fifteenth St., Lake Charles, La.
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- R. A. McCLENAGHAN, (1949), C. E., R., La., Tex. McClenaghan & Barr, Engineers and Architects. P. O. Box 4117, Shreveport, La.
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- JAMES P. McCULLOUGH, (1938), Ch. E., United Gas Pipe Co. P. O. Box 1407, Shreveport, La.
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- GORDON J. McLEAN, (1923), M. and E. E., R., Del. Route 3, Osyka, Miss.
- LEAL C. H. McLEAN, (1933), M. and E. E., Jones & Laughlin Steel Corp. P. O. Box 66, New Orleans 6, La.
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- CHRISTIAN M. VOELKEL, JR., (J), M.E., R. Dixie Machine Welding & Metal Workss. 2762 Wisteria St., New Orleans 17, La.
- JOHN F. VOGT, JR., (1948), E.E., New Orleans Public Service, Inc. 3816 Jena St., New Orleans 15, La.
- ALVIN C. VOLK, (1949), C.E., R., Consulting Civil Engineer. 109 W. Jefferson St., Bastrop, La.
- ALVIN A. VOSS, (1927), C.E., R., U.S. Naval Air Station, Pensacola, Fla. 3825 North 10th Ave., Pensacola, Fla.
- BOBBY R. VOTAW, (J), (1950), E.E., R., Gulf States Utilities Co. Nava-sota, Texas.

W

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- JACQUES H. WAGNER, (1950), M. E., E. E., Private practice, heating and air-conditioning, Box 1244, Alexandria, La.
- RICHARD E. WAGNER, (1933), C. E., R. U.S. War Dept. 1633 S.W. 30th Ave., Miami, Fla.
- FRANK H. WALK, (1947), C. and M. E., R., Dunham-Wilson Co., Inc. 2167 Glendale Ave., Baton Rouge, La.
- ARTHUR L. WALKER, (1943), C. E., Tidewater Dredging Co. Humble Oil Bldg., New Orleans, La.
- J. D. WALKER, (L. M.), (Jan. 8, 1908), C. E., Lang Co., 2500 Poydras St., New Orleans 19, La.
- CHARLES WM. WALL, (J), (1948), M. E., Esso Standard Oil Co., La. Div. 1609 Moreland Ave., Baton Rouge, La.
- JOHN E. WALLACE, (1948), Field E., Gaylord Container Corp. 817 Avenue B, Bogalusa, La.
- WAYNE PAUL WALLACE, (1936), C. E., R., Louisiana State University. Baton Rouge 3, La.
- STEPHEN J. WALLBILICH, (1926), C. E., R., Corps of U.S. Engineers. 4212 State Street Drive, New Orleans 15, La.
- C. PERCY WALTERS, (1947), Operating E., Gulf States Utilities Co., 4333 Broussard St., Baton Rouge 12, La.
- FRANK C. WALTERS, (A), (1950), Marine E., Esso Standard Oil Co. 1947 Westmoreland Drive, Baton Rouge, La.
- WILLIAM D. WALTHALL, (1950), C. E. Southern Bell Tel. & Tel. Co. 128 Memory Lane, Lafayette, La.
- GEORGE B. WALTHER, JR., (1948), Agricultural E., Cities Service Refining Corp. 1803 Hodges St., Lake Charles, La.
- ALBERT R. WALTON, (1950), Surveyor, R. Self-employed. 1641 Edwin St., Shreveport, La.
- JOHN L. WANTLAND, (J), (1949), M. E., R. La. Polytechnic Institute, Ruston, La.
- RICHARD R. L. WARD, (1947), M. E., R., Texas, La., Cit-Con Oil Corp., P. O. Box 1578, Lake Charles, La.
- ALFRED O. WARE, (J), (1949), Chemist, La. Power & Light Co. 711 Rochelle Ave., Monroe, La.
- WALTER SCOTT WARE, (A), (1950), M. E. Negley Bag & Paper Co. 206 Lincoln St., West Monroe, La.
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- JAMES S. WARREN, (1950), E. E., R. Southern Bell Tel. & Tel. Co. 425 Rousell St., Houma, La.
- SAMUEL R. WARRINER, JR., (J), (1951), M. E., Warriner Equipment Co., 504 Delta Bldg., New Orleans 12, La.
- ROY V. WASKO, (J), (1950), M. E., J. B. McCrary, Engineers. 4612 Hopkins Ave., Dallas, Texas.
- L. T. WATKINS, (J), (1951), C. E., Missouri Pacific R.R. 322 E. Huisache St., Kingsville, Texas.
- JESSE C. WATSON, (1950), La. Dept. of Highways, 716 Evangeline Drive, Lafayette, La.
- MAX P. WATSON, (1944), M. E., E. E., Petroleum E., R. United Gas Pipe Line Co., and Union Producing Co., P. O. Box 1628, New Orleans 11, La.
- CALVIN T. WATTS, (1948), C. E., R. La. Polytechnic Institute, Ruston, La.
- CHARLES H. WEATHERLY, (J), (1945), M. E., General Electric Co. Beagle Manor, Marblehead, Mass.
- JOHN H. F. WEBERT, (1928), Structural E., Jones & Laughlin Steel Corp. 4115 Clermont Drive, New Orleans 22, La.
- IRWIN C. WEIDIG, (1951), E. E., La. Power & Light Co. 4317 Orleans Ave., New Orleans, La.
- LEO S. WEIL, (L. M.), (1920), M. E., E. E., R., Leo S. Weil and Walter B. Moses, 600 Audubon Bldg., New Orleans 16, La.
- BILLY A. WEISFELD, (J), (1951), E. E., R., Chrysler Corp. Michaud Ordnance Plant, 102 Livingston Place, New Orleans 20, La.
- THOMAS J. WEISHAUP, (1952), C. E., R., U.S. Bureau Public Roads. 321 Maestri Drive, Baton Rouge, La.
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- BURRIS D. WOOD, (1947), C. E., R., La. Dept. of Public Works. 822 North St., Baton Rouge, La.
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MINUTES OF MEETINGS AND BUSINESS OF THE SOCIETY

Minutes of Meeting of the Board of Direction Held on Thursday, Jan. 10, 1952

The meeting was called to order by President Newton, with Messrs. Abrahm, Cucullu, Knost, McNiven, Molaison and Fernandez present. Mr. Knost moved that the minutes of the preceding meeting be approved as corrected, seconded by Mr. Molaison and carried.

The treasurer presented a report showing the income and expenditures for 1951 compared with the budget approved at the beginning of the year.

The secretary reported that 374 ballots had been cast in the recent membership election and that all applicants were elected to their respective grades.

Mr. Cucullu presented the teller's report and announced that 342 votes had been cast for the election of officers, and that 337 had voted the straight ticket as recommended by the Nominating Committee. Mr. Cucullu also stated that a report of the Vocational Guidance Committee would be presented at the meeting to be held on Friday evening, January 11.

Mr. Molaison moved that the resignations of the following be accepted with regret; seconded by Mr. Abrahm and carried:

Tom O. Dillon, J. O. Dyal, Malcolm B. Helm, Edward D. Hogg, C. U. Schexnailder, C. N. Schwarz, Paul S. Stuart, Jr., Kyle Ward, Jr., Edwin R. Wilkinson, Vertrees Young.

Mr. McNiven announced that Dr. Maurice E. Striebe, Director of Technical Demonstrations for the Bell Television Networks, would be available to address the Society on February 14. His paper, describing the use of coaxial cables for transmitting T-V programs, and using slides and unique demonstrative apparatus, has been highly recommended. Mr. Knost moved that the date of the regular February meeting be changed from Monday, February 11 to Thursday, February 14. The motion was seconded by Mr. Abrahm and carried.

Following a short discussion of the program for the annual meeting, the meeting adjourned.

JOHN P. FERNANDEZ, Secretary-Treasurer

Minutes of Annual Meeting of the Louisiana Engineering Society, Thursday, January 10, 1952

The meeting was called to order by President Newton with approximately 125 members and guests present. Dr. David H. Edrington, Jr., Pastor of the First Presbyterian Church, gave the invocation, following which President Newton welcomed members and guests.

Reading of minutes of the preceding meeting was dispensed with, and President Newton then introduced the presidents of L.E.S. Sections who were in attendance. Mr. Clayton L. Nairne then introduced the keynote speaker, Mr. Edwin Vennard, Vice-President, Middle West Service Company, Chicago, who gave a most enlightening talk entitled "An Engineering Approach to Freedom". Following the lecture, President Newton requested a rising vote of thanks to Mr. Vennard, which was promptly executed.

The secretary-treasurer then presented his annual report, a copy of which is attached to these minutes.

President Newton then made his annual report, and presented certificates of merit to the following speakers who took part in the Student Conference:

Ulysse Pitre of Southwestern Louisiana Institute; Robert W. Barry of Louisiana Polytechnic Institute; Kendrick Holle of Tulane University, and Neil Brechtel of Louisiana State University.

Certificates of Life Membership in the Society were presented to the following, who have been active members for the past thirty years: Felix L. Alcus, Frederick H. Fox, Herrick J. Lane, Jules A. Lorio, John A. McNiven, and Frederick F. Pillet.

Mr. Charles M. Kerr then escorted Major General Edward S. Bres to the rostrum to receive an Honorary Membership in the Society at the hands of President Newton. This is the highest award the Society gives, and is presented only for acknowledged eminence in engineering.

Mr. Michael C. Abrahm then introduced special resolutions, copies of which are attached to these minutes. Mr. Todd moved that they be accepted and copies forwarded to those mentioned therein. The motion was seconded by Mr. Knost and carried.

Mr. Lionel J. Cucullu, Chairman of the Nominating Committee, then gave the Teller's Report, requesting the following gentlemen to escort the following newly elected officers to the rostrum:

(Dean Roy T Sessums, incumbent Director having one more year to serve, was not present due to his absence from the State.)

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Former President James M. Todd, escorting Mr. R. Mallard Seago, Director for 2 years.

Former President A. Lee Dunlap, escorting Mr. John P. Fernandez, Secretary-Treasurer.

Former President Frederick H. Fox, escorting Mr. Frank W. Macdonald, 2nd Vice-President.

Former President Clayton L. Nairne, escorting Mr. Michael C. Abraham, 1st Vice-President.

Former President David W. Godat, escorting Mr. John A. McNiven, President.

Retiring President Newton then handed the gavel to President-Elect McNiven, who accepted the office.

Announcement of some of the highlights of the Annual Meeting Program, and the audience was urged to attend the Thursday Night General Interest Meeting at Dixon Hall, following which Mr. Lehmann moved that the meeting adjourn, seconded by Mr. Godat and carried.

JOHN P. FERNANDEZ, Secretary-Treasurer

Minutes of Meeting of Officers, Board Members and Contact Representatives of Louisiana Engineering Society, held on Friday, January 11 at Arnaud's Restaurant

The meeting was called to order by President McNiven, with Messrs. Seago, Abraham, Roeger, Cucullu, Freeman, Knost, Betz, Macdonald, Larkin, Sicks, Bujard, Molaison, Wallace, Newton and Fernandez present. The president requested each one to stand and introduce himself, and announced that the object of the meeting was to obtain closer working cooperation between the state sections and the parent organization.

Mr. McNiven stated that, before opening the meeting to general discussion, several questions that had arisen during the year would be brought up:

At the August meeting Mr. James had reported that the Monroe Section had the following problems: (1) What action should be taken with regard to members who pay the parent society dues but not the section dues; (2) since the Monroe Section contains Ruston, a city comparable in size to Monroe, the Ruston members disapprove of the title "Monroe Section"; should steps be taken to change the name of the section?

The first question was not discussed, in view of the fact that no one from the Monroe Section was present, and that section is the only one which levies local dues. With regard to the second question, the following suggestions were offered for renaming the Monroe Section: "Monroe-Ruston Section", "Northeast Section", "Fifth Congressional District Section".

This brought up discussion of the geographical limits of sections. Mr. Bujard of the Lafayette Section stated that members living in Opelousas much preferred to attend meetings at Lafayette than at Lake Charles because of the shorter traveling distance. At this point, representatives of the Lake Charles Section reaffirmed their willingness to transfer members from Opelousas and vicinity to the Lafayette Section. After some discussion Mr. Seago moved that the president appoint a committee to present a plan for revision of section boundaries so that the maximum number of members would find it convenient to attend meetings. The motion was seconded by Mr. Bujard, whereupon President McNiven appointed the committee as follows:

R. M. Seago, Chairman; Hu B. Myers, Alexandria; Vivian E. Sicks, Lake Charles; Louis H. Roeger, Shreveport; Louis Duclos, Baton Rouge; Harry D. Richardson, Monroe, and A. M. Bujard, Lafayette.

Mr. Freeman asked whether the Society ever had considered making New Orleans another section and having a parent organization. He was told that a study had been made whereby it was determined that a parent organization could not be supported on the present \$3.00 income per full member.

Discussion was had on the problem of securing speakers, and it was decided that, as soon as a speaker has been obtained for his section, the program Chairman should notify the Program Chairmen of other sections of the arrangements made. By this means it may be possible to have a speaker address two or more section meetings on the same trip.

Mr. Bujard announced that the Program Chairman for the Lafayette Section was Mr. R. T. Brooks, and Mr. Wallace stated that the Second Vice-President of the Baton Rouge Section always served as its Program Chairman. It was reported that the parent organization had found it advisable for the Program Chairman to carry over for two months into the new year, thus giving time for appointment of the new chairman and for him to contact speakers.

It was reported that the Student Chapter at Lafayette had requested representation of Southwestern Louisiana Institute at the Student Night meeting

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which is held in New Orleans each year. They were advised that they were indeed welcome to participate, but it was pointed out to them that the Lafayette, Lake Charles and Alexandria Sections were better located for students to attend and present papers there.

Mr. Cucullu gave an outline of the progress made by the Vocational Guidance Committee and showed some demonstration charts that are used in the New Orleans area.

Mr. Newton moved that Mr. Abraham be appointed Chairman, with Messrs. Seago and Fernandez members of the Finance Committee; the motion was seconded by Mr. Butler and carried.

Mr. Abraham moved that Professor A. M. Hill be appointed Editor of the Proceedings, seconded by Mr. Molaison and carried.

Mr. Seago moved that Professor R. A. Steinmayer be appointed Chairman of the Professional, Civic and Industrial Affairs Committee; the motion was seconded and carried.

Mr. Newton moved that the President and the Secretary-Treasurer be authorized to sign checks drawn on the Society's account, and that either or both of them be given access to the Society's safety deposit box. The motion was seconded by Mr. Abraham and carried.

It was announced that at the first regular meeting of the Board of Direction, appointment of Contact Representatives would be made, and each section was urged to recommend its choice for its respective district.

There being no further business, the meeting adjourned.

JOHN P. FERNANDEZ, Secretary-Treasurer

Minutes of Meeting of the Board of Direction, January 31, 1952, L.E.S. Room, St. Charles Hotel

Present: President McNiven, Messrs. Myers, Molaison, Wallace, Duclos, Seago and Abraham. Professor A. M. Hill present for part of time by invitation.

After discussion with Professor Hill, the following resolution was adopted:

Since it is necessary to reduce expenditures because of the increasing costs of operation, and to avoid the necessity of raising dues, it is resolved that Publication of Proceedings be cut to quarterly instead of bi-monthly, if constitutional, with all present features maintained, including membership list, which will show name, branch of engineering, registered, place of employment, and mailing address, with abbreviations used wherever possible.

Moved by Mr. Abraham, seconded by Mr. Duclos, carried. (Note: The initial issue of above scheme to be left to the discretion of Messrs. Hill and Fernandez.)

Minutes of previous regular meeting read and approved. Messrs. Seago/Abraham.

Minutes of special meeting of January 11th read and approved. Messrs. Molaison/Duclos.

Budget presented by Finance Committee approved as presented. Messrs. Molaison/Duclos.

Approval of Engineers' Week recommendations as presented by letter of Mr. John Burk dated January 25, 1952. Messrs. Molaison/Seago.

President be empowered to appoint two members of Louisiana Engineering Society to serve on Citizens' Planning Committee. Messrs. Abraham/Wallace.

Resignation of Mr. R. M. Lovelace accepted with regret; Mr. Emmett F. Craig dropped at his request.

Suggestion of Mr. Abraham that an honorary membership be awarded to Mr. Edwin Vennard was tabled until next meeting.

Approval of all appointments of Chairmen and Vice-Chairmen of committees. Messrs. Seago/Wallace.

Approval of District Contact Representatives. Messrs. Molaison/Wallace.

Messrs. Duclos and Wallace invited parent organization to meet in Baton Rouge during June.

President McNiven suggested holding a meeting with standing committee chairman on Monday, February 7, which was agreed.

The meeting adjourned.

MICHAEL C. ABRAHM, Acting Secretary

Minutes of Meeting of the Board of Direction Held on February 14, 1952

The meeting was called to order by President McNiven, with Messrs. Abraham, Macdonald, Molaison, Myers, Seago, Sessums and Fernandez present. Mr. Calvin T. Watts, Contact Representative for the 5th Congressional District, also was present by invitation. Minutes of the preceding meeting were accepted as corrected.

Letters of thanks for courtesies extended at the annual banquet, received from Mesdames W. E. Blessey, W. J. Drawe, Jr., J. K. Mayer, and Professor R. N. Miller, were read.

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President McNiven announced that he would appoint the two representatives requested by the City Planning and Zoning Commission in the very near future.

As a matter of old business carried over from the December meeting, Mr. Soule Butler's objections to the certificates of registration issued by the State Board of Registration for Professional Engineers and Land Surveyors were discussed. Mr. Macdonald reported that these objections already had been brought to the Board's attention and that changes are contemplated.

Mr. Abraham moved that Mr. J. Robert Rombach be appointed Chairman of the Publications Committee for 1952, seconded by Mr. Seago and carried.

A suggestion made and tabled at the meeting of January 31 to elect Mr. Edwin Vennard an honorary member of the Society was brought up. The secretary pointed out that a brief biography of the candidate, containing the qualifications on which his nomination is based, must be submitted to the Honorary Membership Committee before any action can be taken.

A list of proposed changes in the constitution of the Lafayette Section was read by the secretary. Mr. Sessums moved that these be approved for submission to the Lafayette membership, seconded by Mr. Myers and carried unanimously.

Mr. Macdonald reported that the architects have complained about the interpretation placed on the Engineers' Registration Act (Act 73 of 1950) by the Director of the Division of Regulatory Inspection for the City of New Orleans. It was announced that a meeting of representatives of the engineering societies would be held on Monday February 18 at the Engineers' Club, in order to appoint an official spokesman and coordinate the efforts of each group.

Mr. Macdonald pointed out that the preliminary draft of the proposed Home Rule Charter for the City of New Orleans contained several items which are objectionable to the engineering profession. As the matter concerns the whole profession, it was decided to refer the matter to the Louisiana Council of Engineers so that the various societies may act in unison. A tentative date for the meeting was set for Wednesday, February 28.

It was reported that a meeting of the Board with standing committee chairmen was held on February 11 and that most of the committees for 1952 have been organized. There being no further business, the meeting adjourned.

JOHN P. FERNANDEZ, Secretary-Treasurer

Minutes of Meeting of the Louisiana Engineering Society, February 14, 1952

The meeting was called to order by President McNiven in the Grand Ballroom, St. Charles Hotel, with approximately 250 members and guests present. Mr. McNiven welcomed members of the Armed Forces Communications Association and employees of Southern Bell Telephone Company.

Business of the meeting was dispensed with, and Mr. McNiven called on Mr. Benjamin F. Hatfield, who introduced the speaker of the evening, Dr. Maurice E. Strieby, Director of Technical Demonstrations, American Telephone and Telegraph Company, who gave a most interesting and demonstrative lecture on "Television Networks".

A lively discussion period followed, after which Mr. McNiven thanked the speaker and the Southern Bell Telephone people for having provided such an excellent and timely lecture, and the meeting closed with a rising vote of thanks to Dr. Strieby.

JOHN P. FERNANDEZ, Secretary-Treasurer

Minutes of Meeting of the Board of Direction March 10, 1952

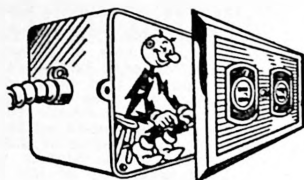
The meeting was called to order by President McNiven, with Messrs. Abraham, Bujard, Macdonald, Molaison, Richardson, Seago and Fernandez present. Mr. Ben T. Bogard, member of the State Board of Registration and of the Monroe Section, also was present by invitation. Mr. Macdonald moved that minutes of the preceding meeting be accepted as read, seconded by Mr. Abraham and carried.

The secretary gave an outline of the activities of the L.E.S. and the Louisiana Council of Engineers concerning the objections to the draft of the Home Rule Charter for the City of New Orleans. He also read a report from Mr. W. S. Nelson, Chairman of the Society's Legislative Committee, on this subject.

A letter from the American Institute of Architects was read.

Mr. Abraham moved that resignations of Messrs. Charles W. Hill, J. F. Ilgenfritz, J. C. Penny, E. O. Seidel and Anthony J. Evans be accepted with regret, since all are known to be on active duty in the armed services. Motion seconded by Mr. Molaison and carried.

Mr. Seago moved that the price per issue of the Proceedings be changed



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to 50c and that advertising contracts be accepted for a minimum of two issues. The motion was seconded by Mr. Abraham and carried.

The secretary read a letter from the Lafayette Section announcing that the revision to their constitution had been voted upon as follows: Total number of ballots mailed, 96; votes cast in favor of the amendments, 75; against, 1. Mr. Bujard announced that, since the letter was written, one more vote had been received in favor of the amendments. It was therefore understood that the amendments to the Lafayette Section's constitution are now in effect.

Mr. Macdonald moved that the secretary be directed to place on the ballot the names of all applicants who have been approved for their respective grades of membership by the Membership Qualifications Committee; motion seconded by Mr. Abraham and carried.

Mr. Abraham moved that initiation fees be waived for 1952, seconded by Mr. Bujard and carried.

In view of the fact that addresses of the following members are unknown and that they are delinquent in the payment of dues, in accordance with the constitution Mr. Seago moved that they be dropped for non-payment of dues, seconded by Mr. Richardson and carried: George Anthony Crowder, George T de la Matyr, Clarence E. Dickey, George C Fugler, Sidney L. Grillot, Ralph E. Lind, Jr., James M. Newland, Joseph B. Weldon, and Roy E. Mitchell, Jr.

The secretary announced that letters have been mailed to all delinquent members of known address and action will be taken according to the constitution at the board's next meeting.

Discussion followed on the selection of committeemen for the 1953 Annual Meeting and it was decided that the most urgently needed personnel would be appointed at the board's next meeting.

There being no further business, the meeting adjourned.

JOHN P. FERNANDEZ, Secretary-Treasurer

Minutes of Meeting of the Louisiana Engineering Society Held Jointly with the Louisiana Post, Society of American Military Engineers, March 10, 1952

The meeting was called to order by President McNiven with approximately 125 members and guests present. President McNiven welcomed members and guests of the S.A.M.E. He then relinquished the chair to Colonel Charles G. Holle, Chairman, Louisiana Post, SAME. After their business was conducted, President McNiven again took the gavel. It was moved, seconded and passed that the reading of minutes of the preceding meeting be dispensed with. The secretary then read minutes of a meeting of the Board of Direction held on February 14.

President McNiven gave the highlights of a brief prepared by the Louisiana Council of Engineers and submitted to the City Charter Committee, after which Colonel Marcel Garsaud, addressing the civilian members of both societies, stated that the U. S. Corps of Engineers had performed remarkable work and that recent news comments expressed unjust criticism of the Corps; he further stated that a resolution should be adopted by the Society and addressed to our congressmen and Chief of Engineers, and substantiated his remarks by quoting the Mississippi Valley Association which praised the Corps of Engineers. Colonel Garsaud then moved that a committee of five members be formed to write such a resolution. The motion was seconded by Mr. F. Grevemberg and carried.

President McNiven then called on Mr. Steve Wallbillich to introduce the speaker, Colonel Charles G. Holle, District Engineer, U. S. Corps of Engineers, who gave a most descriptive talk on "The Work of the Corps of Engineers in the New Orleans District".

Following the usual question period, the meeting adjourned with a rising vote of thanks to the speaker.

JOHN P. FERNANDEZ, Secretary-Treasurer

Minutes of Annual Meeting of the Lake Charles Section, L.E.S., Feb. 4, 1952

The meeting was called to order in the main dining room of the Pioneer Club at 8:30 p. m. by President Larkin. Eighty-seven members and guests were present.

Motion was made and seconded to dispense with the minutes of the last meeting.

Mr. Larkin then introduced Mr. Sicks as the new President of the section and turned the meeting over to him. Mr. Sicks introduced the other new officers of the section, W. M. Davis and G. B. S. Ricketts, respectively Vice-President and Secretary-Treasurer.

The speaker of the evening, Mr. Elmer Shutts, was then presented to the membership with a short introduction by Mr. Ricketts. His talk, entitled

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"History of the Development of the Port of Lake Charles", traced the general history of the port, while bringing out some of its more unusual aspects. Outstanding among these was the information that the port was developed primarily with private capital and initiative with some of its biggest advances made during periods of business recession.

Prior to the meeting a social hour and banquet were held at the same location.

Ten cards were turned in by ladies interested in the formation of a Women's Auxiliary to the Section.

The meeting was adjourned at 10:00 p. m.

G. B. S. RICKETTS, Secretary-Treasurer

**Minutes of Executive Committee Meeting of the Lake Charles Section
Louisiana Engineering Society, Feb. 26, 1952**

The meeting was opened at 8:00 p. m. at Sammy's Restaurant by Mr. Sicks.

A discussion was held over the proposed re-arrangement of section boundaries. Mr. Burgess pointed out that we would be called upon to supply a delegate to a State Meeting to agree on new boundaries. Messrs. MacNamara and McCorquodale were appointed to work with Mr. Burgess to develop a proposal for the section boundaries—this proposal to be available in about thirty days.

Committee appointments were considered and a tentative list prepared. Messrs. Larkin and Burgess agreed to check with the chairman and vice-chairman appointed and notify the secretary of acceptance so that a complete list can be prepared and mailed to the Committee members.

The secretary was requested to communicate with the State Secretary regarding pins for members, past president certificates, souvenir gavels.

Discussion was also held regarding the addition of the following names to the section charter as they had been inadvertently omitted in its preparation: Wyman, Wade, Larkin, Guillott, and Guidry.

The secretary was requested to write a letter to the School Boards (both City and Parish) offering services of our vocational guidance committee to high school students (not necessarily seniors only).

G. B. S. RICKETTS, Secretary-Treasurer

**Minutes of Meeting, Lafayette Section, Louisiana Engineering Society
February, 1952**

Mr. A. M. Bujard, President, called the meeting to order in the F. M. Hamilton Training School at 7:30 p. m. Tuesday, February 12, 1952.

Mr. Bujard then asked for the reading of the minutes of the previous meeting. The minutes were approved and adopted as read.

Unfinished business was then brought up before the group. This consisted of the charges in the Constitution and By-Laws. It was reported that to this date 48 votes had been cast for the changes with only 1 against the changes.

Under the topic of new business, Mr. Bujard brought up the low funds in the treasury. The reason for this, Mr. Bujard stated, is that reservations were made to attend L.E.S. dinners and some did not attend. The November and January meetings cost the treasury \$61.00 because of this.

A letter for President McNiven was then read to the group in regard to Engineers' Week. President McNiven suggested Engineers' Week be given publicity toward increasing the membership of the society. Mr. Andre Dubus made a motion that we accept said suggestion and it was seconded by Mr. Hiram Mason.

The meeting was then turned over to Mr. Dubus who introduced the guest speaker of the evening, Mr. A. E. Beattie who is System Engineering Manager for Gulf States. Mr. Beattie spoke on the Proposed Power Plant to be located near Scott.

The meeting was then adjourned and refreshments were served.

EMERY DOMINGUE, Secretary-Treasurer

**Minutes of Meeting, Lafayette Section, Louisiana Engineering Society
March, 1952**

Mr. A. M. Bujard called the meeting to order and asked for the reading of the minutes of the previous meeting. The minutes were approved as read.

Mr. Bujard then asked for committee reports. Mr. Felix Boudreaux gave a report on the Vocational Guidance Committee. He spoke about Southwestern's Engineers' Day, May 2-3, 1952.

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Mr. Bill Walthall reported for the membership Committee. He said applications had been mailed to each member and each one was asked to bring in new members.

Unfinished business was then brought before the group. Mr. Bujard stated that the L. E. S. Parent Society had approved the changes in the Constitution for the Lafayette Section of L. E. S.

The President then announced that the nominating committee had been appointed by the executive committee. The members appointed were: Charles Russel, Felix Boudreaux, and Bill Walthall. The committee is to give its report at the April meeting which will be held April 15th.

The meeting was then turned over to Mr. Allen Bonnet who introduced the speaker, Mr. Andrew Moore, Engineer in charge of Electric Installation for Central Louisiana Power and Light. The scheduled speaker, Mr. Randall, was unable to attend because of illness.

EMERY DOMINGUE, Secretary-Treasurer

**Minutes of Meeting, Lafayette Section, Louisiana Engineering Society
April, 1952**

The meeting was called to order by Mr. A. M. Bujard, president. He asked for the reading of the minutes. The minutes read that the nominating committee would report at this April meeting but the report is to be given at the May meeting. The minutes were approved as corrected.

No committee reports were given and no unfinished business brought before the house.

Under the heading of new business the president read a letter from Mr. Cucullu regarding a conference for Vocational Guidance work to be held at Louisiana State University.

A general discussion was then held on the shortage of engineers. Dr. zurBurg spoke on the plans for Engineers' Day, May 2-3.

The meeting was then turned over to Mr. Robert T. Brooks. He introduced the guest speaker Mr. W. H. Huckaby, State Highway Maintenance Engineer. Mr. Huckaby spoke and showed a film to the group entitled "Let's Get Out of the Muddle".

The meeting was then adjourned.

EMERY DOMINGUE, Secretary-Treasurer

**Minutes of Meeting, Alexandria Section, Louisiana Engineering Society
February 6, 1952**

Meeting for the Alexandria Section of the Louisiana Engineering Society was held at Herbie Kay's at 7:00 o'clock p. m. with thirty members and guests in attendance. Mr. Soule' Butler, the retiring President introduced the incoming officers, Mr. Hu B. Myers, President; Mr. Robert E. Chappuis, Vice-President, and Mr. O. E. Barron, Secretary and Treasurer. Mr. Myers, after appropriate remarks accepting the office, appointed the following men as chairmen of the following committee: Mr. Henry E. McDowel, Vocational Guidance, Mr. Daniel V. Cresap, Program, Mr. C. C. Edwards, Contact, and Mr. W. D. Roland, Entertainment.

Mr. Cresap then distributed for consideration a paper on which was listed eleven suggested discussion subjects for future meetings. It was decided that all subjects were acceptable and as many as possible would be included in the 1952 program. A copy of the paper that was distributed is attached.

It was suggested that future meetings be held regularly on the second Thursday in each month instead of having called meetings on a selected date basis in each month as has been the practice. This was voted on and carried unanimously.

Dinner was then served after which the meeting was again called to order by Mr. Myers and Mr. C. C. Boyd showed films entitled "Build Low Cost Roads with Confidence" and "Build with Soil Cement". After the showing of the films there was a general discussion regarding the next meeting terminating in the decision that wives of members would be invited to attend the March meeting. It was also decided that the next subject for the program would be "Toll Dialing" and an attempt will be made to have Mr. B. F. Hatfield, Louisiana Chief Engineer, Southern Bell Telephone Company, present to lead the discussion.

There being no further business motion was made and seconded that the meeting be closed.

O. E. BARRON, Secretary-Treasurer

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Suggested Program for 1952, Alexandria Section, Louisiana Engineering Society

1. Practical Soil Mechanics
2. Coaxial Cable in Reference to Television
3. Geology of Central Louisiana
4. Air Entrained Concrete
5. Morganza Spillway
6. Prestressed Concrete
7. National Highway Picture
8. Weather Reporting and Interpreting
9. Flood Control on the Mississippi River
10. Toll Dialing
11. Power Production and Distribution

**Minutes of Meeting, Alexandria Section, Louisiana Engineering Society
March 13, 1952**

The regular meeting of the Alexandria Section of the Louisiana Engineering Society was held at 7:30 p. m. at Herbie K's Oyster House with 33 members and guests in attendance. This was a dinner meeting at which wives were invited.

Mr. Hu Myers presided, called the meeting to order, welcomed the guests, and expressed the Society's appreciation of work performed by two of the ladies, Mrs. Rougeou and Miss Corley. Dinner was then served after which Mr. Myers requested Mr. Barron to introduce the guest speaker, Mr. B. F. Hatfield, Louisiana Chief Engineer of the Southern Bell Telephone and Telegraph Company. Mr. Hatfield gave a very interesting talk on toll dialing. After the talk, a rising vote of thanks was given Mr. Hatfield for a very able presentation of the subject.

A discussion of the advantages of having a ladies auxiliary was held resulting in a plan for a meeting to be called by wives of the society's members to go into the matter further. The secretary was instructed to furnish them with a copy of the society's member list.

Mr. Cresap then made an announcement regarding the next meeting which is to be held on April 10.

Mr. Tom David, then made a motion that the meeting be closed which was seconded by Mr. Daniel Cresap.

O. E. BARRON, Secretary-Treasurer

Minutes of Meeting, Alexandria Section, La. Engineering Society, May 15, 1952

A regular meeting of the Alexandria Section of the Louisiana Engineering Society was held at 7:30 p. m. at Herbie K's Oyster House with 17 members and guests in attendance.

Mr. Hu Myers presided, called the meeting to order, and welcomed the guests. The meeting was then recessed for dinner.

After dinner Mr. Myers again called the meeting to order for a short business session. The reading of the minutes was dispensed with by motion of Mr. Soule Butler and seconded by Mr. C. C. Edwards. A motion was made by Mr. Henry E. McDowell to recess the organization during the months of July, August, and September. This motion was seconded by Mr. Daniel V. Cresap and by voice vote was carried unanimously.

There being no further business, this part of the meeting was closed.

Mr. Myers introduced Mr. Adras P. LaBorde who in turn introduced Mr. H. A. Huesman, the chief speaker for the occasion. Mr. Huesman gave a very interesting talk on "Soil Mechanics and Its Practical Application". From an invitation for questions there were many made from the floor.

Mr. Myers then called on Mr. Cresap regarding the June Meeting. Mr. Cresap stated that arrangements were being made with the Central Louisiana Electric Company for a speaker to talk on Power Transmission and Distribution.

A motion was then made that the meeting be closed which was duly seconded.

O. E. BARRON, Secretary-Treasurer

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PROCEEDINGS OF THE LOUISIANA ENGINEERING SOCIETY

JUNE, 1952

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OF THE

LOUISIANA ENGINEERING SOCIETY

Vol. XXXVIII

SEPTEMBER, 1952

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EDITORIAL NOTES AND COMMENTS

Licensing of Engineers. Mr. Henri J. Molaison has made an analysis of our membership.

The Society's roster of June 1952 contains the names of 1,374 members of all classes, excluding students. Of this number, those known to be registered as professional engineers in any state (not including registered surveyors) totaled 836, or 60.8%. **HAVE YOU REGISTERED?**

Our Annual Meeting. Members of the Society have every reason to be proud of the annual meeting. It brings together many able speakers, both local and national, on a wide variety of subjects. The student meetings are of benefit in giving the young engineers an opportunity to appear before an unfamiliar audience, and to meet some of the older engineers. The Board of Direction has appointed Mr. William J. Drawe, Jr. as General Chairman of the Annual Meeting, with David Moodie as vice-chairman. These two able engineers will need the wholehearted assistance of every member of the organization.

Listen Americans! A letter from an American-born lawyer who has lived his adult life in Argentina has come to my desk. Its warning is so important to Americans, I have obtained permission to quote from it: "Things here are very bad," says the writer, "perhaps much worse than is reported in your papers. Personally I do not see any hope of a change until the masses here learn through bitter experience that an economy directed by totalitarian government just does not work. This will still take time, for private initiative and free enterprise had made a rich country of this one.

"This wealth, employed in a government handout policy has created in the minds of our masses the illusion that every man-jack can live like a millionaire without hitting a lick of work. We all admit that the coming elections will be won by the party now in power and that once this happens the present process of absorption of the individual by the State will be speeded up and free enterprise further curbed. Even as matters now stand private initiative is so harassed at every turn nobody dares to venture on a new undertaking.

"I am obsessed with the impression that the story of this country's economic decline may be likened unto a fine clock whose works were in good shape and nicely wound up because of private initiative and free enterprise. It was such a good mechanism that despite all the abuse it has received from the self-styled government experts it has functioned after a fashion up until now. But at last it is running down on us and will soon stop.

"Having enjoyed many happy years here under the blessings of freedom, I never thought the people would stand for the creeping revolution that has engulfed us. Lulled by prosperity and by the confidence that freedom was an inalienable right we enjoyed because of the sacrifices of former generations, we went to sleep while the forces of evil were awake. I have seen how easily it can happen in a country and for that reason I am so fanatically concerned that you in America do not let it happen to you."

Yes, it has always happened thus: "creeping revolution"—the hand out State, government economic planning, paralyzing taxes, a falling off of incentive and production, then the wielding of harsh government power! Will we in America have the foresight and the courage to stop the trend in its tracks—NOW?—by **George S. Benson, President of Harding College.**

The Fallacy of Low-Cost Federal Housing. The Magazine of Building, House and Home Edition has the following concerning federal housing projects.

The Hartford Housing Authority toted up its figures, found it cost \$75.83 monthly to maintain each "low-rent" tenant-family. Of this, the average tenant pays \$40 rent, the taxpayer pays a subsidy of \$35.83. Since census figures for 1950 put the median rent in Hartford at only \$38, it was clear that in Hartford well over half the citizens were paying taxes which support public housing tenants in more expensive quarters than they had themselves.

Comparative cost of public and private housing got as good a test as is likely when Knox Corporation erected similar projects at the same time in Waynesboro, Ga. Public housing cost \$8,076 per 784 sq. ft. unit, with potbellied stoves and no paving. Private rental project cost \$6,258 per 713 sq. ft. unit, with paved streets and fireplaces. Knox blames restrictive PHA rules for difference.

Our Annual Outing. The attendance this year was the best since 1948, 188 attending the dinner. Ninety members and guests participated in golf, 16 played horseshoes. The donors of the prizes were most generous. The outing was held at the Colonial Country Club. The entertainment committee under the chairmanship of Allen H. Jensen is to be congratulated upon a fine program.

New Members. The following have recently been elected to membership in our society.

For Member

HENRY G. ABBOTT, Baton Rouge; age 36. Endorsed: A. G. Meakin, T. E. Peak, T. L. Wilson. Texas A & M College, BSChE, 1937. La. State University, MSChE, 1949. Member Am Chemical Society. Phillips Petroleum Co., Process Control Engr., 1937-40. U.S. Army Corps of Engrs, Lt. Col., 1940-45. Esso Standard Oil Co., Div. Foreman, 1945 to date.

OTHA E. BARRON, JR., New Orleans; age 31. Endorsed: A. J. Fransen, L. J. Lassalle, J. M. Ledoux. La. State University, BSEE, 1940. Associate Member AIEE. Southern Bell Tel. & Tel. Co., Transmission Engr., 1940-42. U.S. Air Force, Electronics Officer, 1942-45. Robbins & Myers Inc., Sales Engineer, 1945-date.

WALTER D. BEISNER, Baton Rouge; age 34. Endorsed: A. G. Meakin, H. K. Groves, J. T. O'Brien. University of Minnesota, B.Ch.E., 1941; Graduate work in Ch.E., 1945-46. Jr. Mbr. AIChE. Esso Standard Oil Co., Ch.E., Div. Foreman, 1946-52.

CHESTER R. BEST, Baton Rouge; age 49. Endorsed: F. J. Germano, L. J. Lassalle, W. P. Wallace. University of Louisville, BSEE, 1932. La. State University, M.S.Eng. Mechancis, 1950. Member Society for Experimental Stress Analysis. Mengel Co., laboratory and quality control work. La. State University, Asst. Professor of Eng. Mechanics, 6 yrs.

WALTER BROWN, Shreveport; age 49. Endorsed: W. W. Alsup, E. M. Freeman, W. E. Fitzgerald. Engineering University (Technische Hochschule), Vienna, Austria, Dept. of M.E., degree "Ingenieur" (corresponding to Masters in USA), 1921-26. Member ASTE, ASTM. Registered, La., Ohio. Fairfax Eng. Co., Chief Design Engr., 1942-43. International Derrick & Equipmt. Co., Chief Mech. Engr., 1943-47. Brewster Comp. Inc., Chief Design Engr., 1947-51.

- MARION C. BUBENZER, Shreveport; age 53. Endorsed: A. A. Lyons, V. A. Lyons, J. H. Ellis. La. Polytechnic Inst., B.E. 1918. University of Chicago, Math, 1919-21. Member Texas Society P.E. Registered Petroleum Engr., Tex., La. Claiborne Parish Police Jury, road construction, 1924-27. Southwest Natural Gas Co., 1927-date, now General Supt.
- ROLAND J. CAMBRE, Lafayette; age 51. Endorsed: H. R. Mason, M. S. Pendergast, A. M. Bujard. Southwestern Louisiana Institute, Engineering (me) 1922-26, B.S. Wagner Electric Co., Sales Engineer, 1926-30. La. Public Utilities, Power Sales Engineer, 1930-39. Southwestern La. Institute, Supt. of Mtee., 1939-41; Associate Professor of M.E., 1941-date. Member ASEE.
- JOHNSON S. CONNER, Baton Rouge; age 54. Endorsed: L. J. Lassalle, F. H. Fenn, F. F. Pillet. La. State University, BSEE, 1935; MSEE, 1937; A.M. (Math) 1940. Member ASEE, Am. Soc. University Professors, Tau Beta Pi. Island Creel Coal Co., E.E., 1940-42. La. State University, Asst. Professor of E.E., Drawing, 1943-52. Presently on leave serving L.S.U. Extension Program in the Caribbean, Feb. 1952-date.
- BENJAMIN C. CRAFT, Baton Rouge; age 48. Endorsed: L. J. Lassalle, F. F. Pillet, W. P. Wallace. Leland Stanford Univ., Mining, A.B., 1928; E.M., 1929. Member AIMME, Tau Beta Pi, Pi Epsilon Tau, Sigma Xi. Registered Petroleum Eng., Texas. Louisiana State University, 1929 to date, now Professor Petroleum Engineering.
- QUINCY O. CRAIG, Alexandria; age 46. Endorsed: D. V. Cresap, M. E. McDowell, H. B. Myers. I.C.S., Scranton, Pa. 1932-36. Highway, railroad location, construction, 1925-30. Charge of Topo. & Hydro. Survey parties, Miss. River & tributaries, 1931-39. Project Engr., Cantonment areas and airport construction, 1939-45. Project Engr., levees, channels, bridges, highways, pile dike revet., concrete structures, 1945-date.
- LAURENT J. DECOURT, New Iberia; age 46. Endorsed: H. R. Mason, A. M. Bujard, J. R. Gaugler. Southwestern La. Institute, BSEE, 1931. Gulf Public Service Inc., Meter Tester, foreman, 1933-51. Central La. Elec. Co., Sr. Engr., 1951-date.
- CURTIS LEE DENSON, Sterlington; age 29. Endorsed: R. L. Phillips, F. X. Shaughnessy. Miss. State College, B.S.M.E., 1948. Rex Brown Steam Elec. Station, 1948-51. Sterlington Steam Electric Station, Asst. Engineer, 1951-date. Member Tau Beta Pi.
- DAVID H. FLOYD, Shreveport; age 44. Endorsed: J. H. Ellis, A. A. Lyons, V. A. Lyons. Oklahoma A & M College, BSCE, 1930. Registered Civil & Petroleum Engr., La., Okla., Southwest Natural Gas Co., 1930-date, now Chief Engr.
- CONRAD E. GRAFTON, Maplewood; age 36. Endorsed: R. E. Burgess, F. E. Charles, W. M. Davis. Registered Land Surveyor, La. Western Geophysical Co., Party Chief, 1942-45. Cities Service Refining Corp., Party Chief, 1946-49. Arabian American Oil Co., Chief Surveyor, 1949-50. Cities Service Refining Corp., Party Chief, 1951 to date.
- HARVEY JAY HALL, Baton Rouge; age 28. Endorsed: H. A. Hall, F. A. Hannaman, Jr., T. J. Innes, Jr. La. State University, B.S.M.E., Jan. 1948. Esso Standard Oil Co., Engineer, Jan. 1948 to date. Junior Member ASME.
- AUDIO G. HARVEY, Lafayette; age 38. Endorsed: L. I. Korn, V. A. Lyons, F. W. Macdonald. Tulane University, B.E., M & E, 1934. Registered E.E., M.E., La. Member Society of Exploration Geophysicists. La. Highway Comm., Computing Draftsman, 1935-36. Geophysical Service Inc., Party Chief, 1936-47. Delta Exploration Co., Vice-Pres. & Supervisor Lafayette office, 1947-date.
- H. WILLIAM HERBST, New Orleans; age 28. Endorsed: B. M. Dornblatt, B. A. Grehan, W. E. Blessey. Tulane University, B.C.E., 1945. Registered C.E., La. Jr. Mbr. ASCE. U.S. Navy, Construction & Repair Officer, 1945-46. La. Dept. Highways, Sr. Bridge Detailer, 1946-48. State Construction Co., 1948. Dunham-Wilson Mfg. Co., 1948-49. Smith & Padgett, Architects, Resident Engr., 1949-51. B. M. Dornblatt & Associates, Resident Engr., 1951-date.
- FREDERICK J. HOFFMAN, New Orleans; age 51. Endorsed: W. K. Bankston, R. M. Seago, D. W. Stewart. Tulane University, Chemical Eng., 1919-21; Pharmacy, Ph.G., 1921-23; Pharmaceutical Chemistry, Ph.C., 1923-24. N. O. Public Service Inc., 1925-date, now Chemist and Engineer at Industrial Canal Station. Member Chemistry Subcommittee, E.E.I.

KENNETH G. JOHANSON, Shreveport; age 33. Endorsed: C. B. Foster, Jr., A. A. Lyons, J. C. McLemore. Utah State Agricultural College, 1945-49, B.S. Degree, Major Landscape Arch., Minor Civil Eng., Landscape Architect, private practice, 1950. City of Longbeach, Cal., Asst. City Planner. City of Shreveport, City Planner and Traffic Engineer. Associate Member, Am. Society Landscape Architects, Active Member, Am. Society Planning Officials.

JAMES A. LEMOINE, Bunkie; age 28. Endorsed: G. P. Lemoine, S. J. Lemoine, G. C. Williams. Louisiana State University, B.S.M.E., 1948. S. J. Lemoine & Co., Construction Engr., 1948-51. Lemoine Bros., General Contractors, Partner, July 1951-date.

ZACHARIAH L. LOFLIN, Lafayette; age 42. Endorsed: R. C. Cambre, H. R. Mason, R. E. Jenkins. La. State University, B.S. Sugar Eng., 1931; M.S. Chem. Eng., 1933. Columbia University, Math, Ph.D. Member American Mathematical Society, Am. Chemical Society, Mathematical Ass'n of America. Registered M.E., Ch.E., La. Southwest Miss. Jr. College, Prof. of Math & Chemistry, 1932-36. Doherty-Stirling, Inc., Heating & Air Conditioning Engr., 1936-40. Southwestern La. Inst., Asst. Prof. Math., 1940-42. Miss. Ordnance Plant, Chief Engr., 1942-43. Southwest La. Institute, Prof. Chem. Eng., 1943-45; Head Math Dept., 1945-date.

EDWARD R. METZ, JR., Baton Rouge; age 31. Endorsed: A. H. Douglas, H. L. Landry, W. A. LeBlanc. Louisiana State University, B.S.M.E., 1947. Delta Tank Mfg. Co., Inc., Jr. Engr., 1947-49. Stone & Webster Eng. Corp., Office Engr., Feb.-May, 1949. J. B. Beaird Co., Inc., Jr. Engr., July-Oct., 1949. A. C. Pierce Co., Inc., Service Mgr., 1949-50. Delta Tank Mfg. Co., Inc., Engineer, June 1950-date.

JOHN C. McCAMPBELL, New Orleans; age 40. Endorsed: F. H. Fox, F. W. Macdonald, R. A. Steinmayer. University of North Carolina, B.S. Geology, 1934. Vanderbilt University, M.S. Geology, 1935. University of N.C., Ph.D., 1944. Member Eigma Xi, Geological Society of America, Am. Ass'n Petroleum Geologists, Am. Geophysical Union. University of N.C., Instructor, Asst. Professor Geology, 1939-44. Rutgers University, Asst. Prof., 1944-48. Tulane University, Associate Professor, 1948-date.

HENRY M. MORRIS, JR., Lafayette; age 33. Endorsed: G. G. Hughes, J. R. Hunter, H. R. Mason. Rice Institute, B.S.C.E., 1939. Univ. of Minnesota, C.E. Hydraulics, Math & Geology, M.S. degree Dec. 1948; Ph.D., Dec. 1950. International Boundary Commission, El Paso, Tex., Jr. Asst. Engr., 1939-42. Rice Institute, Instructor in C.E., 1942-46. Minnesota Univ., Instructor C.E., 1946-51. Southwestern La. Institute, Professor and Head, Dept. of Civil Eng., 1951-date. Member ASCE, ASEE, Sigma Xi, Am. Geophysical Union, Am. Meteorological Society, Tau Beta Pi, Phi Beta Kappa, American Scientific Affiliation. Registered C.E., Texas.

GEORGE C. PALMER, Shreveport; age 29. Endorsed: J. H. Ellis, A. A. Lyons, V. A. Lyons. Clemson A & M College, E.E., 1940-43. Centenary College, Geology, 1946-48. Member Shreveport Geological Society, Am. Petroleum Institute. Registered Petroleum Engr., La. Southwest Natural Gas Co. and Southwest Natural Production Co., Production Engr., 1946-date.

QUENTIN F. PERRITT, Arcadia; age 33. Endorsed: F. E. Hogan, R. T. Sessums, C. T. Watts. La. Polytechnic Institute, BSCE, 1948. Registered C.E. and Surveyor, La. Interstate Natural Gas Co., C.E., 1948-49. Private practice of civil engineering and land surveying, 1949 to date.

WALTER F. PLAUCHE, New Orleans; age 29. Endorsed: H. Jack Hinrichs, J. S. Riorda, J. M. Todd. Tulane University, B.E. in M.E., 1948. James M. Todd, Mechanical Engineer, June 1948-Aug. 1949. deLaurel & Moses, Mechanical Engineer, Aug. 1949-to-date. Junior Member ASME. Registered M.E., La.

EDWARD GEORGE SAAL, Gueydan; age 28. Endorsed: V. D. Breaux, Jr., R. E. Jenkins, G. G. Hughes. Southwestern La. Institute, B.S.M.E., 1947. Cities Service Corp., Draftsman, 1947-48. Gueydan Lumber Co., Inc., Manager, June 1948-to-date.

CECIL M. SHILSTONE, New Orleans; age 39. Endorsed: B. M. Dornblatt, R. P. Linfield, A. W. Thompson. Tulane University, B.E.Ch.E., 1935. University of Heidelberg, Germany, 1935-37. Shilstone Testing Laboratory, chemist, office manager, director La. branch, 1937-to-date. Fellow, American Inst., of Chemists, Member, Texas Society Prof. Engrs., Am. Soc. Testing Materials, Am. Chemical Society. Registered Prof. Engr., Texas.

THOMAS J. WEISHAUP, Baton Rouge; age 36. Endorsed: H. L. Lehmann, J. S. Logan, R. H. Vaughan. Georgia Inst. of Technology, B.S.C.E., 1946. U.S. Navy, Lt., 1941-45. La. Dept. of Highways, Project Engr., 1947-49. U.S. Soil Conservation Service, Drainage design & const., 1949-50. U.S. Bureau Reclamation, Structural design, 1950-51. U.S. Bureau Public Roads, Highway Engineer, March 1951-date. Registered C.E., La.

EDWARD J. WELSCH, JR., New Orleans; age 37. Endorsed: A. J. Fransen, O. K. Olsen, A. M. Scott. Tulane University, B.E., C.E. 1937. Registered C.E., La. Freeport Sulphur Co., Eng. Design, 1937-38. J. Gordon Lee, General Contractor, 1938-42. Higgins Shipyard, Field Engr., 1942. R. P. Farnsworth & Co., Estimator, 1942-45. J. Gordon Lee, Estimating and Field Construction, 1945-date.

THOMAS A. WOODWARD, New Iberia; age 35. Endorsed: A. M. Bujard, T. A. Bonnett, W. D. Walthall. La. Polytechnic Institute, B.A. (Ch.E.) 1938. Registered E.E., La. Gulf Public Service Co., 1938-43. Draftsman, Asst. Engr., Dist. Engr. U.S. Naval Reserve, 1943-46. Gulf Public Service Co., Asst. District Engr., 1946-51. Central La. Electric Co., Senior Engineer, 1951-date.

For Transfer From Affiliate To Member

CLARENCE J. ROBERTS, JR., Baton Rouge; age 30. Endorsed: W. D. Poole, H. T. Barr, H. L. Landry. University of Georgia, B.S.A.E., 1943. Pennsylvania Salt Mfg. Co., Mfg. Representative, 1946-47. La. State University, Instructor, Agricultural Eng. Dept., 1947-48. Gulf States Utilities Co., Agricultural Engineer, Sept. 1948 to date. Member Am. Soc. Agri. Engrs., 1940; Member La. Agri. Engrs. Ass'n, 1950. Registered Agricultural Engineer, La.

For Affiliate Member

HALSEL A. CANAVIER, SR., New Orleans; age 44. Endorsed: M. C. Abraham, W. K. Bankston, D. W. Stewart. Emsco Derrick & Equipment Co., Machinist, 1926-28. Tropical Oil Co., Machinist, 1928-32. Emsco Derrick & Eqpt. Co., Machinist, Foreman, 1932-42. Brown Shipbuilding Co., Mechanical Supervisor, 1942-47. Ebasco Services Inc., Mechanical Supervisor, 1947-date.

GEORGE M. CONNELL, Alexandria; age 51. Endorsed: S. Butler, C. C. Edwards, H. B. Myers. La. State University, Civil Eng., 3½ yrs., 1922-25. Central Const. Co., Asst. Supt., 1926-28. La. Dept. Highways, Asst. Bridge Mtce. Engr., 1929-30. Central Culvert Corp., Vice-Pres. & Engineer, 1940-date.

ROBERT COOPER, JR., Hammond; age 25. Endorsed: E. J. James, H. L. Lehmann, W. L. Thompson. U.S. Merchant Marine Eng. course, 1944-45. Member La. Highway Engrs. Ass'n. Registered C.E. (Public Employee), La. La. Dept. of Highways, Rodman, Instrumentman, Project Engineer, 1945-date.

JOHN C. JORDY, New Orleans; age 31. Endorsed: W. K. Bankston, W. B. Moses, D. W. Stewart. Tulane University; Business Admin., 1939-42; University College, Business Admin., 1946-47. U.S. Army, Captain, T. C. Reserve, 1942-46. Creole Food Co., Sales Manager, 1946-48. Southern Spray-kote Co., Inc., President and General Mgr., 1948-52.

For Transfer From Junior To Member

AYLMER P. BATCHELOR, Shreveport; age 31. Endorsed: C. A. Matherne, E. M. Freeman, L. J. Lassalle. Louisiana State University, B.S.M.E., 1948. United Gas Pipe Line Co., May 1948 to date. Registered M.E., La. Member ASME.

ROY GLENN CAPPEL, New Orleans; age 28. Louisiana State University, graduate in Civil Engineering. Registered C.E., La., Ala. U.S. Army Engineers, 2 years. W. Horace Williams Co., 3½ years design and supervision of wharves, bulkheads, off-shore structure.

BERNARD LOUVIERE, New Orleans; age 27. Tulane University, Mech. Eng., 3 yrs. Registered M.E., La. Gulf Engineering Co., Sales and application Engineerfi 5 yrs. U.S. Navy, 1 year.

CHARLES H. WEATHERLY, Marblehead, Mass.; age 26. Tulane University, B.E. in M.E. General Electric Co., 6½ years., design engineer on jet engine test equipment.

For Junior Member

- PHILIP L. BENFIELD, Baton Rouge; age 27. Endorsed: H. T. Barr, W. H. Carter, W. D. Poole. Clemson A & M College, B.S. Agri. Eng., Jan. 1950. University of Ill., Agri. Eng., 1950-51. Member ASAE, La. Agri. Eng. Ass'n. South Carolina Pen. Farm. Agri. Engr., summer 1949; University of Ill., Asst. in Agri. Eng., 1950-51. La. State University, Assoc. in Agri. Eng. Research, 1951-date.
- ROGER BISSINGER, New Orleans; age 26. Endorsed: A. Abramson, I. Isaacson, C. N. Kahn, Jr. Cornell University, B.E.E., 1946. University of Pennsylvania, E.E., 1946-49. Registered E.E., La. Radio Corp. of America, Electrical Design Engineer, 1946-49. Electrical Sales Company, Proprietor, 1949-52.
- AMABE J. BROUILLETTE, Alexandria; age 25. Endorsed: S. Butler, D. V. Cresap, H. B. Myers. International Correspondence Schools, Surveying & Mapping, 1946-49. La. Dept. Public Works, Instrumentman, Party Chief, Inspector, 1946-date.
- ROBERT L. CALHOUN, Alexandria; age 26. Endorsed: S. Butler, C. C. Edwards, Jr., Theo. G. Edwards. Southwestern La. Institute, B.E.E.E., Aug. 1948. Southern Bell Tel. & Tel. Co., Junior Engr., 1948-date.
- WILLIAM H. DYER, JR., Baton Rouge; age 30. Endorsed: H. N. Ogden, J. R. Whipple, C. S. Woodruff. La. State University, B.S.E.E., 1951. Student Member AIEE. Registered E.E., La. Ogden & Woodruff, Engineering Design, Feb. 1951-date.
- E. J. FRENCH, Vivian; age 21. Endorsed: B. D. Atchley, A. C. Lindsay, A. A. Lyons. La. Polytechnic Institute, B.S.C.E., 1951. City of Shreveport, Asst. City Engineer, Aug. 1951-to-date. Registered C.E., La.
- GARY J. GUIDRY, New Iberia; age 28. Endorsed: P. L. Delcambre, Jr., L. C. Landry, Jr., E. E. Sikes, Jr. Southwestern, La. Institute, Science-Math, B.A., Feb. 1948. American Exploration, Computer Seismograph Crew, March-Dec. 1948. United Gas Corp., Heating & Air Cond. Engr., Feb. 1949-date.
- SAMUEL R. JOHNSTON III, Shreveport; age 26. Endorsed: P. M. Barber, A. A. Lyons, J. C. McLemore. Centenary College, Pre-Eng., 1945-46. McClenaghan & Barr, Rodman, Chainman, 1945. Walter F. Wylie, Drafting, 1946. City of Shreveport, Instrumentman, 1947. Ryall Eng. Co., Surveying & Mapping, 1948. Minor & Shoupe, Instrumentman, 1949. Geo. E. Dutton, Party Chief, 1949. Ben E. Ramsey, Party Chief, 1951.
- JOHN PAUL JONES, Baton Rouge; age 25. Endorsed: J. R. Whipple, C. S. Woodruff, S. A. Nasca. La. State University, BSME, 1949. Member Tau Beta Pi. Registered M.E., La. Ogden & Woodruff, Eng. Draftsman, 1950-date.
- JOSEPH E. KELLY, Shreveport; age 30. Endorsed: B. T. Bogard, H. L. Mitchell, W. W. Alsup. La. Polytechnic Institute, BSME, 1950. Hycalog Co., 1950. J. B. Beaird Co., Inc., Sept. 1950-date. Registered M.E., La. Member ASME.
- STANLEY P. KOLTUN, New Orleans; age 27. Endorsed: S. D. Louchis, R. M. Shaw, J. P. Fernandez. La. State University, B.S.Ch.E., 1948. Firestone Tire & Rubber Co., Technician, June-Oct. 1943. Allied Chemical & Dye Corp., Chemical Engr. 1948-49. U.S. Corps of Engrs., N. O. Dist., General Engineer, Sept. 1951-to-date.
- EMILE S. KROUSE, JR., Baton Rouge; age 27. Endorsed: H. L. Landry, D. F. Latimer, F. J. Warren. La. State University, B.S. Agri. Eng., 1951. Gulf States Utilities, Farm Representative, June 1951-date. Registered, La. Member ASAE.
- DAVID J. LEVINE, New Orleans; age 23. Endorsed: A. M. Hill, C. A. Peyronnin, Jr., J. H. Peebles, Jr. Tulane University, B.S.M.E., 1951. Freeport Sulphur Co., Mech. Engr., June 1951-to-date. Registered M.E., La. Member ASME, ASH&VE, Society of Tulane Engrs.
- DEAN CLIVE McKEE, New Orleans; age 24. Endorsed: W. E. Blessey, F. W. Macdonald, M. J. Ruck. Tulane University, BSCE, 1951. Registered C.E., La. B. M. Dornblatt & Associates, Structural Designer.
- LAWRENCE MANN, JR., Baton Rouge; age 26. Endorsed: L. J. Lassalle, F. A. Hannaman, Jr., T. J. Innes, Jr. La. State University, B.S.M.E., 1949. Purdue University, M.S.I.E., 1950. Esso Standard Oil Co., Project Coordinator, May 1950-date. Junior Member ASME. Registered M.E., La.

- RICHARD E. PHILLIPS**, Baton Rouge; age 26. Endorsed: J. S. Burk, F. E. Reeves, J. D. Roberts. University of Cincinnati, M.E., 1951. Jr. Mbr. ASME. Registered M.E., La.; Engr.-in-training, Ohio. Cincinnati Milling Machine Co., Eng. Trainee, 1947-51. Ethyl Corp., Jr. Engr., 1951-date.
- JAMES R. POTTER**, New Orleans; age 27. Endorsed: R. N. Crews, C. L. Graves, J. L. Hicks. Clemson A & M College, B.C.E., 1947. Jr. Mbr. ASCE. Registered C. E., Surveyor, La. Froeling & Robertson, Lab. technician, 1947-48. Gulf Refining Co., Const. Engr., 1948-date.
- WAYNE C. RANDALL**, New Orleans; age 29. Endorsed: J. W. Brown, W. D. deLaurel, W. C. Ellis. U.S. Airforce, Radio Mech & Electronics, (1941-43-44). Southwestern La. Institute, E.E., 1947-49. Randall Electric Co., Apprentice Estimator, 1939-41. U.S. Airforce, Radio Mechanic, Air Radar & Electronics Specialist, 1941-45. Randall Electric Co., 1945-47. Southwestern La. Institute, 1947-49. Gregory-Salisbury & Co., Engineering Salesman, 1949-51. deLaurel & Moses, Consulting Engrs., Elect. Engr. & Inspector, 1951-to-date.
- JEAN F. SMITH**, Baton Rouge; age 27. Endorsed: J. H. Bateman, F. J. Germano, L. J. Lassalle. La. State University, B.S.M.E., 1951. Gulf States Utilities Co., Junior Engineer, Sept. 1951-date. Jr. Mbr. ASME. Registered M.E., La.
- EMANUEL STRAVOLEMOS**, Shreveport; age 25. Endorsed: W. W. Alsup, A. S. Mijalis, E. S. McRoberts. Texas A & M College, B.S.M.E., 1948. Student Member, ASME & ASH&VE, 1947. J. B. Beaird Co., Inc., Jr. Engineer, July 1948-to-date.
- CARL H. THOMAS**, Baton Rouge; age 27. Endorsed: H. T. Barr, L. E. Creasy, W. D. Poole. Clemson Agri. College, B.S. Agri. Eng., 1950. La. State University, Agri. Eng., 1950-date. Whitaker & Co., Tractor Salesman, summer 1950. La. State University, Graduate Research Associate, 1951-date.
- CHARLES G. TULLIS**, Shreveport; age 24. Endorsed: W. W. Alsup, B. T. Bogard, H. L. Mitchell. La. Polytechnic Institute, BSME, 1951. J. B. Beaird Co., Inc., Jan. 1951-date.
- JOSEPH H. WATERFIELD**, New Iberia; age 27. Endorsed: A. M. Bujard, P. L. Delcambre, L. C. Landry, Jr. Univ. of Tenn. Jr. College, E.E., 1946-48. Univ. of Tenn., B.S. Ind. Mgt., 1950. Member National Ass'n Corrosion Engrs. United Gas Corp., Jr. Engr., 1950-date.
- MELVIN C. WILLIAMS**, Baton Rouge; age 23. Endorsed: W. P. Wallace, F. F. Pillet, L. J. Lassalle. La. State University, BSCE, 1950. Jr. Mbr. ASCE. Registered C.E., La. La. State University, Instructor in C.E. and Asst. to Dean, 1950-date.

For Transfer From Student To Junior Member

Graduate in Civil Engineering at Tulane University:

RONALD P. CRESSY

Graduate in Civil Engineering at Southwestern La. Institute:

CARROLL A. CLARK
RALPH E. COOPER
HARRY DECKERLEGAND

EDMOND E. DUPRE, JR.
JORGE JOY
U. L. PITRE, JR.

Graduates in Chemical Engineering at Southwestern Louisiana Institute:

STERLING A. CALLAHAN, JR.
CHARLES E. COLE

FRANK V. DAIGLE
HUGH P. HEBERT

Graduates in Electrical Engineering at Southwestern Louisiana Institute:

E. BOND
ROSCOE B. JONES
LUCIEN T. MARTIN

DARRELL L. NEPVEUX
TOM OWEN

Graduates in Mechanical Engineering at Southwestern Louisiana Institute:

FLOYD T. LANGLOIS
PERSHING J. LEFORT
LOUIS B. MANN

JAMES R. NORMAN
JAMES B. STARR

PAPERS AND DISCUSSIONS

THE CONSERVATION OF CRITICAL ALLOYS IN STEEL*

This paper reports on the activity in progress at the Manufacturing Research department of the International Harvest Company in the conservation of alloys in steel. The activity is in collaboration with the Manufacturing Divisions and with the advice and counsel of the Engineering Department.

The principal avenues of approach to alloy conservation lie in:

- (1) The lowering of the alloy content by the use of leaner steels.
- (2) The addition of boron accompanied by a further lowering of the alloy content.
- (3) The use of carbon steels which contain no alloys other than manganese.

The following parts have been selected as typical of the work: ball bearings, bolts, gears, roller bearings, and transmission shafts. These are large production parts which play a vital role in the useful life of the Company's products. They also represent steels with carbon contents in the low, middle, and high ranges.

Not all of the parts have been changed in composition to incorporate the leaner alloy or carbon steels, but an idea of how much progress has been made is shown by a recent survey which shows that the Company has made a 79% reduction in nickel, a molybdenum reduction of 75% with a 21% increase in chromium. The reason for the increase in chromium is that the boron treated steels use chromium as the sole alloy. Chromium is not at the moment on the critical alloy list. Of the alloy steel being made at the Wisconsin Steel Division, 65% are boron treated steels.

This paper will place the greatest emphasis on the utilization of boron treated steels.

Table I illustrates the potentialities of alloy conservation by the use of boron.

Table I—Theoretical Alloy Conservation Based on 10,000 Tons of Steel

The rewards of manufacturing research in this area are two-fold:

- (1) The conservation of essential steel-making alloys so that the United States may continue to build enough products for both its civilian and military needs.
- (2) The production of high quality machines at the lowest possible cost.

* By A. S. Jameson, Supervisor of Metallurgical Research Laboratory, International Harvester Co., Chicago, Ill.

	Standard	ALLOY CONTENT—TONS			Boron	ALLOY CONTENT—TONS		
	Alloy Steel	Nickel	Chromium	Molybdenum	Alloy Steel	Nickel	Chromium	Molybdenum
Ball Bearings	52100	—	145	—	CR-B-MO	—	30	20
Bolts	4307	—	—	25	50B40	—	50	—
Gears	8620	55	50	20	50B15	—	50	—
Roller Bearings	4620	182	—	25	80B20	30	30	10
Shafts	8640	55	50	20	50B40	—	50	—
TOTAL TONS		292	245	90		30	210	30

CONSERVATION OF ALLOY: Nickel 262 Tons 90%
 Chromium 35 Tons 14%
 Molybdenum 60 Tons 66%

The economic advantage in the use of boron treated leaner alloy steels and carbon steel accrue from their lower first cost and their ability to be fabricated with greater ease. The realization of these economies are in some cases dependent on the improvement of heat treating equipment.

Fortunately, we do not work alone. There are research workers in companion industries, in universities, in technical societies, and in other research centers. They publish the results of their findings which we study and adapt to our purposes, and contrariwise, we also give them our findings, which they put to good use. We are represented on committees of the Society of Automotive Engineers, the American Standards Association, the American Society for Metals, the American Society for Testing Materials, and other societies. Research is sponsored by the International Harvester Company at the Metals Institute of the University of Chicago, the Armour Research Foundation, the Battelle Memorial Institute, and in other research organizations.

The key to the conservation of alloys is hardenability. This is simply defined in a ferrous alloy as the property that determines the depth and distribution of hardness induced by quenching. Hardness is correlated with strength. The standard hardenability test in use in American industry was developed in the Research Laboratory of the General Motors Corporation, although a great deal of the basic work on hardenability was done in the Research Laboratories of the United States Steel Company.

Although we have the key, there is still much to do. Boron does not act like other alloys. It is affected in its contribution to hardenability by the carbon content of steel. According to Wray¹, boron has a marked effect in increasing the hardenability of SAE 13XX steel from 0.2 to 0.6% carbon. When the carbon content is over 0.6%, the effect of boron rapidly decreases to nil at 1.20% carbon. This brings with it difficulties which will be mentioned later in our discussion of specific parts.

Boron Steel in Gears

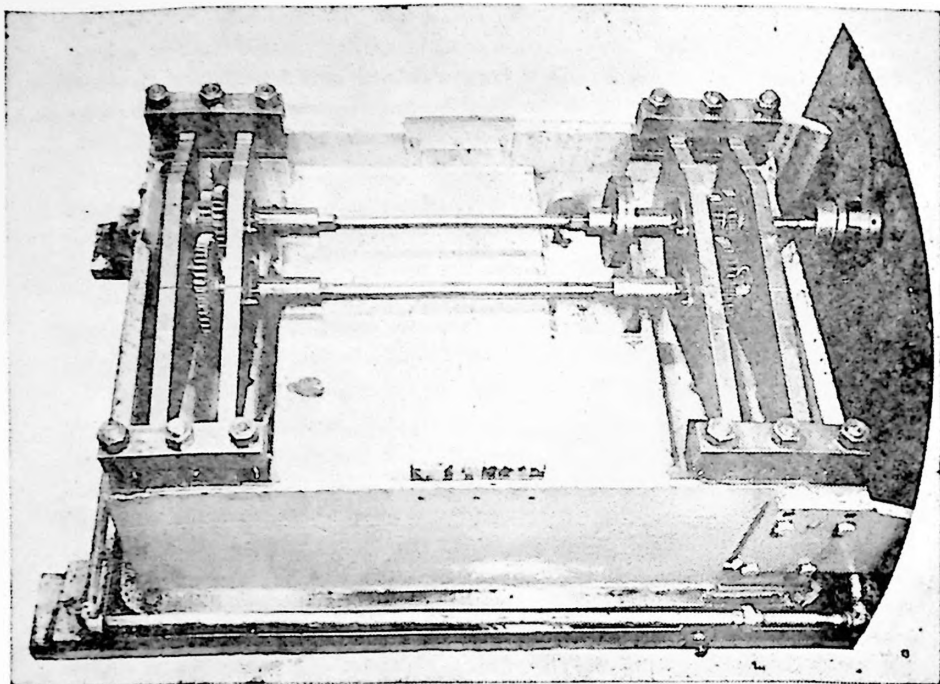
SAE 8620 steel was commonly used for transmission gears. One of the first steps in alloy conservation was to change to 4118 steel, which contains 0.40 to 0.60% chromium and 0.08 to 0.15 molybdenum. This material has a very satisfactory record of performance.

The first boron steel experimented with in tractor transmission gears was 50B20, which eliminated the molybdenum content of 4118 and substituted boron, using the same chromium range of 0.40 to 0.60%. These gears are gas carburized to depth of 0.04 inches. The carbon content on the surface is increased to about 1%. They are then hardened by direct quenching in oil and tempered to obtain a hardness of from 57 to 63 Rc.

In hardening the gear, there are at least two carbon levels—1% on the outside or case, and 0.20% on the inside or core. Inasmuch as boron has a much smaller effect in increasing the hardenability at 1% carbon than it has at 0.2% carbon, there is a tendency to increased warpage. The effect of this is that the bores of the gears closed in more than was usual with the 8620 or 4118 steel, thus making it necessary to remove more stock and consequently, reducing broach life. The tooth spacing was changed. The face run out increased. The answer to this is to lower the carbon and alloy contents of the steel in order to reduce the hardenability of the steel representing the core or inside. This corrected the shrinkage of the bore and the distortion in the teeth. However, in lowering of the alloy content of the steel, the hardenability of the outside or case is lowered to a point where difficulty is experienced in obtaining the desired hardness of 57 to 63 Rc. It was necessary to improve the quenching system to obtain a more effective quench.

There is another avenue of approach which has not been explored and that is carburizing in such a manner as to hold the carbon content of the outside or case to 0.8 to 0.9%. In this carbon range, boron is more effective in increasing hardenability than at 1% carbon.

The method of laboratory evaluation of gears is to test them at various loads which are about the normal operating loads until the endurance limit is obtained. This is done by the use of internally torque loaded gear testing machines as illustrated in Figure 1. The gears made from boron steel are evaluated by plotting their performance in this test against the previously determined performance of SAE 8620 steel or whatever steel is normally used. It is assumed in the test that gears which do not fail at 5,000,000 cycles would not fail in service.



MEF-4883A

Figure 1 — Photograph of Gear Testing Machines

Experimental work is also underway to use SAE 1050 plain carbon steel. The gears are hardened by induction heating of the teeth. This is the regular practice for certain tractor gears.

Boron Steel in Conical Roller Bearings

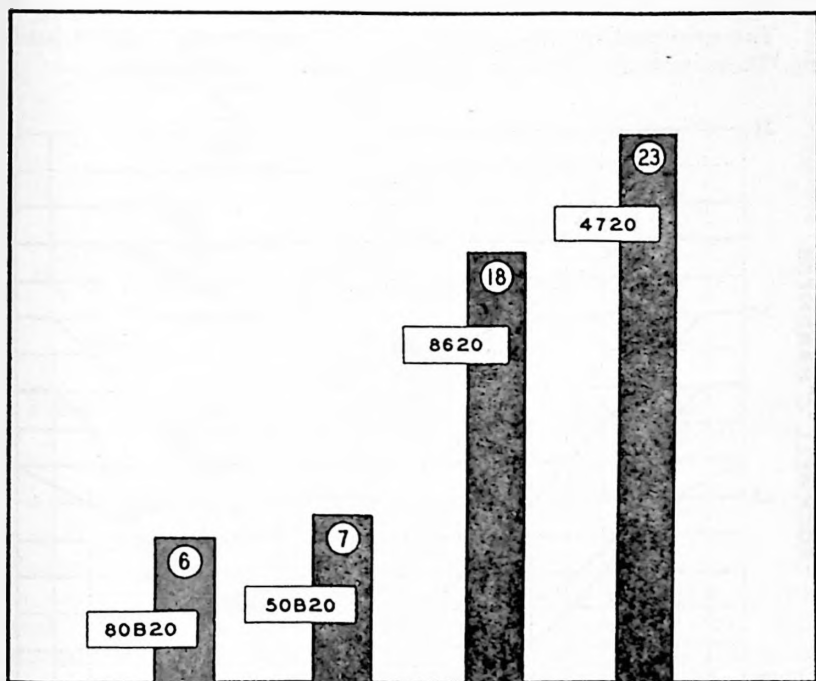
Roller bearing parts are made from low carbon steel which is carburized and hardened to 61-63 Rc.

The standard material is SAE 4600, a steel containing about 1.85% nickel and 0.25% molybdenum. The first alloy conservation was to change to AISI TS-4720, which contains about 1% nickel and the same molybdenum content, and second, to develop the use of SAE 8520, which contains about 0.5% nickel, 0.5% chromium, and 0.2% molybdenum. Experiments are now underway with 80B20 steel, which contains about 0.3% nickel, 0.25% chromium, and 0.1% molybdenum boron treated.

The carburizing of the bearing parts, rollers, and outer and inner races is carried out to produce various case depths depending on the thickness of the parts. The range will be from 0.04 to 0.07 inches.

The same problem is present as in the gears, that is, the greater effectiveness of boron as an increaser of hardenability in the low carbon core than in the higher carbon carburized case. The distortion problem is not as acute as in gears because the bearing parts are of a more regular shape. It is also part of the regular heat treatment practice to fixture quench many rings, thus holding them to size. The principal concern here is with obtaining enough hardenability in the case to produce the required surface hardness of 61-63 Rc.

The addition of boron to the steel does not compensate for the lowering of the alloy content of steel as is illustrated in Figure 2, therefore, the hardening practice must be improved sufficiently to compensate. There is no margin for careless handling. The parts must be transferred to the oil quenching medium as quickly as possible.



① NUMBER-J55 HARDENABILITY VALUES

CARBURIZED AND OIL QUENCHED-REHEATED TO 1525°F AND END QUENCHED

Figure 2 — Hardenability of Carburized Standard and Boron Treated Alloy Steels Austenitizing Temperature 1525° F.

Accelerated life tests have been started to evaluate bearings made from 80B20 steel. These tests are made in machines which load the bearings to three times their normal rated loads.

There is some work being done on outer race rings made from SAE 1050 plain carbon steel. Rings have been induction hardened to about 60 Rc and will be submitted to accelerated life tests in the near future.

Boron Steel in Shafts

The material used for axels and shafts was SAE 8640 steel. A counterpart to the previous mentioned 4118 steel with a carbon content of 0.40% was developed, which has a good service record. Recently tests are being made using 50B40, which contains 0.40—0.60% chromium and boron treated. At 0.40% carbon, boron is quite effective in increasing hardenability.

The principal method of evaluating shafts is by torsion loading. These tests are made on a 600,000 inch pound machine.

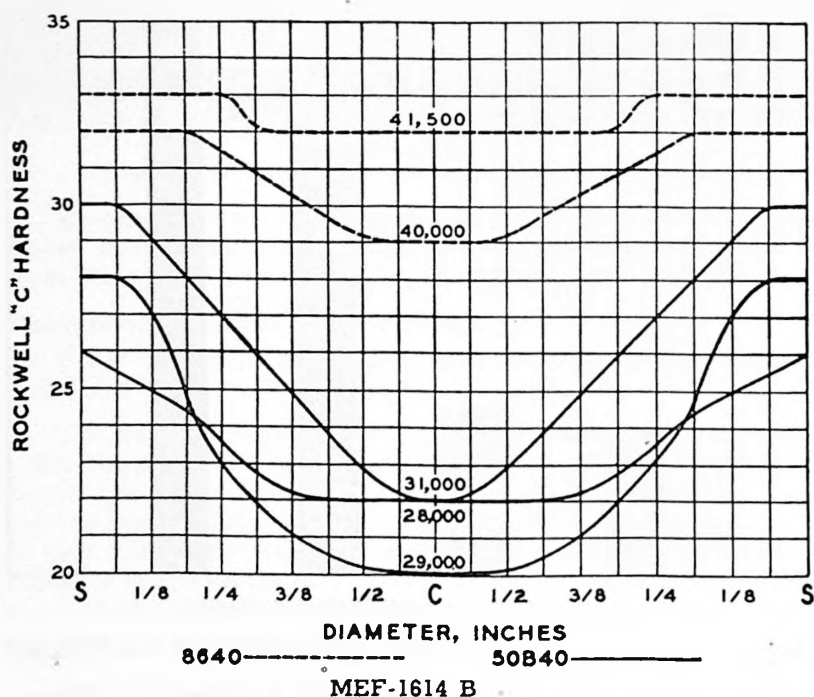
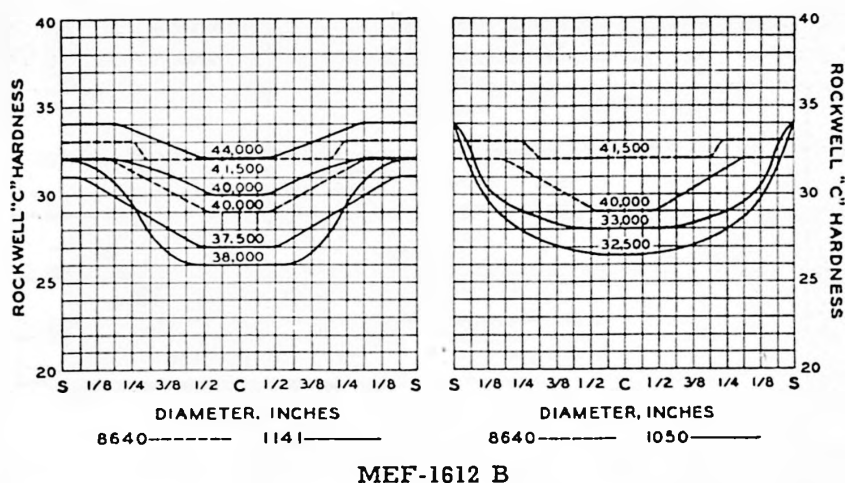


Figure 3—Cross Sectional Hardness vs Proportional Limit—inch lbs. of 8640 and 50B40 Steels

Some early data on torsion testing is shown in Figure 3. This is a comparison between SAE 8640 and 50B40 steel, based on the proportional limit. It would appear from this data that the 50B40 steel is inferior to the SAE 8640 steel; however, it will be noted that the 50B40 steel is tested at a lower surface hardness level.

This presents an opportunity to mention one important point in connection with the substitution of alloys by boron, and this is that boron does not retard the loss of hardness on tempering as do the alloys. Boron treated steels must therefore be tempered at about 50° F lower in order to produce the same hardness.



MEF-1612 B
Figure 4—Cross Sectional Hardness vs Proportional Limit in Torsion SAE 8640, SAE 1141, and SAE 1050 Steels.

It can be stated that the proportional limit in torsion testing is in direct relationship to the cross sectional hardness. This is well illustrated in Figure 4, which are the results of torsion tests made on the same diameter shafts made from SAE 1050, plain carbon steel, and SAE 1141, a steel containing no alloys other than manganese. Manganese is not classified as an alloy steel where the maximum specified manganese range does not exceed 1.65%. Incidentally, the use of SAE 1141 steel creates an opportunity to obtain improved machinability due to its higher sulphur.

Boron Steel for Bolts

The steels ordinarily used as bolt materials are SAE 4037, SAE 4042, or SAE 8637. This applies where the bolts are made to conform to the SAE or ASTM specifications, which call for a minimum

tensile strength of 150,000 psi minimum. The first two steels contain 0.25% molybdenum as an alloy and the third one 0.5% chromium, and 0.10% molybdenum. The nickel-chromium molybdenum is now replaced by 0.5% chromium steel boron treated known as 50B40 steel. Boron steel bolts made from 50B40 are in regular production.

The principal method of evaluating bolts is by tensile testing. A 60,000 lbs. testing machine was used for the test with an extensometer arrangement for recording load-elongation curves.

In Figures 5 and 6, it will be seen that 50B40 steel is a satisfactory alternate for any alloy steels in $\frac{1}{2}$ and $\frac{5}{8}$ inch diameters. The standard alloy compositions plotted on the hardness vs. tensile strength curve include steels from 0.30 to 0.42% carbon in the SAE

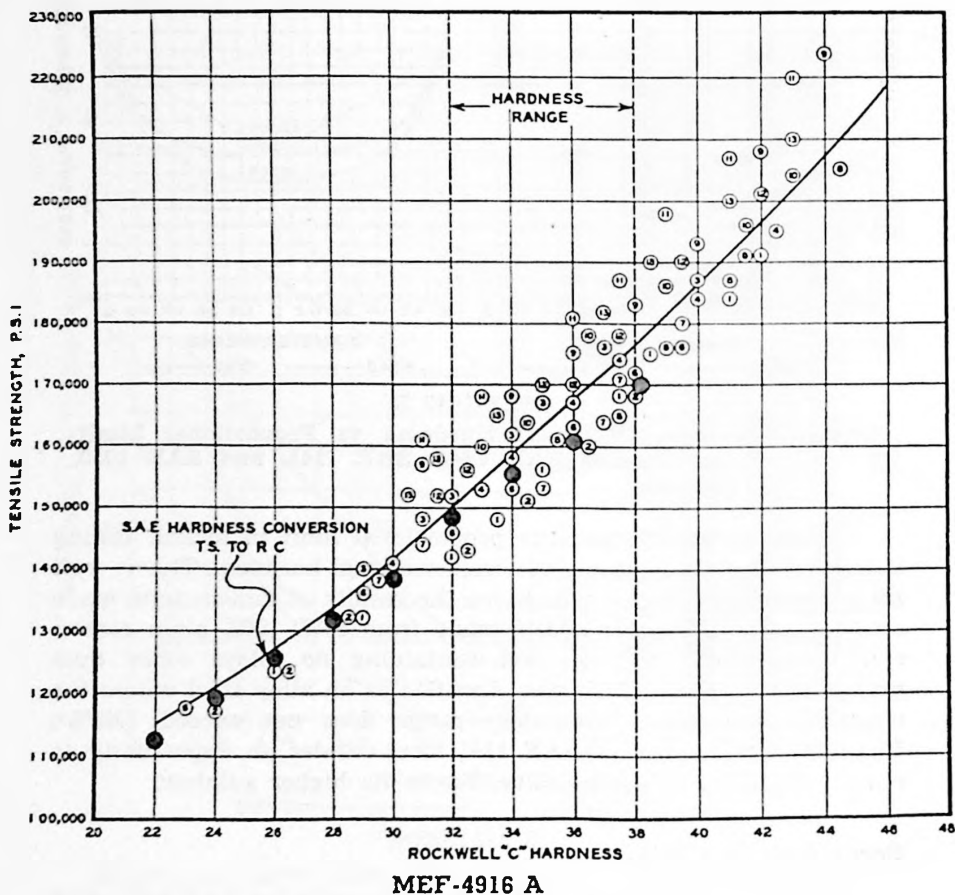


Figure 5—Tensile Strength vs Hardness of 50B40 and 12 Alloy Compositions in $\frac{1}{2}$ inch Diameter Bolts. The Black Circles are the Boron Steel.

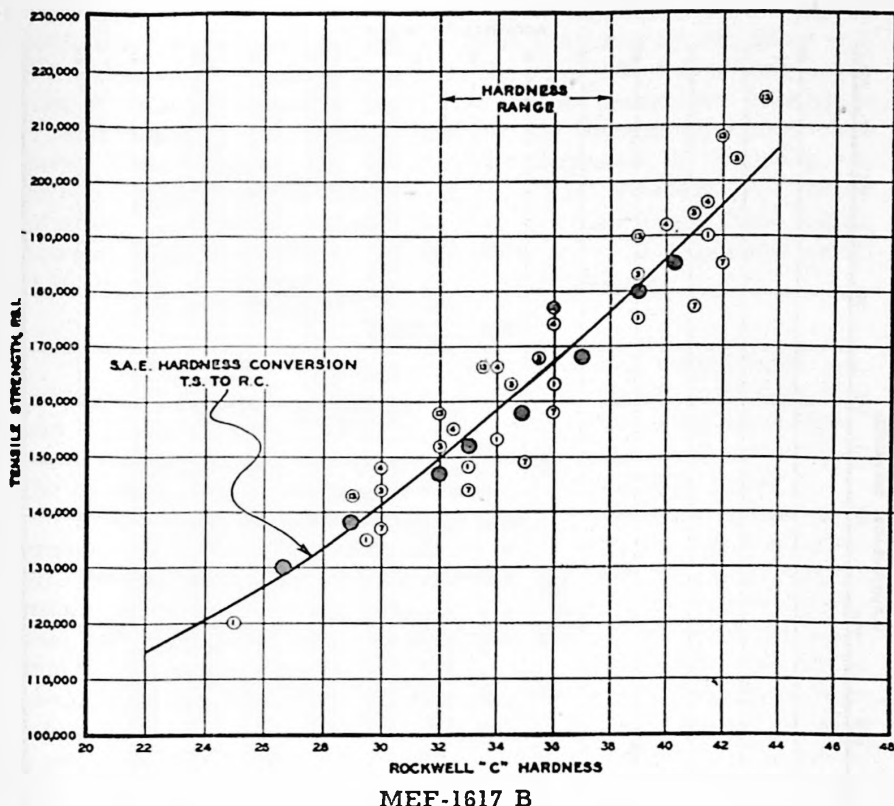


Figure 6—Tensile Strength vs Hardness 50B40 and Five Alloy Compositions in $\frac{1}{8}$ inch Bolts. The black circles are the boron steel.

1300, 2300, 3100, 4000, 4100, 6100, 8600 series. The yield strength of the 50B40 steel was within the normal expectancy of 85% of the tensile strength. The elongation values were also comparable with that of SAE 4042 and SAE 8637.

Tension fatigue tests so far run show that the boron steel does not show any marked differences from those exhibited by other alloy steels of comparable carbon content.

To further emphasize the difference in tempering characteristics, Figure 7 is included. It will be noted from Figure 7 that in order to obtain the same hardness after tempering, the boron steel must be tempered 50° F lower than many of the standard alloy compositions.

It has been found that SAE 1040 steel is a satisfactory alternate for alloy steel in bolt diameters $\frac{7}{16}$ and under. There is sufficient hardenability in carbon steels where the section is small to permit

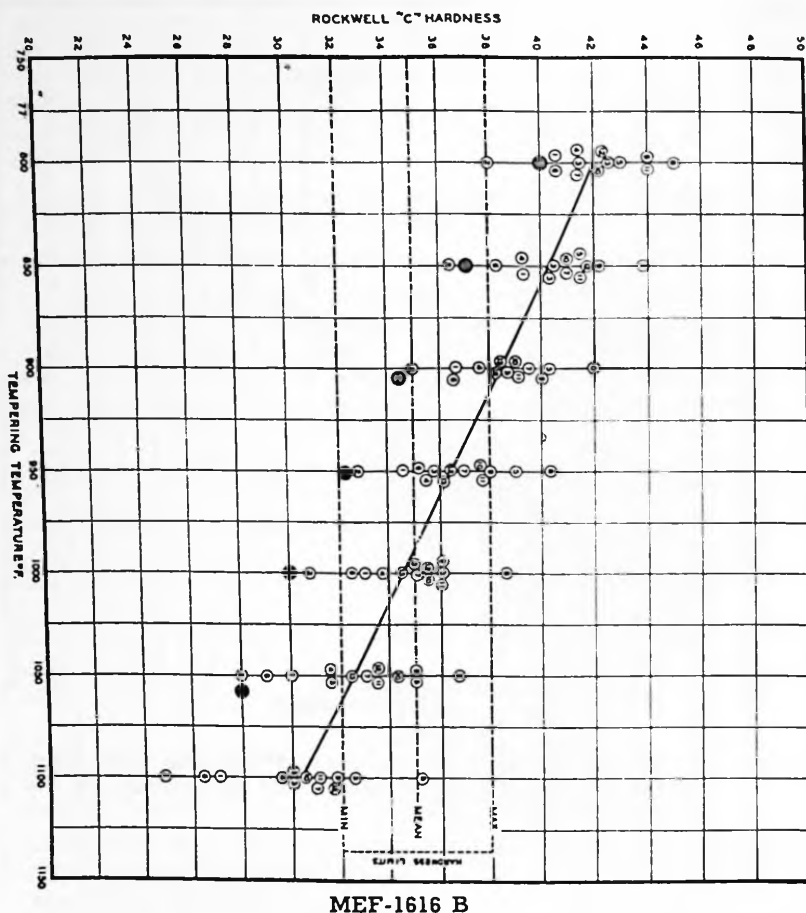


Figure 7—Hardness vs Tempering Temperature 50B40 Steel and 13 Alloy Compositions. Black circles represent the boron steel.

the development of tensile strength adequate to meet the 150,000 psi minimum specification.

Boron Steel for Ball Bearings

In the manufacture of ball bearing components, balls, outer and inner race rings, a steel of a high carbon content is used—a range from 0.95—1.05% carbon.

Experimental analyses have been designed and melted in small quantities where lower chromium contents 0.35% are used in conjunction with 0.25% molybdenum and boron treated instead

of the 1.5% chromium steel presently used for race rings. Hardenability tests show that this chromium-molybdenum combination will equal the 1.5% chromium steel in hardenability with a carbon content of about 1.10%. However, tests concurrently run show that the addition of 0.3% manganese has the same effect as a boron addition. It would, therefore, seem that unless manganese becomes a critical alloy, it would be better to use manganese rather than boron. The effect of boron could be increased by lowering the carbon content of the steel to about 0.8%. However, this would eliminate the free carbides from the microstructure. This might, however, decrease the wear resistance for it is a popular belief that these free carbides increase wear resistance.

CONCLUSION

It will be seen from this brief review that considerable progress has been made in the conservation of alloys in steel making and that some part of this has been accomplished by boron treatment. The most promising field with boron steel appears to be in the medium carbon range, that is from 0.30 to 0.60% carbon.

It is quite surprising to find that the addition of boron in amounts as little as a thousandth of one percent has such an effect on the hardenability of steel. There are, by the way, certain measures which must be taken in steel-making in order to realize this effect. The steel must be fully deoxidized by aluminum additions in amounts equal to about 1 to 1½ lbs. per ton prior to the boron addition. In all of the steels used, other elements have been added besides boron. The best results have been obtained by using a complex alloy of the composition Boron 0.5, Silicon 5.0, Aluminum 13.0, Titanium 20.0, Manganese 8.0, and Zirconium 4.0½ in amounts of about 4 lbs. per ton in open hearth furnaces.

It was apparent in course of the investigation that there are potentialities for a reduction in manufacturing costs. This is brought about by the lower initial cost of the steel and by the fact that lower alloy content means easier machining and shorter annealing cycles.

It is also clear that while there is no change in the cost of heat treatment, the quenching facilities must be brought up to the highest degree of efficiency for the heat treater is working with steels that require fast quenching in order to obtain complete hardening. The margin of safety which is obtained by the use of more highly alloyed steels is no longer available.

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WORK OF THE CORPS OF ENGINEERS IN THE NEW ORLEANS DISTRICT*

I appreciate this opportunity to appear twice on tonight's program. I appreciate, too, Steve Wallbillich's introduction and the opportunity this joint meeting has given me to talk on the work of the New Orleans District of the Corps of Engineers. We all know this work is going on but sometimes we don't connect a lot of these things we hear about and read about—and they look just a little bit different when we see them depicted on a map such as the one we have here tonight. So, taking advantage of my dual capacity as presiding officer of the Louisiana Post of the S.A.M.E. and your guest speaker, I would like to give you a brief summary of the work the two officers and 1700 civilian employees of the New Orleans District are doing and how that work ties in to the overall picture we are trying to paint.

Before discussing the work the New Orleans District performs I think it might be well to tell you just a little bit about the New Orleans District as an organization. It is one of the three Districts of the Lower Mississippi Valley Division—the other two are Vicksburg and Memphis. The New Orleans District embraces practically the whole state of Louisiana and portions of Texas, Arkansas and Mississippi. The New Orleans District is one of 47 Corps of Engineer Districts in the United States. It is engaged practically entirely in Civil Works, although it does perform a military procurement mission that I will mention a little later. But we do no military construction work in the New Orleans District at the present time . . . That mission is divided, as far as the geographical area of the New Orleans District is concerned, between the Galveston and Little Rock Districts.

The New Orleans District at the present time has three main missions. The first—and many think the most important—is flood control; the second is navigation or river and harbor works; and the third is what we might term miscellaneous . . . odds and ends that are assigned to us to perform from time to time.

For the sake of simplicity, let's consider the miscellaneous mission first. In that category we have recently completed a 450-bed Veterans' Hospital in Shreveport, and the New Orleans 500-bed Veterans' Hospital is scheduled for completion and turn over to the Veterans' Administration by the middle of June. These were special jobs assigned to Corps of Engineer Districts all over the country in order that existing construction agencies could be made

* By Colonel Charles G. Holle, District Engineer, U.S. Corps of Engineers, New Orleans District. Presented at the regular meeting of the Society April ??

use of rather than to build new agencies in the Veterans' administration. This assignment of work to the Corps of Engineers was in keeping with a determination made by Congress as far back as 1824 that it was a good idea to assign civil works construction to the Engineers during the peacetime as a means of keeping their hands in for rapid war time mobilization.

Another mission that I will put in the miscellaneous category is so-called "Off-the-shelf" military procurement activity that we are carrying on at the present time. This activity consists of backing up the New Orleans Port of Embarkation in serving six offshore bases by purchasing supplies and repair parts, securing these items locally whenever possible—preserving or processing them—packing them for expert shipment—and returning them to the Port in keeping with a prearranged schedule that will get them to the requisitioning agency in time and in good condition. It also consists of receiving requisitions from Engineer Depots and Engineer Sections of General Depots in this section of the country, and making local purchases for direct delivery to these depots, camps and stations. Depots at Atlanta, San Antonio, Memphis, Baton Rouge and the spare parts Depot at Columbus, Ohio, are served by us in this respect.

From time to time we are assigned other missions—both of a military and civil nature: We perform inspections and investigations for other Districts when we have the facilities in a locality; we perform all the civil works procurement for the Panama Canal; we accomplish special preserving and packaging missions for the Chief of Engineers, shipping the equipment all over the world; and, finally, we have lately been called upon to loan trained personnel to other Engineer installations all over the world—to installations performing important emergency work and where time does not permit the training of employees in the usual way.

That brings us to flood control—certainly a major mission of the New Orleans District. The history of flood control in the Lower Mississippi Valley can be properly place in three stages:

The first stage was the commencement of levees on the Mississippi River. That dates back to 1717—to the time of the founding of the City of New Orleans. Even then the French Government saw the need for protection against floods and ordered certain individuals to build levees. These levees were, of course,, small, not very wide, and relatively weak. Then too, there was no co-ordination. The levee chain is only as strong as its weakest link . . . and there were many weak links.

The second period of flood control can be placed about 1845 when the nation first showed signs of accepting flood control as a national problem. John C. Calhoun and other statesmen began to talk in terms of coordinated control of our levee problem. This had a stimulating effect on the levee building movement and at the time of the War Between the States the levee system on the Mississippi River was in reasonably good condition. Then too, the floods of that period led Congress to pass the so-called Swamp Acts. These acts granted to Louisiana and other states all swamp and overflowed lands within their boundaries which by reason of their wetted condition were unfit for cultivation. These lands were to be sold by the states and the proceeds used in the construction of levees and drainage works for reclamation of the lands themselves. This was the first official support given by the Federal Government for flood control.

The third period of flood control commences with the establishment of the Mississippi River Commission in 1879. From that date forward a concerted effort was being made to convince the Federal Government that the havoc wrought by the drainage of most of the nation was the nation's responsibility. Even though the first efforts of the Mississippi River Commission for flood control were done in the guise of aids to navigation, the movement now had a friend in court.

The fourth stage in flood control came with the passage of the Flood Control Act of 1917. This, finally, was official recognition that flood control was a national problem, but it was not yet a whole solution. This Act provided that the United States would pay two-thirds the cost of building the levees and that local interests would pay one-third, furnish the rights-of-way, and guarantee to maintain the completed levees. Many miles of levees were built under this authorization but the end result was unsatisfactory—for protection still was in direct proportion to the ability of local people to pay. Such a condition was fatal in a flood control system where the levee line is required to be continuous for many miles.

The fifth and final stage came with the passage of the Flood Control Act of 1928. This Act, passed in the wake of the terrible flood of 1927 which inundated most of the Lower Mississippi Valley, finally gave the Corps of Engineers all the tools that were needed to work out a "master plan" and put it into operation.

The conclusion that was reached by the Flood Control Act of 1928 and the subsequent Acts that have amended it, that flood control is truly a national problem is a logical one, for the Mississippi River drains 41% of the United States, and this drainage comes from 31 states of the United States and two Canadian provinces.

In order to arrive at the "master plan" for flood control, the Chief of Engineers sought the advice of other hydrological and meteorological agencies and arrived at the so-called "project flood"—the biggest flood that could logically be assumed as occurring in the Lower Valley. This "project flood" is estimated to measure 3 million cubic feet per second at the level of Old River, near Angola, La. Having arrived at that "project flood," the devices to combat it were sought and it was decided that this huge volume of water could be coped with by utilizing a combination of cut-offs, reservoirs, levees, revetments and floodways. Let's consider each of these in order:

During the 1930's bends in the Mississippi River, particularly between Memphis, Tennessee, and Natchez, Mississippi, were eliminated by digging cut-offs. As a result of these cuts, the river was shortened by 170 miles in its lower reaches and flood heights were reduced by means of quickened run-off. The cut-off program is now complete.

Reservoirs that were built within the New Orleans District are these on the tributaries of Red River which I will discuss in a little while. These reservoirs and many others in the other Districts are operated to hold back huge quantities of water in time of excessive high water until such time as it can be released without danger to the leveed river below.

Many miles of levees have been built in the New Orleans District since the passage of the Flood Control Act of 1928. At the present time there are 493 miles of Mississippi River levees in the New Orleans District—355 miles of which are completed to grade and section. At the present time 4 miles of Mississippi River levee are being brought up to grade by contracts in force. In the Atchafalaya Basin there are 450 miles of protection levee of which 366 miles are complete. The Atchafalaya Basin levee system, which includes the flood control works below Morgan City, should be completed by 1956 at an estimated cost of 60 million dollars. These flood control works below Morgan City include not only the necessary levees, but pumping stations, drainage structures and canals needed to take care of interrupted drainage because of the floodways.

The revetment program along the Mississippi River is one of stabilization of the banks. This is accomplished by paving the banks above the water line with asphalt, and protecting the under-water slope with articulated concrete mattresses, brush mattresses weighed with stone, or by dumped riprap stone or precast asphalt blocks. Because asphalt paving requires expensive specialized equipment, this type of revetment is constructed by hired labor

and with plant owned by the New Orleans District. Normally other types of revtment are placed under contract in keeping with our policy of letting by contract anything upon which we can get a reasonable bid. At the present time we are using the asphalt block method of revetment. During the season just ended we revetted in this manner near the Algiers Point in the New Orleans Harbor, we repaired damage caused by the barge that exploded near the Huey P. Long Bridge not far from the Avondale plant, and we did some work up at Carr Point and Morganza. We are constantly experimenting to arrive at an even cheaper method of placing revetment to protect unstable banks where the development behind these banks precludes setting the levee back.

The last method of achieving the "master plan" to cope with the "project flood" is through the use of floodways. Since the "project flood" at the level of Old River is 3 million cubic feet per second, and the Mississippi River below that point can carry safely only $1\frac{1}{4}$ million cubic feet per second, a means of by-passing the balance of this water had to be found. This was achieved through the Bonnet Carre Spillway and the triple spillway set-up known as the Atchafalaya Floodway System.

The Bonnet Carre Spillway, located just above the City of New Orleans, was designed to carry off 250,000 cubic feet per second of that project flood and thus, during project flood stage, increase the carrying capacity of the Mississippi River below Old River to $1\frac{1}{2}$ million cubic feet per second. Construction of the Bonnet Carre Spillway and Floodway was started in 1929 and completed in 1935 at a cost of \$14,200,000. This also included the construction of one highway and three railroad crossings. The spillway is a concrete structure 7,000 feet long, consisting of 350 bays each 20 feet in width. In lieu of gates each bay is equipped with 20 removable creosoted timber needles or vertical stop logs. The use of the spillway is regulated to prevent the Carrollton gage at New Orleans from reaching 20 feet, a stage about five feet below levee grade. The spillway has been operated successfully in 1937, 1945 and 1950. It can be operated again whenever it is needed and it can operate to its design capacity. Silt, of course, is always a problem, but we perform year-round clearing and maintenance and we invite the general public to haul away the sand and highly recommend it for many domestic and industrial purposes.

The Atchafalaya Basin Floodway System consists of three floodways. since the river below Old River, even augmented by Bonnet Carre, will only take care of $1\frac{1}{2}$ million cubic feet per second, that leaves another $1\frac{1}{2}$ million cubic feet per second of the "project flood" to be carried off by these three outlets. Ac-

cordingly, since the Atchafalaya River itself, the middle of the three floodways, will, at capacity stage, take 650,000 cubic feet per second, the Morganza Floodway has been designed to take 600,000 and the West Atchafalaya Floodway to take 250,000.

The Atchafalaya River becomes an automatic floodway any time the Mississippi River rises to the point where it flows into the little distributary known as Old River, and through it to the Atchafalaya River.

The Morganza Floodway, approximately $4\frac{1}{2}$ miles wide and 23 miles long, is essentially complete except for the control structure which is now under construction. The Morganza Control Structure located near the head of the floodway will serve as a controlled inlet for the floodway and provide high level crossing facilities for Louisiana State Highway No. 30 and the main line of the L. & A. railroad. It consists of 19,340 feet of main embankment and reinforced concrete structure 3,906 feet long. The controlled opening consists of 125 bays 28'-3" wide equipped with vertical lift gates. The concrete gate piers support bridge decks for the railroad and highway and girders for the gantry cranes which will be used to operate the gates. The control structure is now 57% complete and every effort is being made to have it in an operable condition prior to the 1953 flood season. It is estimated that the Morganza Control Structure will cost approximately \$21,000,000.

In addition to the railroad and highway crossings provided by the Morganza Control Structure the Government has constructed high level crossings for the A. & P. RR, the N. O. T. & M. RR, and U. S. Highway 190. The T. & P. crossing located between McKneely and Red Cross, La., is 33,450 feet long and consists of two trestle sections, 6,000 and 10,000 feet in length, with connecting embankments. The base of rail is approximately 29 feet above the average ground elevation. The trestles are of the ballasted reinforced concrete type with concrete piers 31'-3" on centers. The piers are founded on piles. The T. & P. crossing was completed in 1950 at a cost of \$6,230,000.

The N.O.T.&M.RR crossing between Lottie and Krotz Springs is 27,100 feet long and has a trestle section 18,750 feet in length. the trestle is similar in construction to the T. & P. RR crossing. This crossing was completed in 1944 at a cost of \$3,200,000.

The U. S. Highway 190 crossing, located about $\frac{1}{2}$ mile north of the N. O. T. & M. crossing, is 27,387 feet long and has a bridge section 18,778 feet in length. The bridge roadway is 50 feet wide. The spans are of the reinforced concrete girder type supported on precast concrete pile bents spaced 41 feet on centers. The crossing was completed in 1945 and cost \$4,430,000.

The West Atchafalaya Floodway extending from Bayou des Glaises south to the latitude of Krotz Springs is essentially complete except for the railroad and highway high level crossing west of Krotz Springs. Under the flood control plan, this floodway will be used when the flood flows exceed the combined capacities of main Mississippi River, the Atchafalaya River, and the Morganza Floodway. When this occurs, the levee at the head of the floodway along Bayou des Glaises will be over-topped placing the floodway in operation. The floodway is expected to be used once in 100 years. Ring levees have been constructed around the towns of Simmesport and Melville. The N. O. T. & M. RR crossing west of Krotz Springs is presently under construction and is scheduled to be completed in 1954, at an estimated cost of \$5,900,000. The crossing is 39,000 feet long and has a trestle section 7,500 feet in length. The design of the trestle is similar to the RR crossings over the Morganza Floodway. This crossing, together with the N. O. T. & M. crossing over the Morganza Floodway, is of great importance as it will provide the only means by which uninterrupted traffic can be maintained by the N. O. T. & M., the T. & P., the Missouri-Pacific, and the L. & A. railways across the Atchafalaya Basin during great floods which require operation of the West Atchafalaya Floodway. The high level crossing of U. S. Highway 190 will be located north of the N. O. T. & M. crossing. It will be about 39,000 feet long and have a bridge section 7,500 feet in length. The design will be similar to the highway crossing over the Morganza Floodway. The estimated cost of the crossing is \$5,700,000. No funds have been appropriated for this work as yet.

The three floodways—the Atchafalaya River, the Morganza Floodway, and the West Atchafalaya Floodway, all converge into one floodway—the Atchafalaya Basin Floodway, at the latitude of Krotz Springs. This new single floodway is about 12 miles wide and it extends a distance of approximately 80 miles to the latitude of Morgan City. The natural outlet to the Gulf, Berwick Bay, has been augmented by construction of Wax Lake Outlet, located about 10 miles west of Morgan City. Wax Lake Outlet has a bottom width of 400 feet, a depth of 45 feet below mean sea level and a design capacity of 270,000 cubic feet per second. Dredging of this outlet necessitated the construction of the East and West Calumet Floodgates at its intersection with Bayou Teche, and bridges for U. S. Highway 90 and the T. & N. O. Railroad.

That covers the master plan as far as the Mississippi River is concerned. We go a little further into the flood control picture, however, and direct the development of flood control works in the Red River Valley below Fulton, Ark.; we have a flood control program for the Mermentau Basin; and we have been called upon to

provide for flood protection against the vagaries of Lake Pontchartrain. The comprehensive plan for protection of the Red River Valley includes the construction of levees, stabilization of river banks, and construction of flood control reservoirs and channel improvements. There are approximately 453 miles of levees along Red River. Within the New Orleans District, 3 reservoirs have been completed or are under construction (Bayou Bodcau, Wallace Lake, and Texarkana), and 2 reservoirs have been authorized (Ferrell's Bridge and Mooringsport).

Let us consider each of these structures:

Bayou Bodcau Dam and Reservoir is located about 18 miles northeast of Shreveport. The dam is an earth fill structure 11,900 feet long including a spillway and uncontrolled outlet structure 4,000 feet long, and rises 76 feet above the stream bed. The reservoir extends 30 miles upstream, controls drainage from an area of 656 square miles, and has a capacity of 357,000 feet. This reservoir provides protection to 72,000 acres of fertile land below the dam, and to the Red River Basin to the degree determined by the reservoir capacity. The project was completed in November 1950, at a total cost of approximately \$4,500,000.

Wallace Lake Dam and Reservoir is located on Cypress Bayou about 14 miles southeast of Shreveport. The dam is an earth fill structure 4,940 feet long including 644 feet of spillway and outlet works, and rises 48 feet above the stream bed. This reservoir controls the drainage from 260 sq. miles and has a capacity of 96,100 acre feet. In addition to its role as part of the protection system of the Red River Valley, the reservoir affords complete protection to 90,000 acres of the Bayou Pierre Valley below the dam. The project was completed December 28, 1946, at a total cost of \$1,200,000.

The Texarkana Dam and Reservoir, now under construction, is located on the Sulphur River 9 miles southwest of Texarkana, Texas. The dam is an earth fill structure 18,500 feet in length and will have a maximum height of 100 feet above the stream bed. The dam is provided with a gated control structure comprising two reinforced concrete conduits 20 feet in diameter and a spillway 200 feet in width and having a capacity of 66,800 c. f. s. The reservoir controls a drainage area of 3,400 square miles and will provide 2,509,000 acre feet of storage capacity for flood waters in addition to a conservation pool capacity of 145,300 acre feet.

Construction of this project was initiated in August 1948 and is scheduled for completion in January 1955. The total estimated cost of the project is \$33,000,000, including relocation of U. S. Highway No. 59 and the facilities of the St. Louis-Southwestern Railroad.

Two additional reservoirs, Mooringsport Reservoir and Ferrell's Bridge Reservoir, have been authorized for construction on tributaries of the Red River within the New Orleans District. However, funds have not been allotted for these projects and it is not known when construction can be started. Ferrell's Bridge Dam and Reservoir will be located on Cypress Creek approximately 55 miles southwest of Texarkana. The dam will consist of earth fill structure 10,000 feet long with maximum height of 80 feet, a controlled outlet structure, and an uncontrolled spillway. The reservoir will control drainage from 850 square miles. Conservation pool storage will be 32,100 acre feet and flood pool storage, 558,300 acre feet. The project will provide protection for the town of Jefferson, Texas, and 24,000 acres of land below the dam. The total estimated cost of this project is \$17,120,000. Mooringsport Dam and Reservoir will also be located on Cypress Creek, about 50 miles south of Texarkana. The dam will be an earth fill structure 22,100 feet long and 42 feet in height. The dam will include an uncontrolled spillway 400 feet long and a controlled outlet 350 feet long. The reservoir will control drainage from 2,740 square miles and will provide a conservation pool storage of 175,000 acre feet and a flood control pool storage of 579,000 acre feet. The total estimated cost of the Mooringsport project is \$10,000,000.

A project for the improvement of flood control, irrigation, and salinity control in the coastal marshes of the Lower Mermentau Basin was approved by Congress in 1946. This project, with the exception of a portion of the work of channel enlargement on the Mermentau River below Grand Lake, has now been completed, at a total cost of 5 million dollars. The remaining portion of the channel work is now under contract. This project, in addition to the Mermentau channel work, consisted of construction of a gated control structure at Catfish Point; channel enlargement and realignment of the inland waterway from Franklin to the Mermentau River—from Vermilion Bay to White Lake—and from White Lake to Grand Lake; channel enlargement of the North Prong of Schooner Bayou; and construction of a gated control structure near Schooler Bayou Lock. Last year the salt water guard locks in the Mermentau Basin were successfully operated during a period of unusual drought and it was estimated by many that the value of the rice crop saved by their operation has already paid for the cost of this project.

All of the flood control projects I have mentioned provide for protection against river floods. The last of our flood control projects provides for protection of the land against flooding by Lake Pontchartrain. Along the south shore of Lake Pontchartrain there are many square miles of low lands that have been periodically

inundated by the storm tides of the lake. In 1950 Congress authorized a project for the enlargement of 10.2 miles of the old Hammond-Lakeshore embankment to a levee with lakeside slope pavement and toe protection. The project also provided for enlargement of 7.2 miles of levees along the St. Charles and Orleans Parish lines to connect the lakeshore levee to high ground near the Mississippi River. When completed this project will protect approximately 50 square miles of land. Project grade in 10.0 MSL—it has been completed to an interim grade of 8.0 MSL. The additional work will be done when additional assurances of local cooperation are furnished as required by the Act of Congress and when additional Federal funds are made available. The total cost of the project is \$4,590,000, of which \$3,150,000 is required for completion.

The other big job of the New Orleans District is navigation . . . the development and maintenance of navigation facilities. Improvement of the Mississippi River for navigation began long before the inauguration of flood control activities. The first evidence of Federal participation in the Mississippi was the passage of a law in 1820 appropriating money for surveys and navigational improvements. The New Orleans District came into being in 1867; in 1875 it started supervision of construction of the jetties in South Pass by Captain James B. Eads.

Within the New Orleans District there are 7,500 miles of navigable streams—ranging from shallow bayous to the mighty Mississippi River . . . which at Algiers Point has a depth of 195 feet. In addition to the many natural streams, about 300 miles of canal or artificial waterways have been constructed by the Corps of Engineers. These waterways also cover a wide range of width and depth.

Within the New Orleans District there are two deep water channels—one from Baton Rouge to the Gulf of Mexico of the Mississippi River; and the other is the Calcasieu River and Pass. Maintenance of these deep water channels is a job of the New Orleans District. Digging its portion of the Intracoastal Waterway was a job for the New Orleans District. Presently its job is maintaining that waterway, and other waterways of lesser importance, such as Bayou Lafourche, Bayou Teche and the Atchafalaya River. Operation of lock structures is another job of the New Orleans District. These locks are located on the Intracoastal Canal or its alternate routes, in the salt water intrusion regions, and in the Atchafalaya Basin. The District Engineer is responsible for the issuance of permits for any works over navigable streams. In this respect he serves as the field representative of the Secretary of the Army, who has been charged by Congress with the responsibility

of preserving the navigable status of the waters of the United States. The New Orleans District works hand in hand with the Coast Guard in providing aids for navigation. Finally, as part of its channel maintenance mission, the New Orleans District Engineer has the responsibility of removing marine growths—the water hyacinth and the alligator weed—that tend to hinder navigation.

We will consider each of these jobs in turn—

On the Mississippi River there is the 35 foot channel from Baton Rouge to the deep water in the Gulf of Mexico by way of Southwest Pass and 30 feet by way of South Pass. This channel is to a great extent self-maintained; only a few of the 250 miles of river requiring maintenance dredging. Dredging is required to remove shoals in front of the wharves in New Orleans, caused by silt accretions during high water periods. Very little dredging is required in South Pass which, because of its location, carries approximately 2/3 of the ship movements in and out of the river. Except for the lower 1/2 mile dredging is seldom required in Southwest Pass. During high water the lower 1/2 mile of the channel has a tendency to shoal and some shoaling also develops in the outer bar channel. This shoaling is caused by the salt water acting as a submerged weir and causing deposition of the silt and sand being carried along the channel bottom. Dredging in the passes and in the outer bar channel is usually done by the hopper dredge *LANGFITT* which is normally assigned to the New Orleans District during the high water period from January to June. Without jetties at the foot of South and Southwest Passes, it would probably be impossible and certainly an impracticable task to keep the mouth of these waterways free of silt to the extent necessary for deep draft navigation.

The Calcasieu River and Pass Channel extends from Lake Charles to the 37-foot contour in the Gulf of Mexico. The channel dimensions are 35' x 250' in the land section and 37' x 400' in the Gulf. The channel of the land section is a combination of natural river sections and artificial cuts. The Gulf section is about 11 miles long and is flanked by rubble mound jetties extending about 1.3 miles from the short line. Little maintenance is required on this waterway.

These jetties consist of several layers of ballasted brush fascine mats, overlaid by coverings of huge derrick stone. Because of the continual consolidation of the underlying soils, extensive settlement of the jetties has occurred. This has necessitated periodic recapping of the original jetties with rock and concrete. During the past three years, \$1,850,000 have been spent in recapping the jetties of Southwest Pass.

Among the waterway improvements authorized by Congress and executed by the Corps of Engineers has been that of affording a practical coastal waterway route along the Atlantic and Gulf Coasts of the United States. Such a waterway is now available, except for a few gaps, from Boston to the Florida Keys, and along the Gulf coast from Carabelle, Florida to Brownsville, Texas.

The Intracoastal Waterway within the limits of the New Orleans District extends along the coast of the Gulf of Mexico from Lake Borgne to the Sabine River, a distance of 302 miles, and from Plaquemine to Morgan City, a distance of 54 miles, and to the town of Franklin via the Franklin Canal, a distance of 5.6 miles. The main route from Lake Borgne to the Sabine River has minimum channel dimensions of 12' x 125'. The Plaquemine route has a 9' x 100' channel, and the Franklin Canal an interim section of 8' x 50'.

The Intracoastal Waterway connects with the Mississippi River at New Orleans by way of the Inner Harbor Navigation Canal and Lock on the east bank, and the Harvey Canal and Lock on the west bank.

The development of navigational facilities within Louisiana has required the construction of numerous locks. The locks at Plaquemine, and Harvey were built to permit the passage of navigation between the Mississippi River and the Intracoastal Waterway. Plaquemine Lock was constructed in 1912. It has a lock chamber 55 feet wide and 260 feet long, and is equipped with arch type miter gates. Since the tops of the gates are at elevation 38 m. s. l. and high river stages of 43.8' may occur, there are periods when the lock is inoperable. During these periods of extremely high water, the top of the river and gate is brought to levee height by means of an extension reserved for that purpose. The Inner Harbor Navigation Canal Lock, also known as the Industrial Canal Lock, was constructed in 1920 by the Board of Commissioners of the Port of Orleans and leased by the United States in 1942. The lock is 75' wide, 640' long, has a depth of 31.5 feet over the sills, and is equipped with miter gates. The lock is operable at all stages of the river which at this location has an 18 foot variation.

Harvey Lock, on the West Bank of the Mississippi River, was constructed in 1932. The lock is 75 feet wide, 425 feet long, has a depth of 12 feet over the sills, and is equipped with miter gates. The lock is operated at all stages of the river.

Algiers Lock and Canal are now under construction on the west bank close to the Orleans-Plaquemines Parish line. This project was authorized by Congress in 1945 to relieve congestion on the Intracoastal Waterway at Harvey Lock where traffic has increased from 165,000 tons in 1932 to 10,950,000 tons in 1951. Comple-

tion of the Algiers project will provide two locks on the west bank, assuring uninterrupted traffic in case one of the locks is closed for repairs. The Algiers Lock will be 75 feet wide, 760 feet long, a depth over the sills of 13 feet and will be equipped with sector gates. Construction of the lock was started in 1947 and it is contemplated that the project will be completed in 1954. Difficulties in obtaining right-of-way for the canal have materially delayed progress.

In the rice growing regions of Louisiana, navigation locks have been constructed which, together with the Catfish Control Structure already mentioned, help to prevent salt water intrusion into the Intracoastal Waterway during periods of high tide or drought.

Vermilion Lock prevents salt water from Vermilion Bay overing westward through the Intracoastal and into the Mermentau River system which is a source of water for rice irrigation. It is 56 feet wide, has an earth chamber 1,182 feet long and is equipped with steel tumbler type gates hinged at the gate sill. The gates are designed for a maximum differential head of 5 feet. Calcasieu Lock, opened to navigation in December 1950, is another lock constructed to prevent salt water intrusion into the Intracoastal. It is located close to the Calcasieu River and Pass Channel and will prevent salt water from this channel flowing eastward through the waterway and eventually contaminating sources of water. It is 75 feet wide, has an earth chamber 1,180 feet long, and is equipped with sector gates.

Locks have also been constructed in the levees of the Atchafalaya Basin to provide transit of navigation during periods of high water within the Basin.

Bayou Sorrel Lock, on the Plaquemine-Morgan City Route, is located in the East Atchafalaya Basin Protection Levee and was opened to navigation in June 1951. It has a width of 56 feet, an earth chamber 760 feet long, and is furnished with sector gates. It is designed for a maximum lift of 21 feet. Berwick Lock, constructed through the west levee of Berwick Bay, and opened to navigation November 1950, will permit uninterrupted traffic to Patterson, La., during flood stages. The lock chamber is 45 feet wide and 300 feet long. Gates are of the sector type.

Bayou Boeuf Lock, located in the east levee of Berwick Bay, adjacent to Bayou Boeuf, is presently under construction and will be completed in June 1954. It will be 75 feet wide, have an earth chamber 1,117 feet long, and will be equipped with sector gates.

The Secretary of the Army has been charged with the responsibility of maintaining the navigability of the waterways of the

United States. He has delegated the Chief of Engineers as his field representative and, in turn, the Chief has delegated the various District Engineers to represent him. All persons desiring to install structures in or over navigable waters submit an application for a permit to the District Engineer. He examines the application and if it appears to be in order issues a public notice to all navigation interests. If protests to the work are received, he calls a public hearing and receives evidence from both sides. This evidence he submits to the Chief of Engineers, with appropriate recommendation, after a thorough study. In most cases, however, there is no controversy, and the permit can be issued by the District Engineer as soon as he is satisfied there are no objections. During the past year approximately 800 permits were processed and issued by the New Orleans District Engineer.

Another important job of the New Orleans District is channel patrol work and aids to navigation. We operate two channel patrol boats—one on the Mississippi River as far as the northern limits of the district, and one on the Intercoastal and its connecting waterways. The crews of these boats investigate reports on channel obstructions, remove them, and obtain information on channel conditions from the people using the waterways. We also maintain signs and markers along the waterways, place buoys for the Coast Guard, operate signal lights in the New Orleans Harbor, make daily broadcasts of navigation information, and issue regular Navigation Bulletins to all interested. Occasionally, we are required to check on violators of navigation regulations, issue permits for authorized over-length tows, and otherwise aid the ever-increasing waterborne commerce in this area.

Navigation found a new obstacle about the turn of the century—marine growths that clog streams and hamper the passage of vessels. The principal of these are the water hyacinth and the alligator weed. Early mechanical means of elimination of these growths soon gave way to the use of arsenic and until 1937 this was the chief means of combating them. The use of arsenic was abandoned because of danger to humans, animals and crops and crusher equipment and conveyors were used extensively. They have now been replaced by lighter, more mobile equipment of the saw boat type. Considerable research along this line has been performed in recent years in connection with Tulane University and Boyce-Thompson Institute. Experiments were carried on at Bonnet Carre Spillway and, as a result, the hormone type herbicide 2, 4-D was adapted for use as a spray to destroy the marine growth. Chemicals and mechanical means are now being used jointly to destroy jams, clear out infested areas, and hold gains we have made in the elimination of this menace to navigation.

At present there are three new major navigation projects proposed within the New Orleans District, the Mississippi River-Gulf Outlet, the Port Allen Extension of the Plaquemine-Morgan City Route, and the Overton-Red River Waterway.

Construction of the Mississippi River-Gulf outlet, a tidewater channel extending from New Orleans to the Gulf, was recommended for approval by the Chief of Engineers in his report of 5 May 1948. Last October the Public Works Committee of the House of Representatives approved a bill authorizing construction of the project and providing funds for planning of the work. The project comprises two features:

(1) A seaway canal, 36 feet deep and 500 feet wide, extending 70 miles as a land and water cut from Mischeaud southeasterly to Lake Borgne, and cross Chandeleur Sound to the 38-foot contour in the Gulf of Mexico, with protective jetties, a permanent dike through Chandeleur Sound, and a wing dike along the islands as required.

(2) An inner tidewater harbor consisting of 1,000- by 2,000 ft. turning basin at the landward end of the seaway canal, and a connecting channel 36 feet deep and 500 feet wide extending along the Intracoastal Waterway from the turning basin to the Inner Harbor Navigation Canal. The Federal cost of the project based on 1948 prices is \$67,000,000 for construction, with annual charges of \$5,000,000, including \$1000,000 for maintenance.

In 1946, Congress authorized enlargement of the existing 9 x 100 foot channel of the Plaquemine-Morgan City Route to a 12 x 125 foot channel from Morgan City to Indian Village, its extension to Port Allen, and connection to the Mississippi River through a new lock. The project, based on a lock size 56 feet wide, 500 feet long, with 12-foot depth over the sills, and an operating lift of 47 feet is estimated to cost \$13,500,000. Funds for construction have been allotted.

The Overton-Red River Waterway Project, authorized in 1946, provides for construction of a navigation canal 9 feet deep by 100 feet wide, extending from the Mississippi River, through Old River, through Red River to Mile 31, thence by land cuts and existing waterways across the Mississippi-Red River backwater area,, and along the south bank of the Red River flood plain to Shreveport. The project will require 9 locks, a dam in Red River at Shreveport, and a pumping plant near Shreveport to maintain pool elevations in the upper reaches. The lock sizes are tentatively 55 feet wide and 650 feet long, with a depth of 12 feet over the sills. The total estimated Federal cost is \$75,000,000 including \$44,000,00 for lock structures. Funds have been allotted for planning but not for design and construction.

NEWS ITEMS

Dean Roy T. Sessums, of Louisiana Polytechnic Institute, has been appointed Director of State Department of Public Works. Director Sessums is also a member of the Board of Director of the Society. His many friends congratulate him upon his appointment.

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The promotion of two members of the Engineering Department of A. M. Lockett & Company, Ltd., effective September 1 has been announced by B. S. Nelson, vice-president in charge of engineering.

F. Robert Mendow has been appointed chief engineer. Mr. Mendow was graduated from Tulane University in 1930 in Mechanical and Electrical Engineering, with the degree of Bachelor of Engineering, and received the Tau Beta Pi honor award. In 1931, after completing the installation of a new hydraulic laboratory at Tulane University, he joined the Lockett Company as a Junior Engineer. During the intervening period, he has filled various positions: starting as draftsman and design engineer, then contract estimator, field testing and service work; and, for several years, his major activity has been assisting in the promotion of boiler sales and engineering in the several Lockett division offices. Mr. Mendow is an active member of the local section of the American Society of Mechanical Engineers and of the Engineers and Architects Club. During the recent war, he was a volunteer Coast Guard Officer engaged in security patrol on the river front.

Charles J. Wyler has been appointed to the position of Executive Assistant to the vice-president in charge of engineering. Mr. Wyler was graduated from Tulane University in 1917 with the degree of Bachelor of Engineering in Mechanical and Engineering. He volunteered for service in the first World War and served until discharged in 1919 with the rank of Lieutenant of Artillery at which time he joined the Lockett Company. Mr. Wyler is a member of the Engineers and Architects Club; and, is a Life Member of the American Society of Mechanical Engineers and of the Louisiana Engineering Society. He has served in a variety of work. Starting as a Junior Engineer, he did design drafting and at various times contract estimating and purchasing, contract sales work, and field inspections and test work. For some years, he has been in charge of the Lockett Machine Shop, and has also specialized in the designing and estimating of the well-known fuel oil pumping and heating sets for industrial applications. He is also in charge of the installation and servicing of centrifugal air-conditioning equipment.

Long and varied experience makes both men well-fitted for their positions.

ENGINEERING BRIEFS

New Electronic Computer Does 1000-Year Task in Two Weeks.

An electronic, high-speed computer developed at the University of Illinois, Urbana, Ill., is now being used at the Ballistics Research Laboratories, Aberdeen Proving Ground, Md., where it will be used to help prepare gunfire tables and other highly involved mathematical problems .

The computer is named ORDVAC, a contraction of Ordnance Variable Automatic Computer. Cathode-ray tubes, similar to television picture tubes but only three inches in diameter, comprise the "memory" unit, which appears as glowing green dots on the face of the tube (32 dots high and 32 dots wide or 1024 digits).

It is claimed that this machine can solve mathematical problems in two weeks that would take a human more than a thousand years.—*Aminco Laboratory News.*

New Chemical Stops Trypanosome Diseases. Discovery of the first antibiotic chemical capable of stopping trypanosomes, germ family whose members cause deadly African sleeping sickness among other diseases, was announced recently by Dr. Robert J. Schnitzer of Hoffman-LaRoche Laboratories, Nutley, N. J.

The new antibiotic, known only by its laboratory number, X948, was obtained from two unidentified strains of *Streptomyces*, organisms of the same general family that produced streptomycin, by Drs. J. Berger, W. E. Scott, and M. W. Goldberg of Hoffman-LaRoche.

Unfortunately, laboratory tests on animals showed that it is too toxic to be of practical value as a remedy, so no trials with human sleeping sickness trypanosomes were made. Dr. Schnitzer is of the opinion that other antibiotics can be found which will be non-toxic and yet capable of stopping the sleeping sickness trypanosomes.—*Aminco Laboratory News.*

Hotter Than . . . Temperatures perhaps as high as 90 million degrees Fahrenheit are reached in the detonation of an atomic bomb, but today's record for a controlled flame is only 8000° F., obtained by burning fluorine gas in hydrogen. Achievement of extremely high temperatures has already brought about many useful products and processes, but has created new problems of equipment design and operation. The search for materials of construction which will withstand extreme heat continues as the scale of attainable temperature goes higher.

The electric furnace, appearing toward the turn of the century, made possible manufacture of many products previously unknown or found only in nature. Some of the important ones are artificial graphite for lubricants and electrode materials, silicon carbide and aluminum oxide for abrasives, and high-melting metals and alloys. Calcium carbide was not known before the advent of the electric furnace, but now some 800,00 tons are produced annually in the United States for such basic chemicals as cyanamide and acetylene. Electric arc furnaces of up to 150 tons capacity, operating at average temperatures up to 3300° F., now produce blending alloys, such as ferrochrome and ferrotungsten, as well as various crucible steels and metals to resist high temperatures and stresses. The thermite process, in which iron oxide is reduced to molten iron by reaction with aluminum, is used for welding at temperatures from 5400° F. to 6300° F. In working high-melting materials like tungsten, tantalum, and molybdenum, powder metallurgy is employed; the powdered metal is formed into bars and then melted by passing an electric current through it. A process has recently been developed in which metal is melted without a crucible; the metal is suspended in space by an electromagnetic field while current passes through the lump to melt it. This process, still in the laboratory stage, offers promise for producing pure metals, without risk of contamination from a container.

Tungsten can also be melted by an atomic hydrogen torch which produces a temperature above 6000° F. The oxy-acetylene torch, with a maximum flame temperature of 5600° F., has found wide industrial use for cutting, scarfing, gouging, descaling, and other maintenance and repair work, as well as in reclaiming the surfaces of expensive metal castings. Extremely high temperatures are obtained if the torch is supplied with hydrogen and chlorine trifluoride instead of oxygen and acetylene. Oxy-hydrogen and oxy-propane torches, producing about 4600° F., are also used for flame-cleaning of metal.

Much of the most interesting work on high-temperature phenomena is directed at "semi-practical" applications, such as rockets, jet engines, and controlled explosives. Combustion-chamber temperatures of more than 12,600° F. are theoretically possible for some liquid-propellant systems proposed for rockets, but no known materials of construction will stand such heat. Combustion temperatures in rockets now reach 5200° F.; even at this level the best available nozzle may last only a few seconds.

Solar furnace

Optical concentration of the sun's rays to give high temperatures in a limited area is quite promising for laboratory studies of

metallurgical reactions. One solar furnace has achieved temperatures around 6600° F., and proponents of its use in industrial metals manufacture feel that this is a much more logical and promising application than the more frequently suggested power generation via solar heat. The theoretical upper limit for a solar furnace is 11,000°F., the surface temperature of the sun.

Temperatures of several thousand degrees in a considerable volume of space are possible by burning aluminum or zirconium in oxygen at high pressures over a melt of the oxide. Combustion temperatures up to 5000° F. have been observed in such furnaces at atmospheric pressure. At greater pressures, higher temperatures can be obtained; in theory the burning of zirconium in oxygen at 100 atmospheres should occur at 11,600° F.

While there are many ways, theoretical and actual, of attaining transient high temperatures, 1500° F. is about the top for continuous service of moving parts, such as turbine blades. Unless the heat resistance of construction materials is greatly improved, it will still be necessary to employ special techniques to exceed this level by using small working spaces, with the container walls shielded or artificially cooled. The limit of readily attainable temperature is continually being pushed higher, however, and may lead to the production and processing of many new materials or the utilization of some that are not satisfactory at present.—*Industrial Bulletin of Arthur D. Little, Inc.*

Green Pastures. The present boom in demand for products containing chlorophyll is expected to push sales of such items to \$50 million this year. Although the water-soluble chlorophyll derivatives have been known for some time to the medical profession for their healing properties, their chief use has been in wick-type room deodorants and as a coloring or masking agent in soaps. Early last year, however, chlorophyll, or, more correctly, chlorophyllin, was incorporated in a wide variety of personal deodorant compounds, and by the end of the year sales had reached \$22 million. Now there are 40 or more companies listing well over 100 products containing chlorophyll derivatives, ranging from toothpaste and chewing gum to cigarettes and dog food.

Four companies are now producing chlorophyll, mainly by solvent extraaction from alfalfa; a ton of alfalfa yields four or eight pounds of chlorophyllin, which sells for \$85 a pound. The four producers are said to have a total capacity of 90,000 pounds, ten times the 1949 production, and capacity for an additional 30,000 pounds is expected to be ready next month.

Research limited

As yet, pure chlorophyll itself has not been recovered on a commercial scale and its actual value as a deodorant or germicide is virtually unknown. Since natural chlorophyll is insoluble in water, the products now on the market contain a form of chlorophyll which has been chemically modified to render it water-soluble and stable to heat and light. The products generally contain a sodium-copper-chlorophyllin compound; as yet the role of the copper in deodorization and germicidal activity is unexplained. While most recent research has emphasized the development of deodorant formulations to meet market demand, basic research continues to seek the reasons for chlorophyllin's apparent therapeutic qualities. The deodorizing characteristics of chlorophyllin compounds were discovered in the course of their investigation as an adjunct in the treatment of anemias. It is known that chlorophyll is chemically similar to hemoglobin in the blood; studies in this area which go back to the original work on blood regeneration have led to new products for treatment of anemias.

Chlorophyllin preparations have been used successfully for deodorizing, normal tissue repair, and relief of itching in wounds, skin infections, and burns without harmful side effects. Some authorities believe that it may reduce the healing time of burns by as much as 50 per cent.

The elimination of body odors by taking chlorophyll tablets internally still remains a much-debated subject. While it appears that oral odors may be greatly reduced, there is still wide disagreement concerning control of perspiration odors. A field in which little research has as yet been reported is the potential market for chlorophyll compounds for controlling odors in industrial processes or end products.—*Industrial Bulletin of Arthur D. Little, Inc.*

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OBITUARY OF VICTOR LOUIS WILLOZ

The Louisiana Engineering Society and our community have been deprived of the services of an excellent engineer, his family has lost a devoted father, and his friends a loyal associate, with the death on March 24, 1952 of Victor Louis Willoz.

He was born in the City of New Orleans on July 31, 1869 and received his education at Brothers School and at Tulane University, where he received the degree of Bachelor of Engineering. He has devoted many years in the service of utilities, having started in 1893 with the old New Orleans and Carrollton Railroad, and until his retirement in 1948 worked in the field of engineering for New Orleans Public Service Inc. He was married in 1897 to Marie Louise Faures who preceded him in death. He is survived by three children, Armand L. Willoz, Mrs. Olga L. Cass, and Clifford P. Willoz. He had as his hobby model making in metal and wood at his home shop.

While Mr. Willoz would recall with much interest the early days of street railway transportation, he was no believer in the good old days but was thoroughly impressed with, and promoted, engineering progress. In his work with New Orleans Public Service Inc. he was noted for his conscientiousness and friendliness to his fellow employees and those whom he contacted in his work with the Company. He lived a full and useful life, which was exemplary in all respects. Victor Louis Willoz was a good engineer, a public spirited man, and was devoted to his family.

It is, therefore, fitting that we honor his memory by adopting the following resolution:

BE IT RESOLVED, that the Louisiana Engineering Society adopt resolutions embodying the facts as expressed above, and

BE IT RESOLVED that this Resolution be included in the minutes and published in its proceedings, and that copies be sent to his family.

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MINUTES OF MEETINGS AND BUSINESS OF THE SOCIETY

Minutes of Meeting of the Board of Direction Held on April 14, 1952

The meeting was called to order by President McNiven with Messrs. Abraham, Macdonald, Molaison, Seago, Sessums, Wallace and Fernandez present. Mr. Waldemar Nelson, Chairman of the Legislative Committee, also was present by invitation. Minutes of the preceding meeting were read and accepted as amended upon motion of Mr. Macdonald, seconded by Mr. Sessums and carried.

The secretary-treasurer presented his quarterly financial report, and reported that 336 ballots had been cast in the March membership election; only one blackball was received, therefore all applicants named in the ballot were elected to their respective grades.

A letter from Mr. Louis Duclos, President, Baton Rouge Section, was read, after which Mr. Molaison moved that the parent organization hold its usual joint meeting with the Baton Rouge Section in Baton Rouge during the month of June and that the secretary make whatever arrangements were desired regarding meeting notices. Motion was seconded by Mr. Abraham and carried.

Correspondence from Messrs. James M. Todd and Lee H. Johnson concerning the Union Panamericana de Ingenieros was read, after which President McNiven appointed Messrs. Allen W. Betz, Roy Glenn Cappell, Lionel J. Cucullu, Frank G. Fromherz, J. Mason Guillory, Mario R. Guell and Johnnie E. Rebold to serve on the UPADI Convention Committee. Another letter from Mr. Todd, asking the L.E.S. to act as host society of the convention was read; in it he explained that the Uruguayan Society of Engineers was preparing a plaque to be presented to the host society during the convention and that it would be desirable for the host society to reciprocate by presenting a Certificate of Attendance to each delegate attending.

The secretary read a letter from the Engineers and Architects Club inviting the L.E.S. to become an affiliate member of the club. Mr. Macdonald moved to accept the invitation, seconded by Mr. Wallace and carried.

A letter from Dean Lee H. Johnson of Tulane University announced that Mr. Jacob Christian Fritz, a senior in the Chemical Engineering School, had won the L.E.S. Junior Membership Award for the highest scholastic average of his class.

In accordance with the constitution, the following members being delinquent in dues for 1951, it was moved by Mr. Sessums, seconded by Mr. Wallace and carried that they be dropped:

Al Baltazar, J. G. Benoit, E. P. Bercegay, T. A. Brassette, Hugh Davis, J. E. Davis, O. B. Denny, C. Durham, C. W. Edwards, J. O. Evans, W. J. Evans, L. P. Fournet, R. Gates, B. D. Harrison, J. H. Hough, A. R. Jollisaint, T. S. Keaty, J. S. Kopfler, E. O. Lakin, J. H. LeBlanc, E. G. Miller, M. K. Morrison, E. F. Oakley, O. W. Page, C. A. Pecoraro, D. F. Pobst, W. W. Rody, F. X. Shaughnessy, M. A. Steele, R. D. Stogner, P. B. Thigpen, C. W. Tonkin, Jr., E. R. Woodman.

Mr. Macdonald moved that Mr. George A. DeWolf be reinstated to membership in the Society, seconded by Mr. Abraham and carried.

The secretary reported that a Life Member of the Society, Mr. Victor Willoz, had passed away, whereupon the president appointed Mr. Abraham chairman of a committee of his own choice to prepare the obituary of the late Mr. Willoz.

Mr. Seago moved that those students who present papers at the Student Night meeting be awarded junior memberships in the Society for one year following graduation; seconded by Mr. Molaison and carried.

Messrs. William J. Drawe, Jr. and David Moodie were appointed General Chairman and General Vice-Chairman, respectively, of the 1953 Annual Meetings.

President McNiven reported that he had been unable to secure personnel for a committee to draft a resolution voicing the Society's objections to promiscuous criticism of the U.S. Engineer Corps recently expressed by newspaper columnists, as voted upon at the Society's March meeting. In view of this, Mr. Macdonald moved that the matter be tabled until a future meeting, seconded by Mr. Molaison and carried.

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Mr. W. S. Nelson, Chairman, Legislative Committee and L.E.S. Representative in the Louisiana Council of Engineers, reported on the Council's action regarding the proposed City Charter. Mr. Abraham moved that the recommendations of the Louisiana Council of Engineers be approved and that the secretary write a letter to the Honorable Mayor and City Council, so stating, with the Society's official seal attached. Motion seconded by Mr. Sessums and carried.

The secretary reported that the Governor had appointed Mr. J. J. Mundinger to fill the vacancy on the State Board of Registration for Professional Engineers and Land Surveyors.

There being no further business, the meeting adjourned.

JOHN P. FERNANDEZ, Secretary-Treasurer

Minutes of Meeting of the Society Held on Monday, April 14, 1952

The meeting was called to order by President McNiven in the Jackson Room of the St. Charles Hotel, with approximately 125 members and guests present. The secretary read minutes of the preceding meeting and those of a meeting of the Board of Direction held on March 10.

President McNiven then gave an outline of the policy adopted by the Louisiana Council of Engineers relative to the Home Rule Charter for the City of New Orleans, and announced that same had been endorsed by the Board of Direction of L.E.S. He urged members interested in this civic activity to contact the city councilmen in behalf of the engineers' effort.

Mr. M. G. Zervigon then introduced the principal speaker of the evening, Professor Walter E. Blessey of Tulane University, who gave a most interesting and informative lecture on "Pre-Stressed Concrete". Following this, 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 Held on Monday, May 12, 1952

The meeting was called to order by President McNiven with Messrs. Macdonald, Abraham, Duclos, Molaison, Seago, Sessums, Wallace and Fernandez present. Mr. Waldemar S. Nelson also was present by invitation. Mr. Macdonald moved that minutes of the preceding meeting be accepted as read, seconded by Mr. Abraham and carried. Minutes of meetings of the Louisiana Council of Engineers held on March 24 and May 7 also were read, and discussion thereon was tabled until after the other business of the meeting could be concluded.

The secretary reported on the 1953 Annual Meeting and asked the board to complete appointments of committee personnel at the next meeting.

Mr. Abraham read a report of the Vocational Guidance Committee and moved that it be accepted, seconded by Mr. Sessums and carried. A copy of the report is attached to these minutes. Mr. Sessums then moved that Mr. Lionel J. Cucullu, Chairman, and the members of the Vocational Guidance Committee be commended for their excellent work. The motion was seconded by Mr. Duclos and carried. A letter from Mr. Cucullu then was read, stating that the Delta Chapter, ASHVE, and the Baton Rouge Section, AICbE, have expressed a desire to participate in the vocational guidance activities sponsored by the L.E.S. with the present cooperation of the AIEE, ASCE, ASME, and the New Orleans Section, AICbE. Mr. Duclos moved that their offers of cooperation be accepted, seconded by Mr. Abraham and carried.

The secretary reported that Albert H. Wehe, graduate of Louisiana State University, and William C. Gaddy, Jr., graduate of Louisiana Polytechnic Institute, had won the Society's Junior Membership awards for the current year.

Mr. Abraham moved that Mr. F. M. Heroy, Sr., be reinstated to membership, seconded by Mr. Duclos and carried.

Mr. Duclos moved that a microphone for the Society's public address system be purchased, and that selection of same be made by Mr. Seago. Motion seconded by Mr. Wallace and carried.

Mr. Macdonald moved that the Annual Outing held in July be considered the Society's meeting for that month, seconded by Mr. Wallace and carried.

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Discussion took place concerning the motion passed by the Louisiana Council of Engineers, which reads as follows: "Mr. Cooke moved that the Louisiana Council of Engineers go on record as agreeing in principle to the proposal that certain types of pressure piping systems as covered under the proposed amendments to the New Orleans City Building Code, Chapters 48, 52, 53, be in accordance with the National standards and, when welded, require certified welders. Furthermore, that consideration of the amendment to Chapter 54 as to the method of certification be left for further action by the joint committee. A copy of these amendments are attached to these minutes. The motion was seconded by Mr. Dornblatt and carried."

Mr. Duclos moved that said motion be accepted in principle with the addition that the Board of Enforcement be appointed by the mayor from a panel recommended by the engineering societies. Motion seconded by Mr. Seago and carried, with two members abstaining. The meeting then adjourned.

JOHN P. FERNANDEZ, Secretary-Treasurer

**Minutes of Meeting of the Louisiana Engineering Society Held on Monday
May 12, 1952**

The meeting was called to order by President McNiven in the Jackson Room of the St. Charles Hotel, with approximately 30 members and guests present. Mr. John L. Porter moved that reading of the minutes of the preceding meeting be dispensed with, seconded by Mr. Seago and carried. Mr. Duclos moved that reading of minutes of the Board Meeting be dispensed with, seconded by Mr. Macdonald but not carried, and the secretary then read minutes of the Board Meeting on April 14.

President McNiven then read Mr. Cucullu's report of the Vocational Guidance Committee, of which he is chairman, after which Mr. John L. Martinez introduced Mr. Ralph R. Mongeau, a student at Tulane University, who spoke on "Voltage Regulation on Radial Distribution Systems".

Dr. Wayne P. Wallace then introduced Mr. W. E. Kidd, student at Louisiana State University, who spoke on "Automotive Application of the Gas Turbine".

After the usual question period, the meeting closed with a rising vote of thanks to the speakers in appreciation for their well-prepared and interesting talks.

JOHN P. FERNANDEZ, Secretary-Treasurer

Minutes of Meeting of the Board of Direction Held on June 30, 1952

The meeting was called to order by President McNiven, with Messrs. Abrahm, Duclos, Molaison, Myers, Seago, Sessums, Wallace and Fernandez present. Messrs. Allen H. Jensen and Sydney Ellis of the Outing Committee, Waldemar S. Nelson, Chairman, Legislative Committee, and Wm. J. Drawe, Jr., General Chairman of the 1943 Annual Meeting, were present by invitation. Mr. Seago moved that the minutes of the preceding meeting be accepted as read, seconded by Mr. Molaison and carried.

In order to permit Mr. Nelson to keep another engagement, the order of business was dispensed with. Mr. Nelson reported for the special committee on proposed amendments to the city building code, after which Mr. Duclos moved that the L.E.S. Board of Direction endorse the proposed amendments to the city building code as recommended by this committee. The motion was seconded by Mr. Abrahm and carried. The secretary was instructed to send a copy of this motion to Mr. C. Glenn Cappel, the Society's official representative on the Building Code Committee.

Mr. Allen Jensen then announced that the Colonial Country Club had been engaged for July 17 for the Society's 22nd annual golf tournament and outing. A list of the attendance at previous outings was studied and the type of entertainment to be furnished at the outing was discussed. A vote then was taken concerning the program of entertainment, with the following results: In favor, 5; against, 2; abstaining, 2.

The 1952 Annual Meeting report submitted by Mr. Allen Betz then was reviewed, following which discussion was had in which it was pointed out that only 78 persons attended the Friday luncheon last year and it was necessary to settle with the hotel on the basis of 90 reservations. Mr. Abrahm moved that the talk and luncheon held on Friday of the Annual Meeting be dispensed with, seconded by Mr. Sessums and carried.

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Mr. Drawe announced that hotel reservations had been made for January 8, 9 and 10 for the Annual Meeting. With the concurrence of the General Chairman, Mr. Molaison moved that the following chairmen and vice-chairmen be appointed to head annual meeting committees:

Banquet—A. W. Durning, Chairman; Chas. M. Kerr, Vice-Chairman.

Contact with Woman's Auxiliary—John K. Mayer, Chairman; Jules A. Lorio, Vice-Chairman.

Plant Inspection—John D. Taylor, Chairman; Max P. Watson, Vice-Chairman.

Publicity—Allen H. Jensen, Chairman; J. Mason Guillory, Vice-Chairman.

Program—Ward C. Purdum, Chairman; Frank Riess, Vice-Chairman.

Registration—Walter E. Blessey, Chairman; Albert J. Fransen, Vice-Chairman.

Technical Papers—C. Glennon Melville, Chairman; Ivan H. Purinton, Vice-Chairman.

Student Conference—Frank W. Macdonald, Chairman; Sam P. Gullatt, Vice-Chairman.

Technical Exhibits—Daniel H. Vliet, Chairman; Frank C. Fromherz, Vice-Chairman.

Reception—H. L. Lehmann, Chairman; Lionel J. Cucullu, Vice-Chairman.

The motion was seconded by Mr. Seago and carried, following with President McNiven instructed the secretary to notify appointees.

A letter from the Engineers and Architects Club of New Orleans, requesting that two members of L.E.S. be appointed to the Affiliate Council of the club, was read. The duties of the Council are to coordinate the efforts and functions of the various professional and engineering societies in the club. President McNiven then appointed Messrs. Molaison and Clayton L. Nairne to represent the society on the council.

Mr. McNiven announced that the City Council had not included the recommendations made by the Louisiana Council of Engineers in the proposed City Charter to be submitted for public approval.

After some discussion on state civil service and the vacancy on the Board of Supervisors of L.S.U., the meeting adjourned without taking formal action.

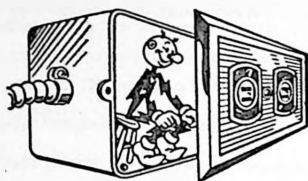
JOHN P. FERNANDEZ, Secretary-Treasurer

Minutes of Alexandria Section, Louisiana Engineering Society, June 12, 1952

A regular meeting of the Alexandria Section, Louisiana Engineering Society was held at 8:00 p. m. at Herbie K's Oyster House with 25 members in attendance. Mr. Hu Myers, president, presided, called the meeting to order, welcomed the guests, and had each one in attendance rise and introduce himself. The meeting was then recessed for dinner.

After dinner Mr. Myers again called the meeting to order for a short business session. The minutes for the May 15 meeting were read and approved. A motion was made by Mr. E. Levy that after recess of the organization, which will end in September, that meetings be held on a more informal basis, possibly with fish fries, crayfish bisques, at camps and other locations. This motion as duly seconded and carried unanimously. Mr. Myers stated that he would appoint a committee to look into the matter and see what could be done towards having these meetings in accordance with the motion made. There being no further business this part of the meeting was closed.

At this time 19 members of the Ladies Auxiliary of the Louisiana Engineering Society entered from an adjoining dining room where their business meeting was being held. Mr. Myers requested the president of the Auxiliary, Mrs. W. D. Roland, for a report on the progress being made by the Auxiliary. Mrs. Roland's report showed a surprising amount of work had been accomplished during the short time the Auxiliary had been in existence. She then invited the section to attend a barbeque to be held at Myers Park just north of Alexandria on Saturday evening, July 12. This invitation was accepted enthusiastically.



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Mr. E. Hogg then introduced Mr. A. M. Moore who showed a film entitled "Power by Which We Live". This was a very impressive film covering the period of the dark days before electricity up to the present and the bright lights that we enjoy today. Mr. Moore then made a talk bringing out the progress that has been made in the development of generated power and plans for the future in the electrical field.

After the talk Mr. Myers thanked Mr. Moore. He then introduced Mr. Cresap who outlined plans for a meeting to be held during the coming fall.

Motion was then made that the meeting be closed which was duly seconded.

O. E. BARRON, Secretary-Treasurer

Minutes of Meeting ,Baton Rouge Section, Louisiana Engineering Society

The first meeting of the Baton Rouge Section of the Louisiana Engineering Society for the year 1952 was held February 20, 1952 in the auditorium of the Agricultural Engineering Building on the Campus of L. S. U.

President Louis Duclos called the meeting to order. A motion was passed to dispense with the reading of the minutes of the previous meeting. There being no old or new business, Mr. Duclos called on Mr. Ted Innes to introduce the speaker of the evening.

Mr. Innes introduced Mr. C. R. Apity from the Clark Brothers Co., Inc., who rendered a most interesting talk on "Centrifugal Compressors". After an interesting discussion period, the meeting adjourned and refreshments were served.

WILEY D. POOLE, Secretary-Treasurer

Minutes of the Meeting of the Baton Rouge Section, Louisiana Engineering Society, March 27, 1952

The second meeting of the Baton Rouge Section of the Louisiana Engineering Society for the year 1952 was held on Thursday, March 27, in the Louisiana Highway Testing Laboratory.

The meeting was called to order by President Duclos. About 35 members and visitors were present. A motion was passed to dispense with the reading of the minutes of the previous meeting. There being no old or new business, Dean Lassalle was asked to introduce Mr. W. J. Evans, the speaker for the evening. Mr. Evans rendered a most interesting talk on the 1951-52 Capital Improvement Program for the city of Baton Rouge.

The meeting adjourned at 9:00 p. m. and refreshments were served.

WILEY D. POOLE, Secretary-Treasurer

Minutes of the Meeting of the Baton Rouge Section, Louisiana Engineering Society, April 23, 1952

The third meeting of the Baton Rouge Section of the Louisiana Engineering Society for the year 1952 was held on April 23, 1952 in the auditorium of the Agricultural Engineering building on the L.S.U. campus. This was a joint meeting with the student branches of the Engineering Society.

President Louis Duclos called the meeting to order. A motion was made and seconded to dispense with the reading of the minutes of the previous meeting. There being no old or new business, Mr. Duclos called on Mr. W. A. Wintz, Jr., to introduce the president of each student branch, who in turn introduced the other officers of each branch. Following the introductions of the officers of the student branches, Mr. Wintz introduced the three student speakers and subjects as follows:

"Automotive application of the Gas Turbine" by W. E. Kidd.

"Recent Advances in Illumination" by J. A. Loupe, Jr.

"History of Portland Cement" by D. D. Sandefur.

After an interesting discussion period on the talks, the meeting adjourned and refreshments were served.

WILEY D. POOLE, Secretary-Treasurer

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Minutes of the Meeting of the Baton Rouge Section, Louisiana Engineering Society, May 21, 1952

The fourth meeting of the Baton Rouge Section of the Louisiana Engineering Society for the year 1952 was held on May 21, 1952 in the auditorium of the Agricultural Engineering building on the L.S.U. campus.

The meeting was called to order by vice-president, Mr. Henry Landry. About 33 members and visitors were present. A motion was made and seconded to dispense with the reading of the minutes of the previous meeting. Mr. Landry then called on Mr. T. J. Innes, Jr., to introduce the speaker for the evening. Mr. Innes introduced Mr. Ludwig Meuser, Technical Superintendent of the Naugatuck Chemical Division of the U. S. Rubber Company, who rendered a most interesting talk on the manufacture of rubber and its place in our economy. The meeting adjourned at 9:30 p. m. and refreshments were served.

WILEY D. POOLE, Secretary-Treasurer

Minutes of the Meeting of the Lafayette Section, Louisiana Engineering Section, May, 1952

Mr. A. M. Bujard called the meeting to order in a private room of Poor-boy's Riverside Inn. This meeting was the annual dinner meeting and Ladies' Night of the Lafayette Section.

The invocation was given after which dinner was served.

New officers for the ensuing year, beginning September, 1952, were nominated and elected at this meeting by secret ballot. Elected to office were the following:

Mr. Allen Bonnet, President.

Mr. R. A. Osborn, First Vice-President.

Mr. Robert F. Helms, Second Vice-President.

Mr. Emery Domingue, Secretary-Treasurer.

Mr. Mason then introduced the main speaker of the evening Mr. James M. Todd, Consulting Engineer from New Orleans. Mr. Todd gave a brief talk on Sulphur after which the group moved to an adjoining room where a film on sulphur was shown.

The meeting was then turned over to the new President, Mr. Bonnet, who spoke a few words. Mr. Andre Dubus thanked and congratulated Mr. Bujard on a splendid job as president of the Lafayette Section.

EMERY DOMINGUE, Secretary-Treasurer

Minutes of Annual Meeting of the Lake Charles Section, Louisiana Engineering Society, March 31, 1952

The meeting was called to order in the Court Room of the City Hall at 7:45 p. m. by President Sicks. Thirty-three members and guests were present.

Minutes of the last meeting were read and accepted.

A financial report was read which indicated a balance in the bank as of March 31, 1952 of \$183.66. The committee appointments were then read and briefly discussed. Following this were some general comments by Mr. Sicks on attendance, publicity and vocational guidance. In his comments on vocational guidance, he again stressed the shortage of engineers.

Upon the conclusion of his comments, Mr. Sicks turned the floor over to Mr. Ward who discussed last year's and the proposed program for this year on vocational guidance. He pointed out in brief that the services of this section of the society were offered to the City and Parish Schools, however as not too much response was obtained, he plans to call on City and Parish School Officials again to offer a panel of engineers to discuss engineering with the students. He requested the co-operation of the membership in putting over the program, his co-operation involves primarily in members making themselves available when called upon.

Mr. Sicks then asked that any other old business be brought up. There was none to be discussed so he asked for any new business and again there was none. He then turned the meeting over to the program chairman for the introduction of the speaker. The speaker of the evening, Mr. G. L. Doremus, who is Senior Corrosion Engineer for Cathodic Protection Service of Houston, discussed the basic and practical ideas behind Cathodic Protection. In the course of his talk he pointed out that corrosion costs the country hundreds of millions of dollars annually, that corrosion is electro-chemical in nature, that a Cathodic Protection System is essentially a short circuited cell in which the

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major voltage drops appear across the Hydrogen film at the Cathode. He then explained the mechanism of corrosion further with simple cells and gave some background on the means of deciding the value of protective current needed. He then went into many facts and figures on voltage and current relationships under various conditions. Having concluded the theoretic portion of his discussion he then discussed the three basic sources of potential: sacrificial anodes, rectifiers, and the not too common wind generator and motor generators. He concluded his talk with a discussion of protection of bare pipe lines, pointing out the economics of hot spot protection versus protection for the whole line. There then followed an extensive question period in which were developed points concerning other applications of Cathodic Protection.

The meeting was adjourned at 9:35 p. m.

G. B. S. RICKETTS, Secretary-Treasurer

Minutes of Annual Meeting of the Lake Charles Section, Louisiana Engineering Society, June 2, 1952

The meeting was called to order in the Court Room of the City Hall at 7:45 p. m. by President Sicks. Eighteen members and guests were present.

The minutes of the last meeting were read by V. P. Davis in the absence of Mr. Ricketts. They were approved as read.

There was no old business.

Under new business, the question was asked if any engineers were consulted in drawing up building codes. It developed that codes adopted were National Building Codes, and does not set out who shall do, design and layout, except that plumbing must be in accordance with State Sanitation code.

Mr. Ward read a letter from Mr. Cucullu concerning vocational guidance.

Mr. Sicks introduced Mayor Price to the group.

Mr. Vincent introduced Mr. Jessen, City Engineer, who spoke on "Drainage in Lake Charles", stressing financial difficulties.

Meeting was adjourned at 9:00 p. m.

G. B. S. RICKETTS, Secretary-Treasurer

Minutes of Meeting of the Shreveport Section of the Louisiana Engineering Society Held June 3, 1952

The meeting was held in the cafeteria of the Louisiana Ordnance Plant. The meeting was called to order at 6:30 p. m. by President, L. H. Roeger.

After a steak dinner, the President requested that those that had brought guests introduce them to the club. There were forty-five members and six guests present.

Colonel Bills, who is in charge of Ordnance activities at LOP, was introduced by the President. In his talk Colonel Bills told something of the work of the LOP and the part that it played in the overall defense effort.

Mr. James A. Ward, General Manager for Remington Rand operators of LOP, was introduced and made a short talk describing the operating details of the plant.

Mr. Murphy Roden, who is in charge of the Safety Program at LOP, was introduced and he gave instructions for the tour of the "S" Line. After everyone was properly equipped with passes and the necessary shoe coverings, we boarded busses and we taken to Line "S". Here we were met by Mr. McClare, superintendent of Line "S", who with Mr. Ward escorted us through Line "S" explaining the various operations and pieces of equipment.

When the tour of Line "S" was completed, Mr. Ward advised that the machine shop was working and if the group wished we could see this in operation. Everyone wanted to see it, so we boarded the busses again and saw the shop where the tools and parts for the equipment were kept in repair and good operating order.

About 10 o'clock a tired group returned to the cafeteria. Although we had done a lot of walking, everyone enjoyed it and felt that it was one of the most interesting programs that we have had.

Without official adjournment, we sought our individual cars and returned to our homes.

W. W. ALSUP, Secretary Treasurer

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FINANCIAL STATEMENT
LOUISIANA ENGINEERING SOCIETY
BALANCE SHEET, DECEMBER 31, 1951
(CASH RECEIPTS AND DISBURSEMENTS BASIS)

CASH:

Checking account—

Whitney National Bank of New Orleans	\$ 3,308.48
Cash on Hand	95.91
Total Cash	<u>\$ 3,404.39</u>

UNITED STATES SAVINGS BOND, SERIES F

(Maturity value—\$6,000.00)—redemption value \$ 4,921.00

INVESTMENTS—HOMESTEADS: (at cost)

Columbia Homestead Association	\$ 370.29
Commonwealth Homestead Association	306.33
Greater New Orleans Homestead Association	1,753.65
Security Buiding and Loan Association	500.00
Sixth District Building and Loan Association	500.00
Union Savings and Loan Association	500.00
Total Investments—Homesteads	<u>\$ 3,930.27</u>

PROPERTY—Furniture, Fixtures, Equipment

and Books—nominal value	<u>\$ 1.00</u>
TOTAL ASSETS	<u>\$12,256.66</u>

LIABILITIES

SURPLUS (Per Exhibit B) \$12,256.66

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LOUISIANA ENGINEERING SOCIETY
STATEMENT OF INCOME AND SURPLUS (ON CASH RECEIPTS
AND DISBURSEMENTS BASIS)
FOR THE YEAR ENDED DECEMBER 31, 1951

INCOME:

Dues collected (less rebate to Sections, \$1,440.50) ..	\$ 6,785.50
Advertising revenue	678.84
Income from investments and having accounts	227.69
Miscellaneous—Net profit sale of certificates, Proceedings, etc.	53.50
Total Income	\$ 7,745.53

EXPENSES:

Salary—Secretary-Treasurer	\$ 2,325.00
Cost of publishing Proceedings	2,683.22
Cost of annual meeting (excess of receipts over disbursements)	(72.62)
Expenses paid in advance—succeeding year's annual meeting	195.95
Cost of annual outing (excess of receipts over disbursements)	(6.48)
Refreshments at meetings (less pro rata receipts from joint meetings held)	561.84
Printing, stationery, and postage	1,173.20
Present to retiring president	60.00
Floral offerings	20.60
Library expense—porter	48.00
Social security tax	46.49
Auditing	125.00
Scholarship awards	150.00
Donation—Engineers' and Architects' Club	50.00
General expenses	204.27
Total Expenses	\$ 7,564.47

NET INCOME FROM OPERATIONS \$ 181.06

ADD: — SURPLUS CREDIT:

Transfer of reserve for loss due to receipt of final
liquidating dividend from bank in liquidation .. \$ 94.91

DEDUCT — SURPLUS CHARGES — (Capital expenditures):

Design of Technological Accomplishment Medal (145.00)
Purchase of new furniture and equipment (558.10)

NET INCOME (LOSS) FOR THE YEAR \$ (427.13)

SURPLUS AT BEGINNING OF YEAR \$12,683.79

SURPLUS AT END OF YEAR \$12,256.66

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Savannah, Ga.

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Greensboro, N. C.

PROCEEDINGS

OF THE

LOUISIANA ENGINEERING SOCIETY

Vol. XXXVIII

DECEMBER, 1952

No. 4

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EDITORIAL NOTES AND COMMENTS

Our Annual Meeting. Your committees have been hard at work on the plans for the coming annual meeting on January 8, 9, 10, 1953. There will be four technical papers, two on Friday morning and two on Saturday morning, scheduled at hours that are more convenient than in the past. We hope that this fact together with the large amount of general interest in the papers to be presented will point to an overflow attendance at all meetings.

A brief schedule of meetings and addresses follows:

THURSDAY, JANUARY 8, 1953

- 11:00 A. M. Conference of University Engineering Students.
1:30 P. M. General Meeting.
Keynote Address: Gerald A. Newman, Consul of Canada and Trade Commissioner.
Title: "The Engineer and a Nation's Progress."
8:00 P. M. General Interest Program — Dixon Hall — Tulane University Campus.
Speaker: Dr. Lee H. Johnson, Dean, College of Engineering, Tulane University.
Title: "Engineering at Home."
Presentation of Andrew M. Lockett Award and Technological Accomplishment Medal.
Refreshments will be served by the Women's Auxiliary.

FRIDAY, JANUARY 9, 1953

- 9:30 P. M. Speaker: A. H. Mehl, Houston District Manager, Carrier Corporation.
Title: "Multi-Room Conditioning."
10:45 A. M. Speaker: N. T. Lawrence, Vice-President in Charge of Operations, United States Lines.
Title: "Interesting Features of the S. S. United States."

SATURDAY, JANUARY 10, 1953

- 9:30 A. M. Speaker: R. W. Sudhoff, Associate Director of Development, The Chemstrand Corporation.
Title: "Synthetic Fibers—A New Southern Industry."
10:45 A. M. Speaker: Dr. Donald H. Loughridge, Ass't. Director, Division of Reactor Development, Atomic Energy Commission, Washington, D. C.
Title: "Atomic Energy."

On Friday afternoon inspection trips will be made of the port facilities on the yacht "Good Neighbor," and to the Chrysler Plant at Michaud. On Saturday evening we will hold the Cocktail Hour and Banquet at the St. Charles Hotel.

There is no charge for registration so please register early and urge your friends to do likewise. For further details please consult your program.

W. J. DRAWE, JR., *General Chairman*

Equality. "We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty and the pursuit of Happiness." Thus wrote the patriots of America in

1776. And now the question arises, and has often arisen: What is the meaning of equality as applied to men? Does it mean that all men shall be alike? Does it mean that all men shall be leveled arbitrarily to a common plane? Does it mean that those who have endowments beyond the average shall be restrained from making a better place for themselves and for others? Does it mean that those who are content with idleness and indolence shall be lifted artificially to an estate beyond what they deserve or could enjoy? Surely it does not — and cannot — mean any of these things. For if it did, there would be no reward for the man who looks beyond the present. There must be equality, yes: equality in the right to voice our views; equality in the right to worship according to the dictates of conscience; equality before the law; equality at the ballot box; equality in the right to work without paying tribute to anyone for the privilege — an equality not circumvented by political pressure, not denied to minority groups, not withheld from the humble, the friendless, or the needy — but not that warped and mistaken “equality” which would push down the able and push up the indolent; not the kind of “equality” that would retard willing men to the pace of the unwilling, or that puts unsteady props beneath backsliders; not that “equality” which would reward them who “toil not, neither do they spin.”

No doubt all the trees in the forest fundamentally have equal rights and privileges. But they don't all grow to the same height, and it would seem rather foolish to cut the tall trees down to the level of the lesser ones to satisfy the theoretical demands of an unnatural formula. And it would seem just as preposterous ruthlessly to pull the short trees up to the height of the tall ones. If we did, it would mean their uprooting—they would wither and die, as all things do unless they grow up by themselves from their own roots.

And so, to those who would like to eliminate differences among men, it should be said that if it were possible to do so, progress would cease. Equality cannot therefore mean to bring all men low. It must mean opportunity for each man to rise to those heights to which his energies and abilities will take him — “and allow all men the same privilege” — to the end that progress may continue, and that thereby all will find benefit. Equality which means less than this is not equality at all — it is slavery.

RICHARD L. EVANS, from “*The Spoken Word*”

New Members. The following members were elected on the September ballot.

For Member

- MARSDEN B. CARMICHAEL**, Baton Rouge; age 27. Endorsed: Floyd D. Richards, J. D. Midwikis. Clemson College, B.S.M.E., 1947, Purdue University, M.S.M.E., 1951. Clemson College, Instructor in M.E., 1947-49. Hamilton Eng. Co., Charlotte, N. C., Asst. to Factory Installation Engineer. Purdue University, Instructor in M.E., 1949-51. Esso Standard Oil Co., Engineer, Sept. 1951-date. Jr. Member ASME. Associate, Sigma Xi, 1951.
- JOHN B. ELSTROTT**, New Orleans; age 29. Endorsed: B. Louviere, J. D. Taylor, L. J. Lassalle. Louisiana State University, B.S.Ch.E., 1946. Walter Cooke, Sales Engineer, 1946-51. Partner with Walter Cooke and H. Leuhmann, Jan. 1952-date. Member Am. Chem. Society, Jr. Mbr. A.I.Ch.E. Registered Ch.E., La.
- CHARLES C. FORD**, Bunkie; age 45. Endorsed: O. E. Barron, O. L. Hyde, F. B. Sonnier, A. M. Moore. L. L. Cooke, Chicago, Electrical Eng. Course, 1923-24. I.C.S., Scranton, Pa., Electrical Eng., 1940-42. A. B. Hudson, Alexandria, Electrician's Helper, 1925-27. Central La. Electric Co. and Predecessor, 1927 to date, as Electrician, Construction Foreman, Supt. of Distribution, Supt. of Transmission and Dist. for Southern Div. Registered E.E., La.
- MARION D. GARRISON**, Lake Charles; age 52. Endorsed: J. S. Duhe, G. B. S. Ricketts, J. P. Tucker. Ohio State University, M.E., 1918-21. Washington University Night School, Stress Analysis & Thermodynamics, 1942-43. Duncan & Garrison Eng. Co., Partner, 1924-32. Widmer Eng. Co., Office Eng., 1940-43. E. B. Badger & Co., Sr. Engr., 1945-46. Matheison Chemical Corp., Design Engr., 1946-date. Registered, Mo. Member St. Louis Engrs. Club.
- HENRY G. HOWARD**, New Orleans; age 49. Endorsed: E. F. Hughes, J. S. Janssen, H. C. Swan, B. M. Dornblatt. University of Maine, B.S.C.E., 1927. Maine Highway Comm., Jr. Engr., 1927-33. Vermont Highway Bridge Dept., Eng. Inspector, Resident Engr., 1937-40. Maine State Hwy. Comm., Engr., 1945-46. Crowell & Lancaster, Architects, Engineer, 1946-49. G. A. Heft & Co., Sr. Engr., 1949-51. Bedell & Nelson, Civil and Structural Engr., Dec. 1951-date. Active Duty, U.S. Army, 1933-37 and 1940-45. Registered La., Maine, Vermont. Assoc. Mbr., ASCE. Member SAME.
- TED H. KALENCKI**, Baton Rouge; age 36. Endorsed: E. R. Metz, F. L. Goodman, J. T. O'Brien. Curtis-Wright Inst. of Technology, B.S.M.E., 1938. M. W. Kellogg Co., Area Engr., Lake Charles, 1941-43. Firestone Co., Process Control Engr., 1943-44. E. B. Badger & Sons, Office Engr., 1945-46. Goodman & Miller, Designer, 1946-47. D'Avy & Kalencki, Private practice of Eng. and Architecture, 1947-51. J. G. White Eng. Corp., M.E. & Designer, 1951. Delta Tank Mfg. Co., M.E. & Tool Designer, 1952. Registered M.E., E.E., La.
- CONRAD W. MARVIN**, Shreveport; age 30. Endorsed: J. C. Faulkner, M. A. Hudson, F. W. Quin, Jr. University of Kansas, B.S.Ch.E., 1942. U.S. Rubber Co., Process Control Engr., 1942-43. Panhandle Eastern Pipeline Co., Gas Engr., 1945-47. Texas Eastern Transmission Corp., Plans & Research Engr., 1947-date. Registered M.E., Ch.E., La. Member ASME, Am. Gas Ass'n.
- CHARLES A. MENVILLE**, Baton Rouge; age 39. Endorsed: F. A. Hannaman, Jr., R. C. Herrell, T. J. Innes, Jr. Louisiana State University, B.S.M.E., 1933. Esso Standard Oil Co., La. Div., Project Engr., 1936-date.
- JEROME L. PRICE**, Baton Rouge; age 28. Endorsed: F. A. Hannaman, Jr., T. J. Innes, Jr., R. H. Meyer. Louisiana State University, B.S.M.E., 1948. Esso Standard Oil Co., Project Engr., 1948-date.
- ROBERT G. STAPP**, Maplewood; age 40. Endorsed: J. S. Duhe, G. B. S. Ricketts, J. P. Tucker. Baylor University, B.A. (Geology) 1934. University of Texas, Architecture, 1934-36. Kansas City Art Inst. & School of Design, M.F.A., 1948. Woodville Public Schools, Art & Drawing Teacher, 1937-40. E. B. Ribble, Architect & Contractor; Helland & Drought, Engrs.; Frederick R. Harris, Consulting Engr.; Pennsylvania Ship Yards, Inc., 1941-43. U.S. Navy, C.B.'s 1943-45. Texas Highway Dept., Delineator; South Park Independent Schools, Head Art Dept.; Matheison Chemical Corp., Draftsman; 1947-51. Member Texas State Teachers Ass'n, National Education Ass'n.

DONALD B. SCHELL, New Orleans; age 29. Endorsed: A. W. Betz, A. J. Harris, R. P. Lockett Jr. Tulane University, B.E. in M.E., 1947. Robbins & Robbins, Sales Engineer, 1947 to date.

WILLIAM J. STEED., JR., New Orleans; age 30. Endorsed: W. S. Leake, R. P. Lockett, Jr., J. D. Taylor. University of Florida, B.Ch.E., 1948. General Electric Co., Test Engineer, Proposition Engr., Sales Engr., 1948-52. Member Sigma Tau.

WILLIAM C. THURMON, Shreveport; age 32. Endorsed: L. H. Roeger, C. A. Frey, W. C. Sorensen, Louisiana Polytechnic Institute, B.S.C.E., 1939. U.S. Air Force, Engr. Officer, 1942-46. Mosher Steel Co., Dallas, Structural Steel Design, estimates, pricing, 1946-48. Mosher Steel Co. of La., Sales Manager, 1948-52. Registered C.E., La.

PHILIP W. WANG, Orange, Tex.; age 33. Endorsed: J. S. Duhe, G. B. S. Ricketts, J. P. Tucker. International Correspondence Schools, Structural Eng., 1932-37. J & L Steel Corp., Structural Detailer, 1935-40. Ingalls Iron Works, Structural Detailer, 1940-42. Consolidated Steel, Checker, 1942-43. U.S. Navy Const. Battalions, 1943-46. Consolidated Steel, Structural Checker, 1946-47. Matheison Chemical Corp., Design Engr., 1947-date. Registered P.E. (Structural), Texas.

FRANK WEISER, Gretna; age 49. Endorsed: F. A. Deckbar, Jr., R. M. Persell, E. F. Pollard. U.S. Dept. of Agriculture, Bureau of Agri. & Industrial Chemistry, Mechanical Engr., Supervisor of Shops, Asst. Bldg. Supt., 1942-52. Member ASME. Registered M.E., La. Licensed Marine Engr., U.S. Coast Guard; licensed Stationary Engr., New Orleans, La.

For Affiliate Member

HOMER T. CHAPMAN, Lake Charles; age 34. Endorsed: J. S. Duhe, G.B.S. Ricketts, J. P. Tucker. University of Georgia, Agricultural Engineering, 1934-38. U.S. Dept. of Agriculture, Soil Conservation Service, 1938-41. U.S. Army Corps of Engineers, Military duty, 1941-45. Matheison Chemical Corp., Engineer, Oct. 1945-date.

CLYDE S. CHILDERS, Orange, Tex.; age 45. Endorsed: J. S. Duhe, G. B. S. Ricketts, J. P. Tucker. Structural steel drafting and engineering training, 1926 to date. Mobile Steel Co., Structural Steel Draftsman and Checker, 1939-40. Consolidated Steel Corp. of Texas, Chief Draftsman, 1941-46. Livingston Ship Building Co., Chief Engr. Structural Div., 1948-49. Matheison Chemical Corp., Estimator, 1950-date.

JOHN J. MALARKEY, Lake Charles; age 34. Endorsed: J. S. Duhe, G. B. S. Ricketts, J. P. Tucker. John McNeese Jr. College, Engineering, 1946-47. I.C.S. Mechanical Engineering Course I, 1951-52. Matheison Chemical Corp., Junior Draftsman, 1947-52.

WARREN E. MARCUM, Baton Rouge; age 31. Endorsed: C. E. Abrahamson, Louis Duclos, A. D. Jackson. I.C.S., Mechanical Engineering, 1944-45. U.S. Army Engineer Corps, Road Squad Leader, 1943-44. La. State Highway Dept., Road Design, 1945-date. Registered C.E., La. (Public Employee).

WILLIAM C. NATION, Maplewood; age 36. Endorsed: J. S. Duhe, G.B.S. Ricketts, J. P. Tucker. I.C.S., Agricultural & Mechanical Design, 1938-40. Geo. T. Stagg Co., Draftsman, 1944-47. State Highway Dept., Frankfort, Ky., Draftsman, 1947. The Girdler Corp., Draftsman, 1947-48. Foster Wheeler, Houston, Designer-Draftsman, 1949-50. Brown & Root, Designer-Draftsman, 1950-51. Matheison Chemical Corp., Designer-Draftsman, 1951-date.

For Junior Member

BYRON E. CRAWFORD, Baton Rouge; age 25. Endorsed: T. L. Cappel, F. A. Hannaman, Jr., T. J. Innes, Jr. University of Arkansas, B.S.E.E., 1951. Esso Standard Oil Co., Electrical Engineer, June 1951 to date. Associate Member, AIEE.

BERTRAM R. DENHAM, Maplewood; age 31. Endorsed: F. E. Charles, W. M. Davis, R. M. See. Louisiana State University, B.S.M.E., 1949. U.S. Army Corps of Engrs., Jr., Engr., 1949. Cities Service Ref. Corp., Draftsman, Contract Engr., Design Engr., 1949 to date. Registered M.E., La.

- JOHN W. EASOM, Alexandria; age 20. Endorsed: D. G. Hunter, L. F. Magee, S. L. Perry. Louisiana College, B.A., 1952. City of Shreveport, Draftsman, April 1947-Sept. 1948. City of Alexandria, Draftsman & Water Works Design, Nov. 1949 to date.
- CLAUDE A. PETTY, JR., Baton Rouge; age 25. Endorsed: F. A. Hannaman, Jr., T. J. Innes, Jr., R. Meyer, Georgia Institute of Technology, B.E.E., 1950. Esso Standard Oil Co., Project Engineer, July 1950-date.
- RICHARD E. RUCKSTUHL, Baton Rouge; age 20. Endorsed: T. J. Innes, Jr., Randall Meyer, H. J. Hall. Tulane University, B.S.C.E., 1952. Esso Standard Oil Co., Project Engineer, May 1952-date. Jr. Member ASCE. Tau Beta Pi, 1951. Registered C. E., La.
- JOSEPH L. SMILIE, Baton Rouge; age 26. Endorsed: H. T. Barr, W. H. Carter, W. D. Poole. Alabama Polytechnic Institute, B.S. Agri. Eng., 1950. Louisiana State University, M.S. Agri. Eng., 1952. La. Agricultural Experiment Station, Asst. Agri. Engr. Member American Society Agri. Engrs., La. Agri. Engrs. Ass'n.
- CHARLES F. SMITH, JR., Baton Rouge; age 26. Endorsed: F. A. Hannaman, Jr., T. J. Innes, Jr., Randall Meyer. University of Virginia, B.C.E., 1951. Esso Standard Oil Co., Project Engineer, July 1951-date. Registered C.E., Va.
- ENOCH TALLEY, Baton Rouge; age 30. Endorsed: Randall Meyer, F. A. Hannaman, Jr., T. J. Innes, Jr. Louisiana State University, B.S.E.E., Jan. 1950. Southern Bell Tel. & Tel. Co., Jr. Engineer, 1950-52. Esso Standard Oil Co., La. Div., Engineer, Jan. 1952-date. Registered C.E., La.
- BRYCE K. TOMLIN, Baton Rouge; age 25. Endorsed: C. K. Dunbar, L. J. Lassalle, W. P. Wallace. Louisiana State University, B.S.C.E., 1949. City of Baton Rouge & Parish of E. Baton Rouge Dept. of Public Works, Chief Eng. Draftsman, 1949-52. Mundinger, Dupree & Cooper, general civil Engineering work, Feb. 1952-date. Jr. Member, ASCE. Member SAME. Registered C.E., La.

PAPERS AND DISCUSSIONS

ETHICS AND ENGINEERS*

When a boy decides to study engineering he is using the fundamentals of ethics but does not know he is doing so. He is possessed of a free will and his conscience tells him what is right and what is wrong, and this constitutes the fundamentals of ethics. He does not become conscious of ethics as such until he joins one of the Student Chapters of a Parent Society, and then only to a very limited degree. For the first time he hears of codes or canons of ethics. As he pursues his studies through a university, very little thought is given by him to ethics because he is too busy fulfilling the demands of the curriculum. It is not until near the end of his university work that this subject is brought home to him; and in most universities very little or no significance is placed upon ethics and professional practices as far as the curriculum is concerned. It is not until he is out of the university for a while that ethics assumes any significance of a serious nature. This applies to all engineers, and it makes little difference whether he is a Civil, Mechanical, Electrical, Sanitary or Mining Engineer, or belongs to any division of the profession. Many engineers do their work in a very satisfactory manner as employees and are not called upon to make decisions involving ethics. This is true because the relations that exist between many engineers and their employer are very pleasant, and as long as both are decent in their dealings with one another questions involving engineering practice and ethics do not come up. For this reason many engineers devote their whole life to the practice of engineering with very little consideration given to the matter of ethics and the serious practices of their profession.

Those engineers who concern themselves with this subject find it difficult to secure information because text books are very limited, and their only recourse is to various papers written by engineers who have become interested in the subject through the practice of their profession. One of the best sources of information are the writings of Daniel Webster Mead, Hon. M. A.S.C.E. This gentleman was born in 1862 and died in 1948. He was president of the A.S.C.E. and one of the greatest engineers of his time. He contributed to "Civil Engineering," the magazine of the A.S.C.E. by setting forth pertinent examples of doubtful practice, with his own conclusions, all of which was for the benefit of the young engineer. While he wrote anonymously, many of his examples and conclusions were taken from his own professional life and practice. He was an engineer of the highest type and he had nothing but scorn and righteous indignation for dishonesty and even chicanery in professional dealings. He spoke with authority because at times he maintained his

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high ideals through personal sacrifice. He is the author of "Standards of Professional Relations and Conduct", which appeared in January 1940 "Proceedings" of the A.S.C.E. which were widely discussed and resulted in twenty-seven printed comments. As a result of this Mr. Mead revised his original paper to include ideas offered in its discussion and this version became No. 21 of the A.S.C.E. series of "Manuals of Professional Practice" which was first printed in 1941 and has been reprinted in 1945 and 1947. Thousands of copies have been distributed in America and in foreign countries; several thousands were distributed to members of the Engineering Institute of Canada.

Ethics, or moral philosophy, is the science of the moral order, or the right or wrong of human acts. It is derived from the Greek word "Aethae" which means manner, custom, way, or habit. It treats of human actions from the standpoint of goodness or badness, and by human acts we mean the intelligent performance of a free human being. It is the philosophical science of human acts from the standpoint of right or wrong applied to everyday life. It can be termed as being both a science and an art. A science is a reasoned out and organized body of knowledge reduced to principles and precepts. An art is a body of precepts and principles formulated for the purpose of doing or expressing something. As a science ethics studies human acts from the viewpoint of their goodness, rightness, justice and their badness, wrongness, injustice in the light of reason. As an art ethics prescribes the laws, precepts, rules governing human acts; it inculcates these laws, precepts, rules as the product of right reason; when these laws, precepts and rules are practical, human life becomes reasonable or ethical. Every person deals with ethics in this everyday performance of committing good or bad acts. It enters into the lives of every person and is not confined to engineers in the practice of their profession. It governs the actions of every segment of the population, and of every person in the various segments, and dictates the way of life of all peoples because it deals with the acts of all human beings.

However, as it applies to engineers in their professional practice ethics can best be defined as set forth in the various codes or canons of ethics for engineers. The Louisiana State Board of Registration for Professional Engineers and Land Surveyors has included the canon of ethics for engineers as adopted by the Engineers Council for Professional Development as their standard of practice and have published same in their Year Book for Registered Professional Engineers and Land Surveyors of 1952. While it is true that each parent society, or state association, of professional engineers has its own code or canon of ethics, that adopted by the Engineers Council for Professional Development endeavors to embrace all of the various codes or canons. For this reason the Louisiana State Board of Registration for Professional Engineers and Land Surveyors has

published the canon of the E.C.P.D. because they register all engineers, regardless of their particular branch, under the laws of the State of Louisiana as they relate to professional engineers. Since this paper is presented to the Louisiana Engineering Society, whose membership includes all types of professional engineers, as well as the Louisiana Section of the A.S.C.E. which restricts its membership to Civil Engineers, I shall limit my remarks to the canon of the E.C.P.D.

It is divided into four major sections as follows: (1) Professional Life, (2) Relations With the Public, (3) Relations with Clients and Employers, and (4) Relations with Engineer.

There are two sections under the heading of PROFESSIONAL LIFE.

Section 1. states, "The engineer will cooperate in extending the effectiveness of the engineering profession by interchanging information and experience with other engineers and students and by contributing to the work of engineering societies, schools, and the scientific and engineering press." The engineer has a direct obligation to society and to fulfill this obligation he must devote some of his time to the furtherance of his profession and he is not entitled to compensation for the time spent in such work. Progress comes through experience and it behooves engineers to make their experience available by their efforts over and above the work for which they receive compensation in disseminating their knowledge through civic actions, engineering societies, schools and technical publications. At times it is not to the advantage of the engineer to give information to others for which he does not receive a fee, but in the overall picture of professional practice it is necessary that this be done, otherwise the progress of engineering, and the general public with whom he deals, will not advance through experience. It is a good act, and hence ethical for the engineer to perform in an unselfish manner, for the benefit of society, and make available knowledge gained through experience.

Section 2. is as follows: "He will not advertise his work or merit in a self-laudatory manner, and he will avoid all conduct or practice likely to discredit or do injury to the dignity and honor to his profession." It is hard at times to refrain from boasting, and it is a common trait for human beings to talk, and write, loud and long about their accomplishments. How often do we avoid persons who become a bore through self praise? Certainly we cannot call such persons dignified, and even when they tell the truth their statements are not taken at face value. The engineer is no different from those who believe that modesty is a virtue, and that the ends of an individual or profession are best served by practicing self-restraint. Self-restraint promotes sober reflection and through both we discipline ourselves, and by such action perform our tasks much better.

The second division, **RELATIONS WITH THE PUBLIC.**

Section 3 is as follows: "The engineer will endeavor to extend public knowledge of engineering and will discourage the spreading of untrue, unfair and exaggerated statements regarding engineering." Please note that this section charges the engineer to discourage the use of anything that is not a fact, and does not condone half facts or statements that do not fully make a presentation which is the truth relating to the conditions at hand. Whether the facts are good or bad from the engineer's standpoint is immaterial, because it is the duty of the engineer to present the facts as they are.

Under Section 4 we find the following: "He will have due regard for the safety of life and health of the public and employees who may be affected by the work for which he is responsible." Since all engineering work deals with public safety this particular section advises the engineer of the very grave responsibility he has to the public in general. He must always bear in mind, and be cognizant of the fact that he is acting on behalf of a very great number of people who compose governments, states, communities and political subdivisions. This section is mandatory in that he be conservative at all times in designs, supervision and inspection of projects so that the public safety shall not be in danger at any time. This is a public trust and it should be treated as such.

Section 5 states: "He will express an opinion only when it is founded on adequate knowledge and honest conviction while he is serving as a witness before a court, commission, or other tribunal." When any citizen of the United States testifies before a public body, with the intention to misrepresent; or testifies without adequate knowledge and preparation, he may commit perjury which is a felony. If he does not deliberately lie his testimony may be misleading and virtually affect the interests of others. Obviously he is wrong by so doing and commits a bad act. If this is true of everyone how much greater does it apply to engineers who, by training, know better and who should be scrupulous in gathering facts and presenting them in a very full and conclusive manner. It becomes an additional obligation on the engineer because others expect him, by reason of the position he occupies, to speak with integrity and authority. There is no justification for an engineer to knowingly commit an immoral act or make a false statement.

Section 6 "He will not issue ex parte statements, criticisms, or arguments on matters connected with public policy which are inspired or paid for by private interests, unless he indicates on whose behalf he is making the statement." It is part of our democratic processes to express opinions and either to favor or to object to certain courses of action. Even when such opinions are not paid for it is always considered fair and equitable for those expressing opinions to state their interest in the matter. When a person is

being paid to express opinions certainly it becomes a duty to advise that his opinion may or may not be influenced by his remuneration. Others are the judge of the weight of his opinions and are entitled to know all of the facts surrounding his participation in the matters at issue. Opinions expressed without compensation assume a totally different aspect than those paid for with cash or other means.

Section 7 "He will refrain from expressing publicly an opinion of an engineering subject unless he is informed as to the facts relating thereto". An engineer is a person who should speak with authority on a subject because it is supposed that he has a very intimate knowledge of those things he is talking about. For this reason great weight is given to the expression and opinion of engineers. They are supposed to know all or most of the facts, and speak with authority concerning same. Because of the engineer's accepted position it is necessary for him at all times to carefully investigate, whether he is compensated or not, and be sure of his facts before expressing an opinion. If he does not act in this manner his action is bad because he may influence persons, or groups, to the detriment and great harm of others.

Under the Third Division—RELATIONS WITH CLIENTS AND EMPLOYERS—we may group sections because they overlap to some extent.

Section 8 "The engineer will act in professional matters for each client of employer as a faithful agent or trustee."

Section 9 "He will act with fairness and justice between his client or employer and the contractor when dealing with contracts."

Section 12 "He will present clearly the consequences to be expected from deviations proposed if his engineering judgment is overruled by nontechnical authority in cases where he is responsible for the technical adequacy of engineering work."

It is difficult for many clients to realize that when they employ an engineer, and pay him a fee, he does not become "their man" in that he should represent them to the detriment of others. It is sometimes equally difficult for the engineer to maintain his position as an impartial judge of the relations and actions between the owner and the contractor, and for that matter other parties who are not contractors. Very often the engineer in his interpretation of the contract documents, drawings and specifications must make decisions which favor the contractor and with which the owner does not agree. Sometimes the relations between the contractor and the owner becomes strained because the owner cannot understand why the engineer should not be partial to him because he is paying for the engineer's services. Many others do not realize that they hire

the services of the engineer but do not purchase his opinions. Occasionally it is to the engineer's interest to side entirely with the owner, but in fairness to those with whom he is dealing he cannot conscientiously assume this position, and hence a question of ethics is involved because his actions are either good or bad to those concerned and to himself. Very often the "finality clause" is involved by which his decision shall be final and binding on all matters concerning the facts of the contract documents. Some owners will not agree to arbitration or a review of the engineer's decision by anyone, and when such is the case the engineer is placed in a very awkward position due to a recent ruling by the United States Supreme Court that if the contract documents state the engineer's decisions are final and binding, the contractor has no recourse but must abide by same no matter how biased, incompetent or unfair they may be. Engineers who act in good faith should never fear a review of their decisions and as a safeguard against good or bad acts or decisions it is only ethical and just that a court of competent jurisdiction have the right to review these decisions whether it be in the interest of the owner or in the interest of the contractor. Such a review is certainly a safeguard to insure fair and ethical actions on the part of the engineer when he makes decisions.

Section 10 "He will make his status clear to his client or employer before undertaking an engagement if he may be called upon to decide on the use of inventions, apparatus, or any other thing in which he may have a financial interest."

Section 18 "He will promptly disclose to his client or employer any interest in a business which may compete with or affect the business of his client or employer. He will not allow an interest in any business to affect his decision regarding engineering work for which he is employed, or which he may be called upon to perform."

These two sections charge the engineer to fully advise his client if he has any interest besides that of professional engineering which may be in conflict with the affairs of those who have engaged him. It is possible that if the owner knows of these interests he would not hire the services of the engineer because they would conflict too greatly with his own affairs.

Sections 11 and 13 are closely allied one to the other because very often conditions arising in Section 11 necessitate fulfillment of conditions in section 13.

Section 11 "He will guard against conditions that are dangerous or threatening to life, limb, or property on work for which he is responsible, or if he is not responsible, will promptly call such conditions to the attention of those who are responsible."

Section 13. "He will engage, or advise his client or employer to engage, and he will cooperate with, other experts and specialists whenever the client's or employer's interest are best served by such service."

At times during the course of constructing a project unforeseen conditions arise which threaten life or property. These conditions may be beyond the scope and ability of the engineer to handle and solve, and hence it is necessary that other experts or specialists be brought into the case in question. It may not be to the interest of the engineer to have such persons enter the problem, but if he is to act in an ethical and just manner he must protect the interests of others before he can consider his own interests. The engineer's decision to inject others into his work resolves itself into a matter of his conscience, and becomes one of ethics due to the fact that his decisions are either good or bad.

Section 14. "He will disclose no information concerning the business affairs or technical process of clients or employers without their consent." If the engineer does not act discreetly concerning the business affairs of his client of which he has intimate knowledge, he can greatly injure the person, or firm, for whom he is working, by his actions. He may cause great harm and the matter of ethics is involved once again because the engineer's actions are either good or bad as they affect the interest of his clients.

Sections 15, 16 and 17 can be grouped together because they deal with the acceptance by the engineer from one client, or other party, of more than one fee for the same services.

Section 15. "He will not accept compensation, financial or otherwise, from more than one interested party for the same service, or for services pertaining to the same work, without the consent of all interested parties."

Section 16. "He will not accept commissions or allowances, directly or indirectly, from contractors or other parties dealing with his client or employer in connection with work for which he is responsible."

Section 17. "He will not be financially interested in the bids as or of a contractor on competitive work for which he is employed as an engineer unless he has the consent of his client or employer."

When an engineer accepts a fee, or remuneration that cannot be considered a fee, from more than one client or interested party he is acting in an unethical manner unless he declares his intentions in advance and secures the acquiescence and approval of his original client. His acts are bad and unethical. In reality the engineer is stealing, because he is accepting funds which cannot belong to him for giving services of a dishonest nature. Under no conditions or

circumstances can such actions be condoned, and this does not apply to the engineering profession alone but to every person in every walk of life.

Under the fourth heading of *RELATIONS WITH ENGINEER*, we find section 19 which is as follows: Section 19. "The engineer will endeavor to protect the engineering profession collectively and individually from misrepresentation and misunderstandings." This section parallels Section 3 which deals with *Relations With the Public*. In dealing with other engineers it is imperative that the truth be presented, and it is only through the presentation of facts that misrepresentation and misunderstanding can be avoided. Generally speaking, the facts help engineers, and engineering, and it is only when deviation from the facts becomes the case that injury is done to the engineering profession and those who make up the profession.

Section 20. "He will take care that credit for engineering work is given to those to whom credit is properly due."

The fulfillment of this section is in keeping with the engineers involved. If the engineer in question has a high sense of honor he will automatically give unto others the credit which is due them. The ethics involved under this section will be neither better nor worse than the integrity of those who must give adequate credit, and place it where it belongs. The temptation is at times very great to further our own ends by taking advantage of others; men of proper principles and good will will not stoop to such deeds while the very small minority will do everything, within the letter of the law, to take that which does not belong to them.

Sections 21, 25 and 26 can be grouped together because they deal primarily with securing employment and compensation for engineering services.

Section 21. "He will uphold the principle of appropriate and adequate compensation for those engaged in engineering work, including those in subordinate capacities, as being in the public interest and maintaining the standards of the profession."

Section 25. "He will not try to supplant another engineer in a particular employment after becoming aware that definite steps have been taken toward the other's employment."

Section 26. "He will not compete with another engineer on the basis of charges for work by underbidding, through reducing his normal fees after having been informed of the charges named by the other."

Unfortunately it is uncommon that one engineer will undercut another in trying to secure a contract for professional services. Even though the fees for professional services are well established

through the recommendations of parent societies, and the adopted usage of the various branches of the engineering profession, it is not unusual for engineers to undercut these recommendations in securing work. Very often after an engineer has been called in and made a proposal for his services, another engineer will hear of it, or be called in by an owner, and either cuts his fee by his own action or at the request of the owner to supplant the other and secure the job. When he reduces his fee he cannot give the owner adequate services because very often to do so would involve a loss to the engineer. The engineer who cuts fees and underbids others hurts everyone including himself because he usually does a poor job in his efforts to reduce his expense, and hence does not serve his clients best interests. However, this is done every day and some engineers place such practice under the heading of "salesmanship". All of the parent societies frown upon such procedure, and go beyond to the extent that they do not tolerate the bidding on a price basis for engineering services in public, private or any other type of work.

It is also incumbent upon the engineer to act fairly with those who are in his employ. Every engineer is worthy of his hire and should be adequately compensated based upon his education, experience and capabilities requiring industry and leadership for the work he is doing. For an engineer not to acknowledge and treat fairly with those working for him who possess these qualifications, is not acting ethically because he does not give others what is justly due them. If it is recognized that subordinates should be treated fairly, labor unions shall not be needed as far as professional engineers are concerned. This is further emphasized in Section 22—which reads as follows: "He will endeavor to provide opportunity for the professional development and advancement of engineers in his employ." Besides being the duty of engineers it is also to their advantage to help those in their employ secure additional training and acknowledge their advancement from year to year by reason of the experience they gain in their work. It is an obligation on the part of the employer because he is charged with training those who will succeed him, and if he does not give his subordinates due opportunity to help themselves acquire knowledge and advance in the profession, he is not training engineers of the future, who shall in time supplant him and carry on the work of the profession.

Section 23 and 24 can be treated jointly because they have much in common.

Section 23. "He will not directly or indirectly injure the professional reputation, prospects, or practice of another engineer. However, if he considers that an engineer is guilty of unethical, illegal practice, he will present the information to the proper authority for action."

Section 24. "He will exercise due restraint in criticizing another engineer's work in public, recognizing the fact that the engineering societies and the engineering press provide the proper forum for technical discussions and criticism."

These two sections deal with libel, which is unlawful and persons are responsible for their actions when they injure others by improper criticism. Libel is a crime in some of its proportions and punishable as a felony. It is not proper for engineers, or others, to speak ill of persons whether they are fellow engineers or not. An engineer may know that another engineer is guilty of unethical, illegal or unfair practice but he cannot prove it, and hence cannot present the information to the proper authorities without leaving himself open to severe consequences. Once again we must be in possession of all the facts before action can be taken concerning such matters, there is the upper place to bring notice of such unethical practice and that is through the engineering societies which have been established for the sole purpose of protecting the engineering profession, and furthering the advancement of its membership, by the practice of proper ethics. It may be hard for the individual engineer to secure adequate protection but when the engineering societies are used results are obtained, because their action only takes place after exhaustive information has been presented and the case in question is made clear. The engineering societies provide a means of protection against those who do not act ethically and whose actions are bad and detrimental not only to the engineer individually and collectively but to the public as a whole.

Section 27. "He will not use the advantages of a salaried position to compete unfairly with another engineer." It is generally accepted that no person can serve two masters. For one engineer occupying a salaried position to compete with another on a basis of a fee is to serve two masters. It is very difficult, if not impossible, for anyone to give his full time to a salaried position and at the same time engage himself on a fee basis which would require a portion of his time. Any owner or client who entertains or engages such a proposal from an engineer holding a salaried position is not helping himself or the engineer in question because the obligations incurred cannot be properly fulfilled. The owner cannot place full trust in the engineer because he is acting in a dual capacity, and the engineer in turn cannot give his full attention to the owner's problems because his salaried position does not allow him to devote full time to same. Ethics are involved because it is a question concerning the conscience of the engineer and whether or not his actions are good or bad in accepting a fee while he is fully employed for a salary.

Section 28. "He will not become associated in responsibility for work with engineers who do not conform to ethical practices."

The only consideration entering into an association with engineers who do not practice on a high plane is that concerning finances. If an engineer is engaged in his profession entirely for what he can make out of it he is not too greatly concerned with whom he is associated as long as he makes money. On the other hand if he is a person of high principles and integrity a decision concerning with whom he will become associated is a very easy one. He either loves money or his profession but in some instances he cannot love both.

In reviewing the canon of ethics for engineers as adopted by the Engineers Council for Professional Development we see that each and every section charges the engineer to perform good acts in his work and by so doing practice his profession in an ethical manner. Since ethics is the science that treats of the goodness or badness of human actions it deals entirely with moral philosophy. Moral philosophy is not confined to engineers alone but concerns every person who possesses a free will. Engineers are held more strictly accountable for their actions because they are better trained than most persons and hence are more responsible for their acts whether they are good or bad. And because of this training, and their ability to act as human beings with free wills, their bad actions cannot be condoned because they know better.

Engineers, judged by their past experience over a number of years, are branded as men of integrity, or as those not in that category. Since the practice of engineering is made up of individuals who are grouped into various branches, the ethics of a particular part of the profession is no better than those who compose that part. The code or canon of ethics of the group, or branch is made by men of the highest integrity, recognized by leaders in the practice of engineering, and hence the codes or canons are set upon a high place. So in the final analysis integrity, which deals with honesty, justice and high sense of moral values, makes the canons of ethics for engineers workable. These men by their good acts resulting from their unselfishness and exercise of their free wills, set the norm for the profession which is so outstanding that others who would side-step cannot afford to do so. For those engineers, who treat everyone fairly and who are men of good will, ethical practice as related to good actions is not difficult. Ethics becomes difficult only when we try to go against the good that is in us and turn to the bad for reasons best known to ourselves.

ENGINEERING ASPECTS OF FREEPORT SULPHUR'S EXPANSION IN LOUISIANA*

Within the past year and a half, Freeport Sulphur Company has been designing and building additional mining facilities for two new sulphur mines located in Southern Louisiana. The development of these two properties and their facilities has brought out some very interesting and unusual engineering problems.

The purpose of this paper is to review briefly developments in the Gulf Coast brimstone industry, and more specifically, to describe the two new projects in the coastal marshes being undertaken by my Company. The first project, which has just about been completed, is at the Bay Ste. Elaine dome near the open Gulf, about 35 miles southeast of Houma, Louisiana. The second project is at the Garden Island Bay dome at the extreme southeastern tip of Louisiana, near the mouth of the river.

The new projects of our company will produce brimstone by the same process Frasch devised 60 years ago. Sulphur deposits on the Gulf Coast occur as crystalline aggregates in the porous limestone and gypsum formations overlying some of the salt domes. These deposits vary in depth from a few hundred feet to 2,500 feet from the surface, and in concentrations varying from 5 to 40 per cent, the thickness of the formation varying from a few feet to several hundred feet. The process consists, essentially, of the injection of superheated water at about 325 degrees F into the sulphur bearing formations, through wells which are drilled from the surface by standard oilfield methods. As the hot water leaves the well bore, it percolates through the formation and transmits its heat to the rock and sulphur. The deposits are usually surrounded by formations impermeable to the flow of hot water, the top sides being enclosed by impermeable sediments and the bottom by dense impermeable anhydrite.

When the water raises the temperature of the sulphur to 240 degrees F, it melts, separates from the rock, and flows through the hot channels downward to the bottom of the well. Here, by gravity separation, sulphur being almost twice as heavy as water, it is freed from the incoming water and from formation water. It then is pumped to the surface by air in a relatively pure state, 99.5 per cent or better.

Both of the new operations of the Company, like the one at Grande Ecaille below New Orleans, are in marshland. In general, the country is low, flat, relatively uninhabited marshes broken by many shallow lakes and bayous. No truly solid sediments exist near the surface, and foundations for all structures of a permanent nature or of substantial size and weight must be supported by piling.

* By Dewitt L. Morris, Assistant to the Chief Engineer, Freeport Sulphur Co. Presented at the regular meeting of the Society, September 8, 1952.

The first engineering aspect in the development of the new dome is the prospecting required to locate and determine the size, depth, and configuration of the caprock area. The growth of geophysical methods of prospecting since 1924 has played an important part in prospecting salt dome structures. All of the Gulf Coast area has been surveyed repeatedly with reflection seismograph and gravity meter surveys. When indications of a favorable structure were found, torsion balance surveys, now replaced by gravity meter, were made to get details. The ultimate check is, of course, by drilling.

Oilfield type drilling equipment is used. In the case of marsh operations, drilling machinery and equipment are mounted on barges identical, except somewhat smaller in size and capacity, to the units which the oil industry uses for marsh drilling work. Freeport has had built during the past year four drilling barges capable of drilling to 3,000 feet at a cost of more than \$250,000 each. Through the use of diamond core bits of large diameters, a recent development, accurate sampling of sulphur formations for reserve estimates is now possible.

The second engineering aspect after it was determined that sulphur was at these locations was a study of the terrain and foundation conditions. A thorough analysis of the sediments was made at both properties. At Bay Ste. Elaine it was found that the surface of the marsh consists of salt grass and decayed vegetable matter at elevations of one to two feet above Mean Gulf Level. The marsh is underlaid by a few feet of humus, 40 feet of very soft clay, medium stiff clay thereafter to a depth of over 100 feet. Only a couple of thin sand streaks and lenses are present, but these have negligible supporting value. These conditions are quite similar to those at Grande Ecaille and the soil analyses indicate about the same supporting values. At Grande Ecaille seventy-five foot piling were required, and they support eight tons per pile, this value being developed in skin friction alone.

Marshes in the Garden Island Bay area are more recent than those at Grande Ecaille and are subject to overflow by fresh water from Mississippi River distributaries. Natural banks at the edges of the distributaries are fairly firm and reach elevations of two to four feet above Mean Gulf level for widths of 50 to 100 feet. The intervening marshes consist of very soft clay at elevations ranging from one foot above to three feet below Mean Gulf Level, covered with cane, grass and water hyacinths. The entire area is underlaid by very soft clay to a depth of 50 feet and soft clay to a depth of 150 feet. Soil analyses indicate that 90-foot wood piling with a rigid foundation cap will subside approximately 14 inches.

An adequate supply of suitable water is a fundamental requisite of the Frasch process. The locations of both of the new plants

brought on additional engineering problems because of the lack of fresh water. The location of the Garden Island Bay mine, which is only three miles above the mouth of one of the distributaries of the river greatly intensified the water supply problem for a fresh water plant.

At Port Sulphur it was found that a 240,000,000-gallon earthen reservoir had to be provided to mitigate the effect of the contamination by sea water invasions upstream along the bottom of the river. During late summer and early fall of nearly every year, the flow in the river is reduced to such an extent that this reverse flow occurs. A study of the flow in the passes near the proposed plant and the salinities revealed that the period of poor quality would be much longer than at Port Sulphur. These predictions left no alternative but to provide a reservoir for approximately six months storage of fresh water if seasonal crippling interferences to the operation of a fresh water plant were to be avoided. The amount of water for mining purposes plus that lost by evaporation, transpiration, and seepage requires a 600-acre reservoir with an available capacity of one billion gallons, or enough to supply the City of New Orleans for ten days.

Construction of suitable reservoir levees with the soft material at the site presents a difficult problem in itself. To construct levees 10 feet high, it is estimated that five lifts of dirt will be required with a period of soil consolidation between each lift. The base of the levee will be about 180 feet in width. Time required for construction will be about 20 months and levee construction costs alone are estimated to be \$250,000.

At the Bay Ste. Elaine mine the only source of fresh water is approximately 35 miles distant. The cost of pipe lines and pumping stations for this distance would be prohibitively high, especially since the deposit is too small to justify a large capital investment. To solve this problem, Freeport Sulphur Company has developed a process in which brackish water or sea water, which surrounds the property, can be heated to mining temperatures. This process I will describe a little later.

The heating plants used in all existing Gulf Coast sulphur mines are almost identical in their flow sheet and vary chiefly in size.

The flow of water through the heating cycle at the Grande Ecaille plant, as it was originally built had a capacity of 2,800,000 gallons per day. It has subsequently been expanded so that the output now averages 6,470,000 gallons per day at 325 degrees F water. The water is first passed down through four heat reclaimers to recover heat from the boiler flue gases which contributes to the high overall plant efficiency which averages 85%. From these it is pumped to the hot process water treating units using all of the exhaust steam from turbine and steam engine drives of the pumps

and air compressors. It then goes through the mine water heaters where the heating to mining temperature is accomplished with the 160# exhaust steam from the 2,000 KW generator and part of the output of the boilers. All power used at the mines is generated in the plants and compressed air for pumping the sulphur wells must also be furnished. All pumps which handle the cold and hot water in the plant are of the centrifugal type and driven by steam turbines.

The flow sheet of the Garden Island Bay plant is similar to that of Grande Ecaille. The plant which is now in the first stages of construction is designed to deliver an average of 2,700,000 gallons of 325 degrees F water per day with an overall plant efficiency approaching 90 per cent. The plant will include three 50,000-gallon per hour hot process water treating units; four waterwall integral furnace type boilers, each having a capacity of 60,000 pounds steam (450 psig) per hour; two 700 KW turbo-generators; three 500 CFM (850 psig) air compressors; four flue gas heat reclaimers; and many turbine-driven centrifugal pumps for handling water. Foundations for this plant will be similar to that of Grande Ecaille, but will cost considerably more per ton of supported load because the supporting power of the sub-soil is even less than that at Grande Ecaille.

The Bay Ste. Elaine deposit has introduced additional problems over those encountered at Grande Ecaille and Garden Island Bay. One of these problems was the small size of the ore body which would not support a large capital investment. This prompted investigation of a portable type of plant that could be moved to other locations if the venture proved unsuccessful or if the life of the property was short. Consequently, the heating plant has been constructed on a large steel barge, and during the next week will be towed over to Bay Ste. Elaine where it is to be sunk into position and connected to the field lines during the following weeks. Present plans call for steaming operations to begin on October 1.

The most serious problem for this barge plant was the lack of a source of fresh water. Fortunately, this problem had been foreseen when it was realized that new brimstone sources would probably be located in tidewater areas, and research extending over the past eight years has been conducted by Freeport. This work led to the development of a new process in which bay water having a salinity as high as 1640 grains salt per gallon (28,000 ppm) will be heated to 325 degrees F for mining purposes instead of piping fresh water from a distant source.

The heating of sea water for mining purposes will represent the first time in history that such a process has been attempted, mainly due to the scaling and corrosive problems ordinarily expected. Freeport's approach to the problem was not the removal of

the elements calcium and magnesium which are responsible for the deposition of scale when the water is heated to high temperatures. Rather it was the development of a process and equipment for heating the water in such a way that decomposition of bicarbonates is prevented. It is hoped that details of the processes which have been developed by Freport will be the subject of a paper at a future date.

Basically, the process to be used at Bay Ste. Elaine consists in heating the sea water under controlled conditions which minimize decomposition of bicarbonate and through proper controls, prevent the deposition of calcium sulphate.

In addition to the deposition of scale, sea water when heated is also highly corrosive and Freeport has developed a process which overcomes excessive corrosion by use of a unique apparatus. The removal of oxygen from sea water substantially reduces its corrosiveness, especially in a hot state. The removal of oxygen is accomplished in an apparatus consisting of a packed tower in which cold sea water flows down and through packing. In the upper part of the bed the water is contacted with flue gases discharged from the boilers and in the lower part of the bed with the products of combustion of natural gas burned directly into the tower.

This apparatus serves several purposes. First, the temperature of the water is raised from about 75 degrees F to 145 degrees F and a large amount of heat reclaimed from the boiler flue gases, thereby maintaining the overall plant efficiency at 85 to 90 per cent. Secondly, the water is raised to 190 degrees F by burning fuel in the base of the tower using theoretical combustion air in a premix burner. This eliminates the heat normally supplied by boiler steam in raising the temperature from 145 degrees F to 190 degrees F. Third, the water is effectively deaerated to less than one-tenth ppm of dissolved oxygen by contacting the water with the inert flue gases in the base of the tower.

Following the heating of the water to 190 degrees F it is raised to 325 degrees F by means of steam in indirect heat exchangers. Some soft sludge accumulates inside the tubes of the heat exchangers and a reduction of heat transfer rate occurs. Restoration of the rate is accomplished by periodic flushing with steam which effectively removes the sludge from the exchangers.

Although the corrosiveness of the water is reduced by deaeration, corrosive resistant alloys are needed in the heat exchangers and small pipe fittings. In larger fittings and pipe lines, cement-lined steel has been found suitable and in well equipment a protective scale can be deposited by small and controlled injections of chemical into the water as it enters the well head.

The new plant and process is not expected to be preferable to the conventional plant where fresh water is available. The initial

plant cost is less, but the operating costs are expected to be greater.

The Bay Ste. Elaine plant is designed to deliver an average of 1,750,000 gallons of 325 degree F water per day, 400 CFM of compressed air (500 psig), a power load of 600 KW and miscellaneous steam for heating sulphur lines and equipment. Five water tube package-type boilers will be provided, each having a capacity of 30,000 pounds steam (400 psig) per hour. The sea water is heated initially in the flue gas heaters to 190 degrees. High pressure centrifugal pumps then force the 190 degree F water through tubular heat exchangers where the latent heat of evaporation of the steam is transferred through the tube walls and into the water. The condensed steam is then re-cycled back to the boiler. In this manner, where distilled water is continuously used in the boilers, a water treating problem is eliminated and fresh water requirements are reduced to only that which leaks from the system. To make up this loss of distilled water, an evaporator will be provided to distill either fresh water barged to the plant site or from sea water. The pressure of the hot water leaving the exchangers will be sufficient to convey it through surface pipe lines and inject it into the sulphur bearing formations. Three flue gas heaters will be provided, each being 10 feet in diameter by 52 feet in height and with two layers of packing.

Specially designed shell and tube heat exchangers will be provided, each having two passes with alloy tubes in each pass. The boilers operate at 400 pounds psig and the steam will be expanded through prime movers, discharging at various back pressures to the exchangers.

The small size of the Bay Ste. Elaine deposit, the unusual terrain, and the urgency of the need for increased sulphur production demanded a new type of drilling and producing operations, compared to land mining as practiced at Grande Ecaille. Land mining, which requires surface filling, is cumbersome. A deposit such as Bay Ste. Elaine, where well life is expected to be short and surface subsidence negligible, adapts itself to a marine form of mining requiring no surface fill. Machinery will be barge-mounted instead of land-based, boats will be used instead of trucks and tractors, canals will replace roads, and all pipe lines will be supported on piling bents.

A similar mining system is planned for Garden Island Bay. At this mine considerable surface subsidence will no doubt occur; but since one of the distributaries of the river crosses the mining area, sedimentation from this distributary can be expected and this sedimentation may be sufficient to replace the surface elevation lost due to subsidence. Although this and other advantages of the marine system of mining may outweigh the disadvantages, the constant exposure to winds, waves and tides may present serious problems.

Since the terrain and foundation conditions are somewhat better at Port Sulphur than at Garden Island Bay and Bay Ste. Elaine, and also since ship loading facilities have already been installed at Port Sulphur, it was decided that this location was the preferable storage and shipping point for all three of these marsh deposits and that sulphur would be barged in liquid form from the outlying deposits.

A new storage area at Port Sulphur has been constructed. A hydraulic fill to an elevation of about eight feet has been placed on an area comprising 80 acres. A study of the soil encountered in shallow bore holes indicated that sulphur bins 30 feet in height could be supported on wood piling 30 to 70 feet in length if driven on four-foot centers. With this load, ultimate subsidence is expected to be two to four feet. The driving of 35,000 piling, started in 1950, was completed during July. These piling will provide two parallel storage sites each measuring 200 feet by 1125 feet and when filled to 30-foot height will provide working storage of about 450,000 tons of sulphur. Cost of the hydraulic fill and pile driving is estimated at more than \$1,000,000, which is a high penalty over land deposits where no such expenditure is necessary. Pile driving has been completed on the bins and some are now in use handling a portion of Grande Ecaille's production, which is barged in liquid form to this site.

The liquid sulphur barges as they arrive at Port Sulphur are emptied into tanks on the sulphur dock. From these tanks the liquid sulphur is pumped through surface lines to a number of small elevated tanks which are located immediately adjacent to the sulphur bins. The elevated tanks when pumped full will quickly and automatically empty themselves through a siphon into the bin where the sulphur distributes itself into a thin layer over the entire bin surface.

Barging of hot liquids in tank cars or barges is not a novel feature, but the transportation of relatively large quantities of a crude, non-metallic mineral in a liquid form is unusual. From Garden Island Bay to Port Sulphur the distance is 45 miles, and from Bay Ste. Elaine 75 miles. For the Garden Island Bay deposit, four barges and three towboats will be required and for the Bay Ste. Elaine deposit two barges and one towboat.

A liquid sulphur barge will be 224 feet long, 39 feet beam, 8 feet 5 inches in depth, and when loaded with 1,000 tons of liquid sulphur will have a draft of 6½ feet. Although equipped with steam coils to prevent freezing of sulphur, no heat will be applied while en route because insulation will prevent excessive heat losses.

Since some of the barges must travel in the open water of the Gulf of Mexico, they all have been designed to meet American Bureau of Shipping specifications for limited coastwise service, and

these specifications are considerably more rigid than those required for inland service. The towboats will be of all steel construction, twin-screw, 80 feet long, 22 feet beam, 6 feet draft and equipped with two 400 HP diesel engines. Communication equipment includes shortwave radio, ship to shore telephones, and radar. Cost of a 1000-ton liquid barge is estimated at \$140,000 and each towboat \$200,000. Total cost of transportation equipment for both Garden Island Bay and Bay Ste. Elaine will approximate \$1,700,000.

We expect that fog, wind, waves, and storms will occasionally interrupt the scheduled transportation of sulphur from these mines, but by having ample standby capacity in liquid barges, some storage will be afforded and this will circumvent the shutdowns of producing wells and curtailment of production when transportation is interrupted.

Despite the fact that by 1951 American brimstone production had increased two and one-half times the prewar period of 1935-1939, there was a critical world sulphur shortage after the outbreak of the Korean war. Sulphur has been allocated both at home and abroad, and consumption has been restricted.

Because sulphur is one of the most widely used of raw materials — essential to the production of paper, fertilizers, chemicals, gasoline, steel, rubber, explosives, and hundreds of other items vital to the economy — the shortage has affected industry and agriculture the world over.

The situation is now changed. Although sulphur consumption is still under government control, the shortage in this country is virtually over and reports from foreign countries indicate a decided improvement there as well. Furthermore, the outlook for the future is extremely encouraging. Very substantial amounts of additional sulphur production are in sight.

Including the two mines I have just discussed, nearly one hundred projects in the United States and throughout the free world are underway, and it is estimated that these projects by the end of this year will add 1,500,000 long tons to the productive capacity, another 1,350,000 tons by the end of 1953, another 250,000 tons by the end of 1954, and still another 900,000 tons by the end of 1955.

The sulphur industry is proud of the achievement. We are confident there is enough new production in sight to dispel the threat of a continuing shortage.

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ENGINEERING BRIEFS

Full-color Photos Now Sent by Wire or Radio. A method of sending full-color pictures over wirephoto or radiophoto circuits has been invented by Harold Carlson, Hartsdale, N. Y., assignor to the Times Facsimile Corp., New York, N. Y.

The invention, covered by patent 2,598,504, permits a full-color photograph to be sent in one transmission, rather than three or four as in previous methods. The new method involves the use of two photoelectric-eye scanners which sweep across the photograph simultaneously. One has a current output which varies jointly with the color being scanned and the density or tone of the color. The other has a current output which varies only as a function of the density or tone of the area being scanned. Then the output currents are amplified, combined, and impressed on modulators to modulate a carrier current as to frequency and amplitude. One modulator represents the instantaneous color of the picture being scanned, the other the instantaneous density or tone independent of color.

The receiving station impresses the received current on a photo-sensitive layer or layers, and the picture is reproduced thousands of miles away. — *Aminco Laboratory News*.

* * *

Warmth of Textiles Evaluated by New Apparatus. A new apparatus for measuring the warmth properties of cotton and other textile fabrics promises to be useful in both commercial applications and research, according to the United States Department of Agriculture.

The apparatus, developed by Dr. G. E. Hilbert, Southern Regional Research Laboratory, New Orleans, La., has certain features which have attracted the attention of other laboratories and of industry as well.

With most conventional methods the warmth value of a fabric is rated by determining the difference in energy required to maintain a warm body at constant temperature in cold air when uncovered and when covered with test material. The new apparatus applies this same principle, but instead of testing in still air, the fabrics are subjected to a stimulated wind along with low temperatures. This combination of wind with low temperatures, which can be adjusted as required, provides a better means of evaluating fabrics under conditions similar to those prevailing in Arctic regions and other cold climates, than is provided by the more usual tests under still-air conditions.

A model of this apparatus is being built and installed by a large merchandiser for use in evaluating the warmth of various textile materials sold to consumers, and several companies have expressed interest in the equipment.

Readers desiring further information should communicate with Dr. Hilbert at the address given above. — *Aminco Laboratory News.*

* * *

Good Breeding. According to a guarded statement from the Atomic Energy Commission, recent experiments show that it may yet be possible to produce more fuel than is burned in the operation of a nuclear reactor. Such "breeding" of nuclear fuel, while not yet proved, has long been considered a theoretical possibility, and its realization would have important implications for both the power-producing and power-consuming industries. Many economic and technical problems remain to be solved, however, before the day when nuclear fuels may supplement conventional energy sources.

In present nuclear reactors, nuclear, or "atomic," energy is released when the nuclei of certain heavy atoms are split into fragments. The total mass of these fission fragments is slightly less than that of the original nucleus, and part of the difference in mass appears as radiated energy and, eventually, heat. The fragmentation also releases neutrons which strike other fissionable nuclei, and a "chain reaction" results.

The only naturally occurring material which is capable of supporting such a continuing chain reaction is one form of uranium, U-235. Neutrons from this "primary fuel," however, can transmute uranium-238 and thorium-232, called "fertile" materials, into the "secondary fuels," plutonium-239 and uranium-233, which do not occur in nature. Once made, these secondary fuels can be used in the nuclear furnace.

While uranium is fairly abundant in the earth's surface, only one part in 140 is the primary fuel, U-235. The splitting of the atoms of U-235 has been used to convert the more abundant U-238 to plutonium for bombs, but the amount of fissionable material produced (plutonium) has always been less than that used, and the primary U-235 was therefore eventually consumed. The successful conclusion of breeding experiments would make it possible to produce, from fertile materials, more fuel than is used. Thus, natural uranium and thorium would become, in effect, additional sources of fuel for the nuclear reactor. One AEC official has recently reported that the potential energy content of known workable sources of uranium substantially exceeds that in the world's reserves of coal and oil.

Power Costs

Most reports issued on the basis of present technology have indicated that the cost of power from nuclear energy would be substantially above that for power derived from conventional fuels. Breeding of nuclear fuel, however, might have a significant effect

on the economics of the process. According to one scheme, the operator of a successful breeder reactor would be able to make enough plutonium to sell to the Government for use in weapons or as a fuel for ship propulsion, to sell power to private industry, and still have enough fuel left over to keep the reaction going. Thus, raw material costs would be low, once the plant got started, since it would consume fuel derived from fertile materials, which are cheap, but which release enormous amounts of energy.

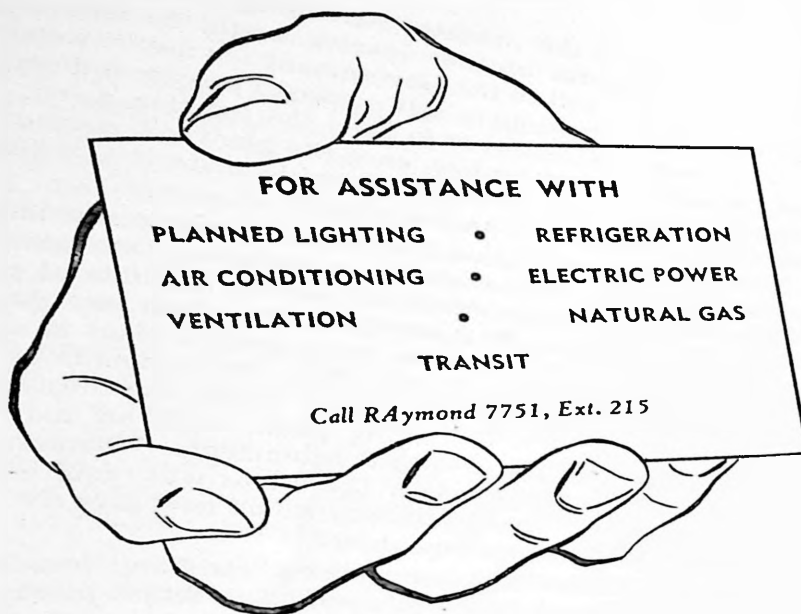
At present, there are several proposals for early construction of specific nuclear power plants under consideration. One possibility is that the AEC, as a consumer of tremendous amounts of power, make some of that power, and plutonium, for its own use. Another plan is that the AEC build a sizable experimental plant to supply power to a Nevada mine which now uses large amounts at high cost. As a third approach, the AEC would finance the construction of a reactor and chemical processing plant, with an industrial company financing the power plant equipment. Whatever the ultimate plan, private nuclear power operations will require careful study and revision of the regulations which now give the AEC monopoly control of fissionable materials.

Although the future of nuclear power is far from clear, some of the controlling factors can be outlined. The initial plant cost, as in a hydroelectric plant, will comprise the largest part of the power cost. The nuclear plant, however, can be located wherever the power is most needed; the fuel is essentially weightless, so its geographical source does not matter. The Government will certainly play a large part in determining when and where to build the plant, who will build it, and how to sell its power. Military requirements force the present concentration on nuclear power plants for propelling military aircraft and vessels. In the future, however, nuclear power plants, breeders of their own fuel, may bring cheaper power, and hence new industries, to areas now hampered by high fuel costs, or to remote locations rich in resources other than fuel.—*Industrial Bulletin of Arthur D. Little.*

* * *

Return of Congress. The possibility that the 82nd Congress would be called back into special session to deal with the inflationary spiral has considerably diminished in the past several weeks. It is now generally believed that enough "cold water" has been thrown on the suggestion to eliminate the likelihood of such action by the President. If a special session is called it will be asked to strengthen the Defense Production Act, primarily from a price control standpoint. The re-opening of the control law could lead, however, to renewed attacks on the provision eliminating salary and wage controls for professional engineers.

—*From Legislative Bulletin, N.S.P.E.*



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Federal Aid to Higher Education. Among the proposals thrown into the hopper in the closing days of Congress and of *considerable potential interest to the engineering profession*, was legislation to authorize a broad and comprehensive program of financial assistance to needy students who are unable to attend college for economic reasons. The legislation was introduced at a late date without any expectation of action by the 82nd Congress, but rather as a basis for study during the summer and fall. The legislation will be re-introduced early in the next Congress.

The engineering interest stems primarily from the fact that under the proposal it is provided that during a period of national emergency at least 60% of the available federal scholarships would be granted to students engaged in fields of study related to the national defense or to defense supporting activities. In view of the fact that the nation may be in a "national emergency" status for some years it may be anticipated that a *considerable portion of the program would be for engineering education*. This probability is supported by a statement of the Federal Security Administration, who declared, at the time the legislation was introduced:

"If we are to insure that our science and our technology, both in the arts of peace and in the techniques of military defense, will continue to lead the world, we must train many more scientists and engineers."

The bill proposes scholarship aid to the "neediest of the ablest" among high school students. It is estimated that 50,000 to 60,000 students each year would be added to the university rolls. The legislation provides scholarships ranging up to \$800 per year per student, in accordance with individual need. The students would be *selected by State Scholarship Commission* for scholarship awards and would be chosen according to standards set up by the state educational authorities, based on ability and economic need. Each student would be free to select any college which will admit him.

In addition to providing direct scholarship aid, the bill proposes a *loan insurance system* whereby students could borrow a maximum of \$600 per year at moderate interest rates. These loans would be repaid by the students over a period of years after graduation. The loans would be made to the students by the colleges and would be insured against loss by the Federal Government.

The legislation specifically provides that it shall not be construed "to authorize . . . any direction, supervision, or control over the curriculum or program of instruction of any educational institution . . ." The cost of such a program is estimated to be \$32,000,000 for each entering class, so that the annual cost after four years would be \$128,000,000. In addition, the principal amount of new

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loans to students covered by insurance would be authorized up to \$10,000,000 in each fiscal year.

The Legislative Committee, with the assistance of the Education Committee, is studying the proposal in detail. (S. 3455, H.R. 8523)

— From Legislative Bulletin, N.S.P.E.

* * *

American Milestone: 1952. As this issue of the "Natural Rubber News" is being prepared, the 1952 presidential election in the United States is only hours away. By the time it reaches most of its readers, the results of this election will be known all over the world. We have been impressed, during an October visit to England, with the active interest at all levels in the outcome.

To everyone, a new Administration brings new hopes or new fears as to the future, depending upon his interests and his point of view. A new President in the White House means new faces in key posts, new policies, and changes which will affect in one way or another nearly every person in the world today.

How will it affect the natural rubber producing industry?

The possibilities are considerable. The new President will find himself the head of the world's largest rubber producing organization — the government-owned synthetic rubber plants. He will be presented with the problem of an Administrative decision as to a recommendation to Congress for their disposal to private hands. The how and when of these recommendations are of obvious vital concern to the natural rubber producers.

Both presidential candidates have already pledged themselves to a more effective program of international relations, without committing themselves on details of policy. One of these "details" will be the attitude of the United States toward the 4-year-old war which the Malaysians have been waging against the Communist terrorists in Southeast Asia. What will the economic, political and military policies of the new Administration mean as far as Malaya is concerned? They can be of life-or-death importance to the natural rubber producing industry which has played such a valiant role in the Malayan anti-Red defense to date.

The answers to these major questions will not, of course, be known on November 5th, nor for many weeks after the January inauguration. They will only gradually emerge in the next few months as the new Administration organizes its new leaders and faces its world problems one by one. — *From Natural Rubber News.*

* * *

Rubber Roads — A Report On A Reality. In 1949 the Natural Rubber Bureau laid the first natural rubber roads in the United

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States, in cooperation with the state highway departments of Virginia, Texas, Ohio and Minnesota, with the status of official state tests. Today, three years later, there are official state or city tests in 19 states and three provinces in Canada. One state, Massachusetts, has more than 350 miles of rubber roads of all types under test. Many cities have liked their first test roads immensely, and several already have reordered others. The natural rubber roads have been laid by the British Rubber Development Board in many parts of Great Britain, in Australia, in Ceylon, in Malaya, in South Africa and in other Empire spots. Test natural rubber roads have been laid by the Rubber Foundation, Delft, Holland, in the Netherlands, in Scandinavia and in many parts of Europe. Test natural rubber roads have been laid by the French Rubber Institute, Paris, in France and in French areas.

Among all the test roads laid by the Natural Rubber Bureau in the past three years, there has been only one failure—in Worthington, Minnesota—and that failure was proved not to be the fault of the rubber additive. There have been many marked successes, notably in Canada and in New England. Test areas on extremely-heavily-travelled roads like the West Side Highway in New York and near the Lincoln Memorial in Washington have stood up remarkably well.

The Natural Rubber Bureau in January, 1952, opened what is probably the best-equipped bituminous road laboratory in the world for the testing of rubber roads. Laboratory tests and road tests seem to offer strong support for the conviction that the highway dollar can be stretched through the addition of natural rubber powder to the regular paving specifications of states and cities throughout the country. The Natural Rubber Bureau is convinced that by adding natural rubber powder the paving surface is given greater elasticity, greater cohesion and considerably stronger resistance to the deteriorating effects of temperature changes. These are all properties a road badly needs. Natural rubber additive also helps the road to absorb traffic vibration and shock. Studies are being made to determine whether the asphalt top surface of a road can be considerably reduced in depth without sacrificing the definite plus values rubber gives to regular specification asphalt surfacing. Studies are being made to determine whether rubber adds a material non-skid quality. To date the laboratory has found convincing evidence that natural rubber additive really improves the life, and reduces the maintenance, of asphalt paving. It has found nothing to indicate that a natural rubber road is a bad investment.

The period from 1949 to 1952 was basically a testing period. Beginning in 1953 there is evidence to indicate a genuine, nation-wide

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interest in rubber paving, and 1953 will be the first year of commercial scale sales. Last month the Natural Rubber Bureau, in response to a test mailing to highway engineers, received more than 500 requests for copies of its booklet "Stretching Highway Dollars with Rubber Roads" and for its new 35-minute 16 mm sound film, produced by Universal Studios in Hollywood, which gives a factual account of laboratory and road tests to date. Last month over 100 detailed specification sheets were filled in and forwarded to the Natural Rubber Bureau from city or state highway officials in 36 states stating their interests in having a test road in their community, and requesting the engineering help and cooperation of the Natural Rubber Bureau laboratory and Natural Rubber Bureau field engineers. News clippings and editorials have appeared boosting the idea of rubber roads in all of the 48 states, and have poured into the Natural Rubber Bureau by the hundreds. Leading technical journals have recognized the development as a major one worth the most careful attention. Rubber roads are the big news in paving for 1953.

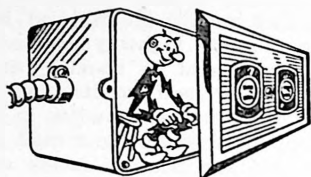
This summer, at the annual meeting of the Public Works Association in Los Angeles, three busloads of highway engineers came out to see a Natural Rubber Bureau test road laid in conjunction with the Convention through the cooperation of the City of Los Angeles. Scores of U. S. engineers stopped at the Natural Rubber Bureau rubber roads booth at the exhibit hall and came to the premiere of the rubber roads motion picture. Over and over again, directors of public works stated that they planned a rubber roads test for their city in 1953.

This development holds the greatest promise for the natural rubber producing areas and for an American highway system just embarking on multi-billion dollar per annum highway construction programs to give America what it so drastically needs — an adequate highway system for the 53,000,000 motor vehicles now clogging an obviously-inadequate road net work.

The big news in rubber in the United States in 1953, the Natural Rubber Bureau forecasts with confidence, is that natural rubber in paving will emerge from test tube and test road to the stage of genuine commercial use. This is a progress report of a development which by 1960 will shock the pessimists. A great deal has been accomplished in the past four years. Next year should see the really-forward stride. — *From Natural Rubber News.*

* * *

Great Britain's Experience With Nationalization. Railroads and certain other transport agencies were nationalized in Great Britain in 1947 with the expectation by those who advocated such policy that resulting economics and efficiencies would place the transporta-



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tion system of that country on a paying basis. That was, indeed, the mandate of the Act of Parliament which set up the nationalized system.

What has occurred in England during the first four years of nationalization? Three railway freight rate increases have been made, the last on January 1, 1952, aggregating 41.3 per cent. This was on top of previous freight rate increases from 1939 to 1947 aggregating 55 per cent. *Consequently, freight rates on British railways are more than twice as high as they were in 1939.* Despite these sharp increases in freight rates, the railroads have suffered *substantial deficits in each of the four years of government operation.* The consensus is that nationalization has been no solution to the British transportation problem.

Despite the problems that confront the American railway and other industries as well, it is evident from the British experience that the American people are better off with privately-owned and privately-operated railroads than the British people are with nationalized railroads.

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At a meeting on the 8th day of September, 1952, the Board of Direction of the Louisiana Engineering Society adopted the following:

**OBITUARY OF
ALBERT BARNETT PATERSON**

With his untimely passing in the City of New Orleans on August 6, 1952, at an age when he was in the prime of his public service, Albert Barnett Paterson — engineer, administrator, executive, banker, civic leader, humanitarian — ended a life of splendid devotion to this community, to his country, and to humanity.

Few men have unselfishly contributed so much to the welfare of New Orleans. The private demands upon his time and energy were severe, but there was a reserve of purpose and intensity upon which he drew in the performance of his many-sided civic activities.

As a member of this Society, to which he gave so much in advice and guidance, we feel a personal and profound sense of loss. But his activities were so extensive and varied that we think of him not as a member of any one organization, but as the first and foremost citizen of this community.

Professional and civic honors rested upon him lightly, for show and pretense, or sham and hypocrisy, had no part in this man. His was the common touch, the love of humanity, and the practice in daily life of deep religious principles.

"Great souls are portions of eternity", and Albert Barnett Paterson is now eternal in the remembrance of his fellow-men.

Respectfully Submitted,

HENRY BOH
LETSER F. ALEXANDER
OLE K. OLSEN
PAUL F. JAHNCKE, *Chairman*

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The Board of Direction of the Louisiana Engineering Society directs that a copy of this memorial be sent to the bereaved members of the family as an expression of the Society's sincerest sympathy.

**OBITUARY OF
GORDON J. McLEAN**

A true member of the engineering profession and member of this Society, Gordon J. McLean, passed away on May 3, 1952, at the age of 51 years.

He was born in New Orleans, May 21, 1901. He received his education in New Orleans, and graduated from Tulane University with B. S. degree in Mechanical and Electrical Engineering.

After graduation he went to work with New Orleans Public Service Inc. as an Operating Mechanical Engineer. After several years of service, he resigned to work for the U. S. Government on engineering projects. In 1936 he was employed by Dupont at Wilmington, Delaware, as a Mechanical and Electrical Engineer and was with them until 1948 when his health failed. He resigned himself to a farmer's life at Kentwood, Louisiana, where he remained until his death.

He was a member of the Louisiana Engineering Society for 29 years, having been accepted into the Society in 1923.

He was married to Margaret Lester of New Orleans and they had one son, Allan.

Those who knew Gordon found him to be a good engineer, a good member and a perfect gentleman.

Therefore, let it be recommended that this obituary be spread upon the minutes of this meeting, and a copy be sent to his wife and family.

Respectfully Submitted,

D. W. STEWART

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MINUTES OF THE MEETINGS AND BUSINESS OF THE SOCIETY

Minutes of Meeting of the Board of Direction Held on Monday, August 11, 1952

The meeting was called to order by President McNiven, with Messrs. Abraham, Duclos, Myers, Seago, Sessums and Fernandez present. Mr. Duclos moved that minutes of the preceding meeting be accepted as read, seconded by Mr. Abraham and carried.

The secretary reported that all candidates for membership listed in the June ballot had been elected to their respective grades.

The semi-annual financial statement of the treasurer was presented, and Mr. Sessums moved that it be accepted, seconded by Mr. Abraham and carried.

The secretary outlined the work of the Annual Meeting Committee and reported that Mr. John Taylor was unable to accept the chairmanship of the Plant Inspection Committee, whereupon President McNiven appointed Mr. Benton P. Babin to chair the committee as recommended by the Board.

The Board approved a plan submitted by Mr. C. G. Melville, chairman, Technical Papers Committee, to have only four papers presented at the annual meeting. These are to be of general interest to all engineers and participating societies would be invited to attend all of the sessions.

A report prepared by Mr. Henri Molaison on registration among L.E.S. members was read, in which it was pointed out that the Society's roster of June 1952 showed 1,374 members of all classes except students. Of these, the number known to be registered as professional engineers in any state (but not including registered surveyors was 836 or 60.8%.

Mr. Myers moved that Stayton L. Perry of Alexandria be reinstated to his former status of affiliate member, seconded by Mr. Duclos and carried.

Mr. Duclos moved that the resignation of John H. Bateman of Baton Rouge be accepted with regret, seconded by Mr. Sessums and carried.

Discussion took place concerning the Committee on Honors and Awards, and Mr. Abraham moved that the following members constitute the committee for the current year, seconded by Mr. Myers and carried: J. H. Collins, Sr., Chairman; Henry Boh, Dr. A. R. Choppin, Bernard M. Dornblatt, J. E. Jarman, Eugene Levy, James P. McCullough, E. A. McLellan, Ernest L. Mire, W. O. Turner, Calvin T. Watts.

President McNiven appointed Mr. K. P. Kammer chairman of a committee of his own choice to prepare an obituary of the late Gordon J. McLean. He also appointed Mr. Paul F. Jahneke, Chairman, and Messrs. Henry Boh, Lester F. Alexander and Ole K. Olsen to prepare a similar memorial honoring the late Albert B. Paterson.

Correspondence received from former presidents Harry P. Newton and Leo J. Lassalle was read.

The secretary was instructed to answer a letter received from the American Association of Small Business concerning the city charter.

The secretary read correspondence from Messrs. B. M. Dornblatt and Craig P. Hazelet, Co-chairmen of A.I.A.-A.S.C.E. Cooperative Committee, concerning the ruling by the City Division of Regulatory Inspection.

Also read before the meeting was correspondence concerning the amendment to the City Building Code, and the Code of Ethics devised by the Engineers Council for Professional Development.

There being no further business, the meeting adjourned.

JOHN P. FERNANDEZ, Secretary-Treasurer

Minutes of Regular Meeting of the Society Held Jointly with the Louisiana Section, A.S.C.E., Monday, August 11, 1952 Jackson Room, St. Charles Hotel

The meeting was called to order by President McNiven with approximately 100 in attendance. The president welcomed members and guests of A.S.C.E. Reading of minutes of the preceding meeting was dispensed with. However, the secretary read minutes of meeting of the Board of Direction held on June 30.

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Mr. Abraham then read a memorial in honor of the late Victor L. Willoz, following which a moment of silence was observed in memory of the deceased. Mr. James M. Todd moved that the motion contained in the obituary of Mr. Willoz be adopted, seconded by Mr. Tom Alexander and carried.

President McNiven then announced that nominations for recipients of the Society's award medals were now being received and that same should be forwarded to the secretary.

Mr. Todd announced that the Pan American Federation of Engineering Societies (UPADI) would hold its second congress in New Orleans August 25-29 and in the following week the A.S.C.E. would hold its centennial in Chicago.

The chair then was relinquished to Mr. F. W. Macdonald, President, American Society of Civil Engineers. After their business was conducted, Mr. John C. Bartley introduced the main speaker of the evening, Mr. Alvin M. Fromherz, senior partner of the consulting firm of Fromherz Engineers, who spoke on "Ethics and Engineers".

Following the usual question period, the chair was returned to Mr. McNiven 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 Held on September 8, 1952

The meeting was called to order by President McNiven, with Messrs. Abraham, Duclos, Macdonald, Myers, Molaison, Seago, Sessums and Fernandez present. Messrs. H. L. Landry and John F. Vogt also were present by invitation. Mr. Abraham moved that the minutes of the preceding meeting be accepted as read, seconded by Mr. Sessums and carried.

The treasurer presented the auditor's report for 1951, which was accepted, and was authorized to pay the bill for same amounting to \$140.00.

A letter from Dean Lee H. Johnson recommending that Mr. Donald H. Korn, a graduate of Fortier High School, be awarded the L.E.S. scholarship at Tulane University for the 1952-53 school year. Mr. Sessums moved that Dean Johnson's recommendation be approved, seconded by Mr. Molaison and carried.

Mr. Sessums moved that the matter of considering scholarships for all four engineering schools in the state be referred to the Committee on Honors and Awards. Motion was seconded by Mr. Duclos and carried.

A memorial resolution honoring the late Albert B. Paterson, prepared by Messrs. Paul F. Jahncke, Lester F. Alexander, Henry Boh and Ole K. Olsen, was read. Mr. Abraham moved that the resolution be adopted and read at the Society's October meeting. Motion seconded by Mr. Molaison and carried.

Discussion followed concerning the Vocational Guidance Committee, and Mr. Duclos moved that Mr. Lionel J. Cucullu be reappointed chairman of the committee, seconded by Mr. Macdonald and carried.

Mr. Duclos moved that Mr. Louis M. Buja be reinstated to the grade of member, seconded by Mr. Abraham and carried.

Mr. Sessums moved that the resignation of Mr. J. D. Wyman be accepted with regret, seconded by Mr. Molaison and carried.

Mr. Molaison moved that the cost of refreshments at the Annual Meeting Coffee Party be shared equally with the Woman's Auxillary, seconded by Mr. Duclos and carried.

Mr. Abraham outlined a plan for a new type of technical paper program for 1953, copy of which is attached to these minutes. Mr. Duclos moved that the plan be approved in principle and that Mr. Vogt, Technical Paper Program Chairman, be authorized to proceed with the first of these programs as soon as practicable. Motion seconded by Mr. Seago and carried.

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Discussion followed as to whether to submit to the Governor names of candidates for the vacancy on the Louisiana State Board of Registration for Professional Engineers and Land Surveyors; it was decided to take action on this matter at the next meeting.

It was announced that the Nominating Committee would be appointed at the next meeting.

There being no further business, the meeting adjourned.

JOHN P. FERNANDEZ, Secretary-Treasurer

Minutes of Regular Meeting of the Society Held on September 8, 1952

The meeting was called to order by President McNiven in the Jackson Room, St. Charles Hotel, with approximately 125 members and guests present. The secretary read minutes of both regular society meeting and board meeting of August.

Mr. Abraham read an obituary honoring the late Gordon J. McLean, following which a moment of silence was observed in memory of the deceased.

There being no other business, Mr. Waldemar S. Nelson was called upon to introduce the main speaker of the evening, Mr. Dewitt L. Morris, Assistant to the Chief Engineer, Freeport Sulphur Company, who gave a most interesting talk on "Engineering Aspects of Freeport Sulphur's Expansion in Louisiana".

Following the usual question period, the meeting adjourned with a rising vote of thanks to the speaker.

JOHN P. FERNANDEZ, Secretary-Treasurer

Minutes of Meeting of the Shreveport Section of the Louisiana Engineering Society Held September 2, 1952

The meeting which was held in the Hostess Room of the Continental Baking Company was called to order by President Roeger at 7:30 p.m.

The minutes of the meeting held June 3, 1952, were read by the Secretary. There being no discussion or corrections, the minutes were approved as read. The Secretary then read a letter from Mr. John P. Fernandez, Secretary-Treasurer of Louisiana Engineering Society, thanking the club for the work done on the Vocational Guidance Program. President Roeger was our representative on this committee.

It was suggested that as soon as the weather became a little cooler, we have a special meeting and barbecue at the Caddo Parish Club. The President appointed a committee to work out the details for this meeting. The committee consists of H. C. Gillen, J. H. Ellis, and A. A. Lyons, with Mr. Gillen as Chairman. The members of the club will be advised as to the date as soon as all of the arrangements have been made.

Mr. A. A. Lyons, Chairman of the Membership Committee, made a brief statement regarding his efforts to secure new members and asked the co-operation of all in getting application blanks to any friends who might be interested in joining the Louisiana Engineering Society.

Mr. Carl Hadra, F. W. Grant, and Gordon Marsalis were appointed as a committee to nominate the club officers for 1953. Mr. Hedra is Chairman of this committee.

There being no further business, the meeting was turned over to Gordon Marsalis, acting program chairman. Mr. Marsalis introduced Mr. R. B. Reiley of the American Institute of Steel Construction, who was to present the program. In his talk, Mr. Reily told of the many uses of Structural Steel and gave some information on the background of the film which was to be shown. The film showed the construction of the United Nations Building and was enjoyed by all.

Light refreshments of coffee and cup cakes were served for this meeting.

W. W. ALSUP, Secretary-Treasurer

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**Minutes of Meeting of the Alexandria Section, Louisiana Engineering Society
October 23, 1952**

The first fall meeting of the Alexandria Section, Louisiana Engineering Society was held at 7:30 p.m. at Herby K's Oyster House with 19 members and guests in attendance. Mr. Hu Myers, President, presided, called the meeting to order, welcomed the guests, and had each one in attendance rise and introduce himself.

Mr. Myers then stated that a plan for a State-Wide Radio Hook-up was being proposed by the Parent Organization. He called on Mr. O. E. Barron to explain the details of the plan. A general outline of the circuit layout was explained. However, very little information was available as to the cost of such a program. Mr. Myers then requested Mr. Barron to go into the matter of cost and report at the next meeting.

Mr. Myers stated that it would be necessary to elect new officers for 1953, and appointed Mr. Soule Butler, Chairman, Mr. Tom C. David, Mr. Daniel V. Cresap, and Mr. O. D. White as a Nominating Committee, and instructed them to report their nominees at the meeting to be held in November. He informed the committee that it was necessary to have nominations for President, Vice-President, and Secretary-Treasurer.

The meeting was then adjourned for supper.

After the supper, the meeting was again called to order by Mr. Myers and he requested Mr. Tom David to introduce the speaker of the evening. Mr. David then introduced Mr. L. M. Odom, Consulting Engineer of Baton Rouge, Louisiana, outlining Mr. Odom's wide and very varied experience in engineering and his many far-reaching accomplishments in his leadership in the engineering field.

Mr. Odom then made a talk on the "Advancement of the Engineering Profession" bringing out worth-while points as to methods that could and should be followed in increasing the prestige of the engineering profession. Mr. Odom's interesting talk was followed very attentively by his audience and after its completion, he was congratulated by each one present.

Mr. Myers thanked Mr. Odom for his talk and then stated that plans for the November meeting had not been completed, but that cards would be mailed to all members informing them of the plan when it was possible to do so.

Motion was then made that the meeting be adjourned which was duly seconded.

O. E. BARRON, Secretary-Treasurer

**Minutes of Meeting of the Lafayette Section of the Louisiana Engineering
Society Held in October, 1952**

The October meeting was called to order by the President, Allen Bonnet. New members and prospective members were presented to the group.

The Secretary then read the minutes of the last meeting and gave a financial report.

New business was then taken up under which new committees were named. The following are the committees and their respective members:

Membership—L. C. Larry, Chairman; R. T. Brooks, Bob Harrison, M. Moses, Wm. J. Johnson, Frank B. Sonnier, C. D. Brown.

Programs—J. R. Gaugler, Chairman; Bob Hetherwick, A. B. Bell, C. J. Russell, Andre Dubus, H. R. Mason.

Vocational Guidance—Felix J. Boudreaux, Chairman; R. J. Cambre, F. J. Zurburg.

Mr. Hiram Mason then gave a report on the A.I.E.E. meeting in New Orleans, which he had attended.

The president then reported on the proposed statewide long-distance telephone hook-up which will probably take place in February, where all chapters would be on the hook-up.

Mr. Jarman then discussed the need to encourage more attendance to the meetings.

The meeting was then adjourned.

EMERY DOMINGUE, Secretary-Treasurer

PROCEEDINGS OF THE LOUISIANA ENGINEERING SOCIETY

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