DAVID W. STEWART

PROCEEDINGS
OF THE
LOUISIANA ENGINEERING SOCIETY

VOL. XXVII. FEBRUARY, 1941 NO. 1

CONTENTS

EDITORIAL NOTES AND COMMENT

Our New President. Opposite this page is a picture of our new president, David W. Stewart. A little further on is printed a brief biographical sketch—but that is only half the story.

The sketch does not tell the reader of "Dave's" friendly disposition, his deep interest in people, his affection for his friends. Fortunate are those of our membership who know him—those who have not met him have that to look forward to. He's a grand man for a big job!

David Whyte Stewart was born on Friday, December 13, 1889, in Kirkcalde, Scotland.

He graduated from high school, attended evening school, and served as an apprentice in technical mechanical work.

Coming to America in 1910, he did construction work for the General Electric Company for 6 years. Then he took a position with the Jacksonville Municipal Power and Lighting Company in Florida; is presently chief engineer of Market Street Steam Generating Station of New Orleans Public Service Inc.

He is a past chairman, Local Section, American Society of Mechanical Engineers; has served on the board of the Louisiana Engineering Society and other varied activities; chairman of the Advisory Board of the Girl Scouts; City Commissioner for Boy Scouts; Chairman, Under-Privileged Children's Committee of the Kiwanis Club; Member of the Association of Commerce, Young Men's Business Club, and the Electrical Association.

Our Annual Meeting. The few lines printed here will be inadequate to picture completely the Annual Meeting held on January 10 and 11. Attendance at all sessions, including the banquet, was excellent. All arrangements for registration, technical papers, trips and dinner-dance went smoothly, due to the untiring efforts of the committees in charge. Our General Chairman, Mr. Karl P. Kammer, deserves much credit and praise.

The Woman's Auxiliary contributed much to the Friday night meeting by serving coffee after the address at Dixon Hall. They also provided an attractive luncheon for visiting wives.

Elsewhere is a more detailed account of the dinner-dance.

Professional Engineering in Canada. The Dominion Council of Professional Engineers at 350 Bay St. Toronto, Canada, have furnished us with the following information:

" . . . the Profession of Engineering is regulated under Provincial Statutes in all the Provinces in Canada with the exception of Prince Edward Island, and that it is necessary that foreign engineers obtain a license from the respective Provincial Association before commencing or contracting for any engineering services in Canada."

Annual Meeting Dinner-Dance. What the Rex ball is to Carnival season among New Orleanians, the Society's Banquet and dance is to the Annual Meeting among our Engineers. This year's dinner-dance was a highly festive climax to a most interesting and informative two-days of technical sessions.

Under the genial guidance of the toastmaster, Arthur J. Naquin, member of the Society and President of the Young Men's Business Club, the banquet moved smoothly. From the initial cocktails, to the concluding cups of coffee there was plenty of laughter, enjoyment and animated conversation. David W. Stewart, incoming president, made a splendid speech, ably cheered from the side-tables by those perennial and ever-popular "assistants," Allen Hackett and Ole K. Olsen.

Mr. Eugene W. O'Brien, Vice-President of W. R. C. Smith Publishing Company, spoke on the Engineering profession. He performed nobly under the great handicap of a very sore throat.

Announcements of the usual awards and scholarship recipients met enthusiastic applause. Retiring president William H. Rhodes received a handsome silver tray in appreciation of his activities, while the retiring secretary, Arthur M. Hill, who, since 1935 has served the Society, was very nearly "floored" by the surprise presentation of another beautiful tray for him, also.

After dinner the crowd danced until a late hour, many of the guests wearing the very colorful and tricky hats which were favors at the banquet, and which, incidentally, were very becoming to many of the ladies.

Our members welcome the following newcomers elected on the last ballot:

Blain, Hugh M., Jr. Member. Age 35. Endorsed: F. P. Hamilton, K. P. Kammer, C. L. Nairne. N. O. Public Service, Gas Chemist 1926-28. Gas Engineer 1928-34. Supt. Gas Plant and Production 1934-date. Address: 431 So. Robertson St., New Orleans.

Ellis, Sydney, Jr. Junior Member. Age 25. Endorsed: D. W. Stewart, F. G. Frost, K. P. Kammer. B. S. in Chemical Engineering L. S. U. 1939. Fifteen months student engineer, N. O. P. Service. Address. 2030 Chestnut St., New Orleans.

Fischer, Frank P. Member. Age 36. Endorsed: D. W. Stewart, R. M. Seago, K. P. Kammer. Graduate of Washington & Lee Univ. B. S. in Electrical Engineering. Four years Market Street Station N. O. P. S. I., 4 years Industrial Relation, 4 years Gas Engineering Dept., 4 years Industrial Equipment Sales, all with N. O. P. S. I. Address: 1820 Audubon Street, New Orleans.

Fithian, Eugene L. Affiliate Member. Age 40. Endorsed: J. J. Bulliung, A. L. Dunlap, Walter Moses. Employed by Eugene Dietzgen Co. for 25 years, now manager of the New Orleans Office. Address: 318 Camp Street, New Orleans.

Gerster, Jack Alan. Junior Member. Age 21. Endorsed: C. S. Williamson, F. M. Taylor, J. M. Robert. 1939 B. E. in Ch. E. Ohio State. August, 1940, M. S. in Ch. E. Ohio State. September, 1940, to date, Instructor, Chemical Engineering, Tulane.

Riess, Frank. Junior Member. Age 24. Endorsed: W. P. Oster, K. P. Kammer, B. H. Grehan. Grad. College of Engineering, Tulane Univ. 1936. Employed by Magnolia Pet. Co. as member of geophysical crew. Employed by Geo. J. Glover Co. as estimator, field supervisor, designing engineer for air conditioning, ventilation and miscellaneous mechanical equipment work. Address: 4320 Pitt Street, New Orleans.

Tobin, John Paul. Junior Member. Age 26. Endorsed: D. W. Stewart, C. L. Nairne, C. G. Cappel. Grad. Mech. Engineering Tulane Univ. 1939. Employed by N. O. Pub. Serv.

since June, 1939. Student training in the following departments for 15 months: Railway, Gas, Elec. dist. and power. Now permanently located in the gas department. Address: 4909½ Carondelet Street, New Orleans.

Student members joining in October, 1940: R. T. Bassnett, Henry J. Bultman, Jr., J. S. Burwell, T. W. Dietze, Stanley C. Dinkel, J. T. Rabinovitz, D. Scherer, W. A. Wood, Jr.

In This Issue. Our Past President, Mr. Frank G. Frost, has an excellent and timely paper on Electric Power and Defense.

A report by Retiring President Rhodes appears in this issue in which he reviews the high lights of events during his administration. Read it; you may be surprised how active your Society has been.

At the back of each February issue occurs the membership list. This makes the first number in the volume particularly valuable.

The Standing Committees are now under the sponsorship of various Board Members.

A new committee in connection with defense has been added.

PAPERS AND DISCUSSIONS

THE ELECTRIC GRID SYSTEM IN THE UNITED STATES ITS ABILITY TO SERVE IN NATIONAL DEFENSE

By

FRANK G. FROST *

Read Before Louisiana Engineering Society January 11, 1941, New Orleans, La.

Today the attention of every clear thinking person in this country is focused on war-torn Europe, questioning whether our nation will eventually be forced into the conflict, what will the outcome be if we must take part, and what should be done now in preparation for defense. Complete preparedness involves the expenditure of huge sums of money, the construction of many new manufacturing plants, the expansion of many of those now existing, the creation of large numbers of skilled workers and technologists to operate these plants, and the correlation of large quantities of raw materials and manufactured products into the finished article suitable for defense needs.

We are kept in constant touch with the progress of these defense measures by our daily newspapers, and our weekly and monthly periodicals. We are informed that this defense movement is progressing at a slower rate than originally anticipated. We read of bottlenecks in the aviation industry and in the machine tool industry, of the lack of certain stategic raw materials and manufactured chemicals. We engineers, better than anyone else, realize that it takes time to construct plants, install equipment, and provide assembly lines to produce war goods in a continuous and orderly procession.

But what of "electric power," which we have come to know today as the backbone of all industry; what of the

* Member of the Society.

great industry which produces this power? Is it ready and prepared to serve these industries which depend upon it so heavily? If so, how has this state of preparadness been brought about? Because of the many conflicting statements which appear from time to time, it becomes the duty and the responsibility of each industry to acquaint the public with the facts regarding that industry. In this way only can be be assured that the proper attention, effort and funds will be concentrated towards building up those industries which must be built up quickly, and much misguided effort and waste of time and money will be eliminated.

My talk today will deal entirely with the electric grid system in the United States, a system composed of thousands of generating stations and thousands of miles of transmission lines, which extend throughout the length and breadth of this land. The subject matter of this talk is not new. Therefore, what I will have to say is not original.

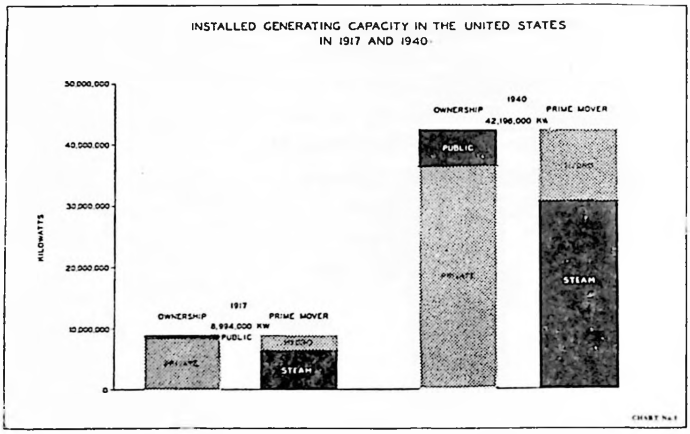
It is the purpose of this paper to show by actual data presented graphically, that the privately owned electrical industry with its enormous generating capacity and its high tension grid transmission system is amply prepared and ready to serve any demands that may be made upon it by the National Defense Program; to show that these demands can be superimposed on existing loads without any confusion resulting; and also to show that it is capable of transmitting this energy produced to all parts of the nation, so that decentralization of industry may be more fully realized.

The electrical industry is now sixty years old. In perfecting, developing, and expanding this industry, fourteen billions of dollars have been spent representing the investment of several millions of our private citizens. It serves some thirty million customers, and this number is increasing yearly. It is a great industry and serves a great purpose in a great nation.

To those responsible for its development, credit must be given for this condition of preparedness. They have consistently held that large reserves of capacity are necessary to meet anticipated demands and unforeseen emergencies, often

at considerable cost to the operating companies. They have constantly argued that steam and hydro developments can function best when these systems are fully coordinated. They have foreseen the possibility of high voltage transmission releasing large units of capacity for joint use by a number of systems. In closely following this creed, they have placed the electric industry far ahead of any other, when defense needs are considered.

I have used the term "Privately Owned Industry." By this term I refer to that part of the industry created entirely by private initiative, and financed solely through private



capital ,thereby differentiating between this and public ownership, which may be either "Municipal" or "Federal." Municipal ownership involves, as its name implies, operation by a muniicpality, built and financed by tax money, or by loans or outright grants of Federal funds. Federal or government ownership represents that part of the industry operated by the government and either built with tax funds or purchased from the private industry by the same means. In order to understand the part contributed by each to the industry's development, some of its history must be reproduced.

Let us consider the industry first from the standpoint of generating capacity. Chart No. 1 shows that at the end of

1940 a total of over 42 million kilowatts of capacity was available for immediate use in this country. In 1917, the period of the last world war, there were less than 9 million kilowatts available. The present day total comprises more energy than can be produced by England, Germany, and France combined. Our present day reserves or unused capacity is nearly twice as great as the total installed capacity back in 1917.

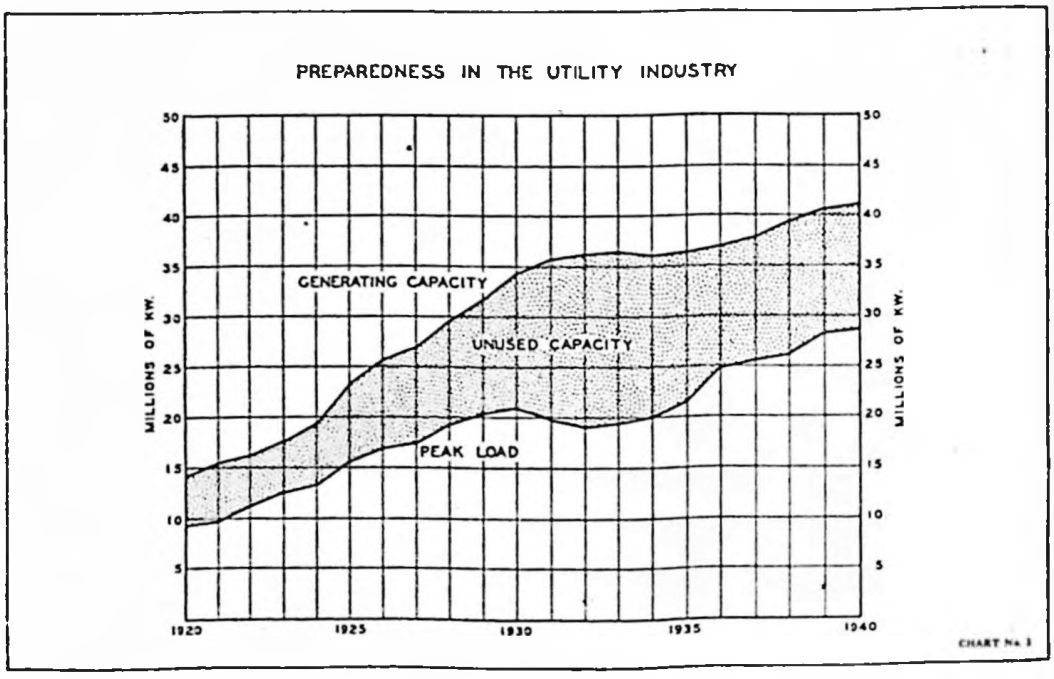
Is this sufficient to meet the needs of industry? If not, by the end of 1941 there will be an additional 2,300,000 kilowatts of capacity ready to produce energy, and this increase was planned, construction contracts let, and orders for equipment and material placed long before the defense program was started, so that much progress has already been made. This contribution, with negligible exceptions, has been provided by the private utilities, and financed by private capital without government aid.

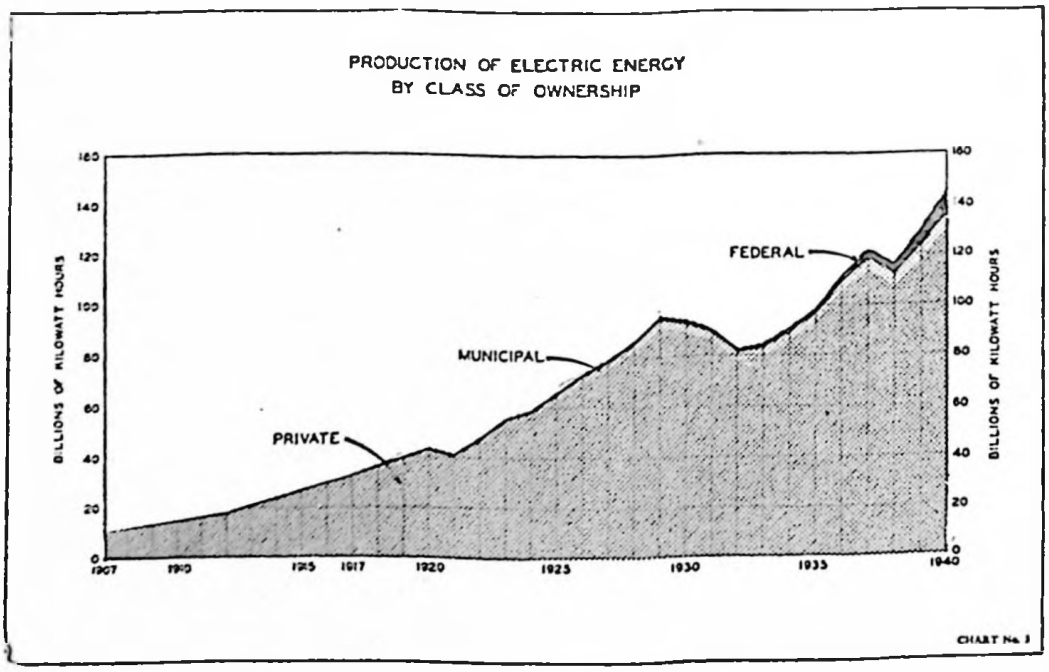
Again referring to Chart No. 1, we find that in 1917 private industry, shown in gray, owned and operated about 90% of the total installed capacity. What has happened in the intervening years? We know that the Federal government has vested huge sums in the development of the T. V. A. and other hydro properties in the far west, and has made numerous loans and outright grants to many municipalities for the same purpose. In spite of this, we find that in 1940 the private industry is still responsible for approximately 90% of the total installed capacity, and that steam capacity has increased at a proportionately faster rate than hydro, a fact also brought out by this chart.

On Chart No. 2, the upper curve shows the strength of total installed capacity by years for the last two decades. Its trend has been steadily upward at a fairly uniform rate, notwithstanding the depression years, and the concentrated attack against the private industry by governmental agencies which developed as early as 1933. The lower curve in this graph represents the peak load or demand for current by the nation during the same twenty year period. This peak load

as shown, however, is not the coincidental or simultaneous peak, so that the unused or reserve capacity shown by the shaded area between the two curves is actually considerably greater than that indicated.

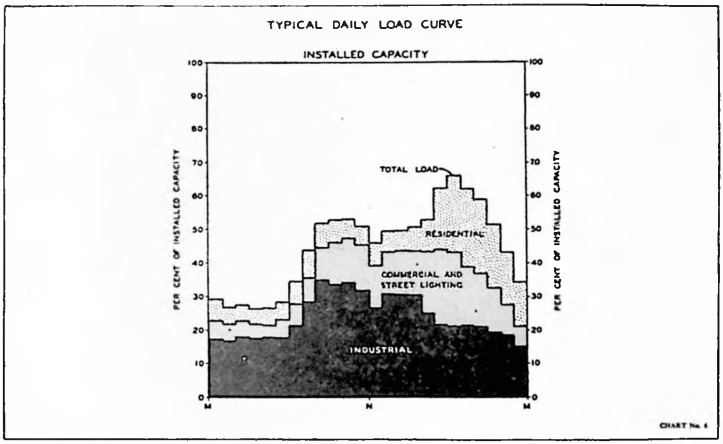
Chart No. 3 shows what the generating capacity reflected in the previous chart produces in the way of energy, namely kilowatt hours. The pink represents the private industry, the





gray the output of municipal plants, and the red the output of Federal plants. Again the contribution of the private owned utilities is approximately 90%; and the other two, Municipal and Federal, are about 5% each. This chart is also interesting in showing the remarkable growth of the electrical industry in the past one-third of a century .

You will recall from Chart No. 2 that about 14,000,000 kilowatts of reserve capacity existed in 1940, over and above the non-simultaneous peak. That there exists considerable



more reserve than this can easily be seen by examining Chart No. 4. This chart represents the daily load curve on a peak load day of one particular system in this country. Nearly every utility system in the country will have a daily load curve somewhat similar to this one. Here we find that the peak load is 65% of the total installed capacity. The colored area, or the load area, however, is only 45% of the total area, so that on a kilowatt-hour basis only 45% of the theoretically possible energy output was actually being used.

Now, in addressing this group of engineers, it is not my intention to convey the idea that all of this reserve or unused capacity can be applied to industry. Some of it must be re-

tained for emergency reserve. If no interconnection existed, all of it would have to be retained for emergency reserve. And here we have stated one of the most important functions of transmission interconnection. When a number of electric systems are closely tied together by means of high voltage transmission, and one of these systems encounters trouble or experiences excessive demands, power can be drawn in from another system to tide things over during the emergency. If such interconnection does exist, it brings out the possibility of tapping tremendous sources of unused energy, by rearranging the load curve shown here by agreement with our customers, so that more energy can be produced from the same installed capacity. If such interconnection does exist, it can be quickly and readily extended, and insures a large quantity of reserve over peak requirements ready to serve the defense industries, and means that these industries can be located anywhere regardless of the source from which this energy is produced, so that when you come to analyze this situation more closely you find that there is no possibility of a power shortage in this country.

In the remaining portion of this paper, it will be my purpose to show that there does exist in this country a large high tension grid transmission system, and to show just what portion of the industry, private or public, has caused it to exist. The series of maps which will follow will portray its development from the early days when the first high voltage lines were built to the present time.

Map No. 5 shows the transmission lines of 60,000 volts and over in 1908. If we went to lower voltage, there would be shown a few more lines. But this was the high tension system at that time, and as you can see there wasn't much to it. With the exception of a little around Niagara, and some in Montana, Washington and California, there were no such lines.

Map No. 6 shows the corresponding situation in 1918. There is really an impressive increase in the number of lines brought about through ten years of development. They are pretty nearly all over the United States in one part or an-

other, but are still relatively few and far between in this year, which saw the close of the last World War.

Map No. 7 shows the situation in 1928. This shows how tremendously this interconnected grid system has grown during the past ten years which elapsed since the end of the war in 1918.

Map No. 8 shows the interconnected system in 1933, and again there are further increases in the number of lines and the extent of their distribution over the nation.

You will note that we have changed from a ten-year interval to a five-year interval in comparing this map with No. 7. The reason for this change is that 1933 was a very fateful year in the history of the public utility industry. This will be seen presently as we come to later maps, but in passing, your attention is called to the fact that the system you see here was almost completely privately owned. More than that, all these lines were almost entirely the product of holding company activities.

Map No. 9 shows the tension grid system of 1940. Here is the interconnected system of today, including Federal lines, Municipal lines, and privately owned lines. It shows that electric service is available throughout the length and breadth of the country, except perhaps in the great American desert an dthe tops of mountains. Even in Montana, the third largest state in the Union, with a population of less than 560,000 or slightly more than the City of New Orleans, transmission lines extend over a large part of the state.

On this map there are about 83,000 circuit miles of high tension lines of 60,000 volts and over. If lines down to 11,000 volts were included, the total circuit miles becomes 300,000, or more than twelve times around the earth at the equator.

Let us look at one of these maps that include some of the lower voltage lines. Here Map No. 10 includes lines down to 22,000 volts, and from this map we can begin to appreciate what the great American Grid System really means.

This series of maps that have been shown, have reproduced the development of this grid system. It has been stated that in 1933 it was nearly all privately created and privately

owned, and in 1940 most of it, in fact 90% of it, was privately owned.

Another series of maps would show that private capital, private initiative, and private management have made electricity universally available and that the sole vehicle for the accomplishment of this great task has been the public holding company.

What have the non-holding companies done? We can find only one company, in Connecticut, in the entire United States, that has done anything. Why have the non-holding companies failed to contribute to this interconnected grid system? To understand this we must consider the economic fundamentals involved. In the case of the non-holding company, there is no unity of ownership, no common bond company, there is no unity of ownership, no common bond between it and other companies, and therefore, no particular interest except in the territory which it primarily serves.

Certainly we would suppose that the municipalities have done something for the interconnecting grid. What have they done? In 1933, the year that I said was important to the public utilities of the United States, here is what they have done—a few lines around Seattle; a few around Los Angeles; and not another municipal line in the United States.

Since 1933 we have had the Public Works Administration with its loans and grants for municipal electric systems. Hasn't that changed the situation with regard to municipal interconnection? We must say it has not. A map depicting municipal high tension lines in 1940, would show that there is not a line outside of California and Washington except the small portion that goes across into Nevada to connect to the Boulder Dam plant. There are 1800 municipal electric systems in this country today, and their contribution to the universality of electric service is limited as noted above.

Why have the municipalities contributed so little? Here again there is no unity of ownership; perhaps their local powers do not permit them to do so, or perhaps local prejudices and jealousies destroy any attempt at coordination.

What has the Federal Government done? No high tension lines were financed by the United States of America in 1933 as any part of the total of 68,000 circuit miles then available for the distribution of electric energy throughout this nation.

What has been done by Federal money since 1933? A map will show the scarcity of Federally financed transmission lines, and their locations. In general they are divided into seven separate non-interconnected systems located between the Tennessee Valley and the Pacific Coast, with no lines at all in the highly concentrated manufacturing areas of the east and middle west.

At this point, let us leave the national system and consider our own electric system here in New Orleans. In order to thoroughly understand the extent of interconnection through our Market Street Station, we can say that at times the frequency of our system is controlled from Jordan or Martin Dams, which are located a short distance outside of Birmingham. This is accomplished through interconnection from Birmingham through the T. V. A. properties over into Arkansas, Mississippi and down to New Orleans. At other times frequencies are carried in Philo Generating Station, which is located in Central Ohio, or the Windsor Station located in West Virginia in the vicinity of Pittsburgh.

I believe most of you men know that when a number of generating stations are tied together, one of these stations is designated to carry frequency, which regulates the time of all electric clocks on the system, and all the other stations merely follow the frequency of that station so designated.

The relationship of electric power to industry and to our social and economic life generally is something like the life blood in the human body. The blood is small in point of volume but it is the one essential factor in life and health. So with electricity, which has become the life blood of modern society. The New Dealers are right when they say it is the most important factor in the more abundant life.

The question is who has provided it, who is providing it now, and who is able to continue to provide it. The chart and maps which have been shown show that 90% of this

vital energy is generated and transmitted by the privately owned and privately financed integrated and interconnected electric systems.

The privately owned electrical industry has the trained forces to operate transmission and distribution systems and generating plants, the trained personnel to direct these operations and the technical staff to handle the most complicated engineering details. It has the capacity to serve the requirements of the National Defense Program, and the financial strength to keep going and provide for future enlargements and system growth, but requires a friendly government attitude to encourage the continued flow of private capital necessary for such enlargement.

These facts are presented since from time to time we see in the press requests for congressional appropriations for extensions to government financed systems.

For example, the Bonneville plant is seeking an additional $3,800,000 for the construction of new transmission lines. In addition to that another $4,000,000 appropriation has been asked for more generating capacity in the Bonneville plant. Perhaps the additional power can be used ultimately for the new aluminum plant near Bonneville, but the proposed system of government transmission lines paralleling the existing lines is not needed in view of the interconnecting systems of the private power industry now existing in the Northwest.

It is certainly not desirable, nor is it wise, for the government to start building more transmission lines and more generating plants which cannot be ready for years to come, and by so doing divert to such unnecesary purposes monies so urgently needed for those things that only the government can do—the building of ships, of guns, of tanks, and of aeroplanes. The government should recognize the preparedness of an industry which is responsible for more than 90% of our country's electrical system, should cooperate with this industry in regard to power for defense purposes, and save Federal money for military purposes. President Wilson, in appointing Bernard M. Baruch as Chairman of the War Industries Board on March 4, 1918, counseled him to "let alone

what is being successfully done, and interfere as little as possible with the present normal processes."

It is obvious that transmission line extensions may be necessary. The materail required is available and such extensions can be quickly made. The construction of generating stations require considerable time—eighteen months to two years—and in general a steam plant can be constructed and put in operation in a shorter period of time than a hydro-electric plant. In the event that additional generating capacity should be required, the private utility industry is prepared and ready to finance and furnish such additional power quickly and economically.

In conclusion, the maps and charts have proven, I think, a number of important things. Let me list some of these:

First: There is in this country built up through the past thirty years or so a great high tension transmission grid system which makes electric power available practically anywhere in the United States.

Second: This grid system is almost altogether the product of privately owned and operated electric power industry.

Third: Except for minor and as yet comparatively unimportant part constructed by Federal money since 1933, this great interconnected grid system has been almost exclusively made possible through the forward looking activities of the public utility holding companies, both interstate and intrastate. We are proud that our utility here in New Orleans ties in and is a part of this grid system.

Fourth: Nearly 90% of the total electric generating capacity of the nation and more than 90% of the corresponding kilowatt output are produced by the privately owned public utility systems above referred to, and only about 5% from the Federally financed plants.

Fifth: Electrically, this country is prepared for national defense requirements. It is prepared because of an industry—our industry—which has been created and developed by private capital and individual initiative.

Sixth: No more Federal funds need be diverted to the building of electric power plants and lines, for the private power industry is able, ready and willing to serve.

Finally: Our industry recognizes that many government hydro-electric power plants have been built and that more may be built as parts of reclamation, navigation and flood control projects. I am sure that you all recognize that the National Debt has reached—or at least is approaching the dangerous upper limit—and that the red flag should be up against unnecessary government spending, and that during this critical period the National Debt should not be further increased with government appropriation for things that can be done by private industry.

In closing, let me repeat that the private utility industry wants the public we serve to know that whatever happens in connection with our country's preparedness problems, we have the knowledge, the experience, the men, the money, and also the will to meet the demands that may be made upon us, and that we in this industry shall not fail in our duty to the nation.

1941

MEMBERSHIP LIST

C. M. : Charter Member
H. M. : Honorary Member
L. M. : Life Member
L. A. : Local Associate Member
L. Aff. : Local Affiliate Member
N. R. Aff. : Non-ResidentAffiliate Member
J. : Junior Member
N. R. J. : Non-Resident Junior Member
S. : State Member
S. J. : State Junior Member

— A —

ALFRED ABAUNZA, (1938), Civil Engineer, Dixie Machine Welding and Metal Works, 633 Cherokee St., New Orleans.

CARL E. ABRAHAMSON, (S.), (1939. La. Hwy. Bridge Department, P. O. Box 1002, Baton Rouge.

MICHAEL C. ABRAHM, (1936), Engineer, New Orleans Public Service Inc., 317 Baronne St.

FRED R. ADAMS, (S), (1940), District Engineer, Southern Bell Telephone and Telegraph Co., 930 Camelia Ave., Baton Rouge, La.

JAMES R. ADAMS, (L. M.), (1911), Assistant State Engineer, Lake Providence, La.

FELIX L. ALCUS, (1922), Mechanical Engineering, 632 So. Peters St., New Orleans.

LEWIS SCHERCK ALCUS, (1922), Consulting Engineer, 7902 Plum St., New Orleans.

LESTER F. ALEXANDER, (1915), President and General Manager, 834 Audubon Bldg., New Orleans.

HUNTER S. ALLEN (S.), (1940), Assistant Office Engineer, Estimate Dept., La. Hwy. Comm., Route 2, Baton Rouge, La.

RAYMOND I. ALLEN, (S), (1940), Resident Engineer, Louisiana Dept. of Highways, Box 471, Columbia, La.

DOUGLAS S. ANDERSON, (H. M.), (Jan. 1, 1909), Professor Emeritus of Electrical Engineering and Dean Emeritus of the College of Engineering, Tulane University, Mandeville, La.

SAM VERNON APPLEWHITE, (1927), Engineer, Geo. P. Rice Company, New Orleans.

WILBERT N. ARGUS, (J.), (1938), Sales Engineer, 317 Baronne St., New Orleans

GABRIEL G. AURIOLES, (N. R. J.), (1938), Chemical Engineer, Calle A No. 459, Vedado, Havana, Cuba.

— B —

JEROME C. BAEHR, (1930), Assistant Engineer, U. S. Engineers, 2nd N. O. District, Foot of Prytania Street, New Orleans.

JOHN C. BAINE, JR., (1938), Superintendent of Equipment, New Orleans Public Service Inc., 2005 Gen. Pershing St., New Orleans.

A. A. BALCOM, JR., (N. R. J.), (1940), Civil Engineering Dept., College Station, Texas.

MARSHALL BALLARD, JR., (L. Aff.), (1937), 605 United Fruit Bldg., New Orleans.

CHARLES CLIFTON BARNARD, (1937), Consulting Engineer, Barnard, Godat & Heft, Terminal Station Bldg., New Orleans.

JOHN C. BARTLEY, (J.), (1939), City of New Orleans Assistant Engineer, City Engineer's Office, 2303 Joseph St., New Orleans.

RAYMOND P. BASSICH, (L. Aff.), (1929), Manager, New Orleans Blue Print & Supply Co., Inc., 826 Union St., New Orleans.

CHARLES DREWRY BATSON, (N. R.), (1928), Manager, Republic Creosoting Company, Mobile, Ala.

VICTOR J. BEDELL, (1936), General Manager, New Orleans Public Belt. R. R., Municipal Bldg., P. O. Box 1240, New Orleans.

BEN H. BELL, (1920), Operating and Electrical Engineer, New Orleans Public Service Inc., 4604 S. Derbigny St., New Orleans.

MACE H. BELL, (1937), District Engineer, A. I. S. C., Inc., 506 Stern Bldg., New Orleans.

CHARLES A. BENDER, JR., (L. A.), (1933), Lubrication Engineer, 1729 Marengo St., New Orleans.

JOHN C. BENDLER, (J.), (1938), Area Director, National Youth Administration, 2228 Gravier St., New Orleans.

R. F. A. BENSON, (1938), Assistant Division Manager, Gulf Refining Company, Maison Blanche Bldg., New Orleans.

JOHN H. BERNHARD, (N. R.), (1922), Consulting Engineer, Salisbury, Somerset County, Pennsylvania.

F. N. BILLINGSLEY, (1915), Consulting Engineer, Billingsley Engineering Company, 409 Interstate Bank Bldg., New Orleans.

CLEM B. BINNINGS, (N. R. J.), (1939), Box 551, Diablo Hts., Panama Canal Zone.

CHARLES BITTENBRING, JR., (J.), (1940), Civil Engineer, 407 Highway Drive, Route 2, New Orleans.

A. L. BLACK, JR., (1931), Engineer, Ford, Bacon and Davis, Inc., Jung Hotel, New Orleans.

HUGH M. BLAIN, JR., (1940), Superintendent Gas Plant and Production, New Orleans Public Service Inc., 431 So. Robertson St., New Orleans.

ALBERT R. BOELTE, (J.), (1937), Structural Designer, Dock Board, 6057 Patton St., New Orleans.

WILLIAM H. BOHNE, (J.), (1940), Civil Engineer, 1217 Napoleon Ave., New Orleans.

CLARENCE NICHOLAS BOTT, (1927), General Contractor, 608 Audubon Bldg., New Orleans.

CARL E. BOTTOLFS, (S.), (1940), Civil Engineer, 600 South Holly St., Hammond, La.

HAL M. BOURG, (S.), (1939), Chief Map Draftsman in Charge of Map Dept., La. Hwy. Comm., Bourg, La.

JASPER L. BOURGEOIS, (S.), (1938), Parish Engineer, Jefferson Davis Parish, Welsch, La.

SHIRLEY C. BRASELMAN, (1919), Vice-President, American Creosote Works, 1305 Dublin St., New Orleans.

ERIC P. BREIDENBACH, (J.), Celotex Company, New Orleans.

EDWARD S. BRES, (1925), Scott & Bres, Contracting Engineers, 311 Maritime Bldg., New Orleans.

A. W. BRODTMAN, (S.), Civil Engineer, P. O. Box 574, Franklin, La.

AUGUST J. BRODTMANN, JR., (J.), (1936), Property Accounting Engineer, New Orleans Public Service Inc., 317 Baronne St., New Orleans.

JAMES P. BRODTMANN, (L. Aff.), (1932), Sales Representative, 901 United Fruit Company Bldg., New Orleans.

THOMAS G. BROUSSARD, (J.), (1939), Engineer, Louisiana Power & Light Co., 8016 Green St., New Orleans.

A. R. BROUSSEAU, (1935), General Contractor, 4738 Marigny St., New Orleans.

HARWOOD I. BROWN, (S. J.), (1937), Draftsman, Freeport Sulphur Co., Port Sulphur, La.

LAWRENCE C. BRUNE, (1933), Engineer, Federal Land Bank, 4625 Spain St., New Orleans.

T. C. BRUNS, (1940), Resident Engineer, Lafitte Ave. Project, Housing Authority of New Orleans, 2308 Prytania St., New Orleans.

WILLIAM P. BRYAN, (S.), (1939), Squad Leader with La. Hwy. Comm., Coolidge St., Rt. No. 4, Baton Rouge, La.

J. T. BULLEN, (S.), (1925), Development of Real Estate, 4026 Curtis Lane, Shreveport, La.

J. J. BULLIUNG, (1915), Engineer, Market Street Power House, New Orleans.

R. T. BURWELL, (1908), Manager, New Orleans Dept., Hartford Steam Boiler Inspection & Insurance Co., 1128 Hibernia Bldg., New Orleans.

— C —

PETER B. CALLAC, (J.), (1937), Instrumentman for Sewerage and Water Board, 7842 Apricot St., New Orleans.

ROY M. CAMI, (S. J.), (1939), Soil Conservation Service, C. C. C., Gonzales, La.

PHILIP HOPE CAMPBELL, (1925), Technical Engineer, with Federal Barge Lines, 6041 Perrier St., New Orleans.

C. GLENN CAPPEL, (1915), Vice-President, W. Horace Williams Co., Inc., Engineers and General Contractors, 833 Howard Ave., New Orleans.

MARTIN CARBONELL, (1938), Assistant Engineer, U. S. Engineer's Office, Foot of Prytania St., New Orleans.

S. STEVE CARNEGIE, (J.), (1940), 7109 Freret St., New Orleans.

J. B. CARTER, (S.), (1939), District Engineer, Dept. of Highways, Lake Charles, La. Highways, Lake Charles, La.

WILLIAM H. CARTER, (S.), (1938), Assistant Professor of Agricultural Engineering, L. S. U., 1458 Lawndale Ave., Baton Rouge, La.

G. P. CARUSO, (J.), (1939), 3703 Dumaine St., New Orleans.

CHARLES E. CASSAGNE, JR., (1937), Civil Engineer, 164 Delaronde St., New Orleans.

WILLIAM A. CASTILLE, (1939), District Engineer, Humble Oil Co., 2307 American Bank Bldg., New Orleans.

N. S. CATCHINGS, (S.), (1939), Salesman, 918 Topic St., or P. O. Box 532, Baton Rouge, La.

D. B. H. CHAFFE, JR., (1920), Partner, Southern States Equipment Co., 425 Celeste St., New Orleans.

NEIL L. CHAVIGNY, (N. R. J.), (1939), Engineer, Bay City, Texas.

THEO CHENET, (S.), (1922), Surveyor, Thibodaux, La.

H. M. CLANTON, (S.), (1935), Office Engineer, 530 Mill St., Lake Charles, La.

ANGUS B. COBB, (S.), (1939), Senior Draftsman, La. Hwy. Comm., 354 Bedford Drive, Baton Rouge, La.

EARL C. COBURN, (S. Aff.), (1939), Supervisor of Installations of Heating and Ventilating Equipment, 2175 Wisteria St., Baton Rouge, La.

AUBREY G. CODE, (1933), Junior Engineer, U. S. Engineers, 1st N. O. District, Foot of Prytania St., 4936 Mandeville St., New Orleans.

J. F. COLEMAN, (Jan. 1, 1898), (C. M. and H. M.), of J. F. Coleman Engineering Co., Consulting Engineer, 1023 Carondelet Bldg., New Orleans.

JAMES HOWARD COLLINS, (1920), General Outdoor Advertising Co., 2120 Canal St., 1310 Short St., New Orleans.

J. B. CONVERSE, (N. R.), (1921), Consulting Engineer, J. B. Converse & Co., Engineers, Mobile, Ala.

ALFRED JOSEPH COOPER, JR., (N. R. J.), (1934), Junior Hydraulic Engineer, 4607 Chambliss Ave., Knoxville, Tenn.

CHARLES A. COOPER, (S.), (1939), Roadway Draftsman, La. Hwy. Comm., R. F. D. No. 1, Baton Rouge, La.

LINTON C. COOPER, (S. J.), (1939), Bridge Dept., La. Hwy. Comm., 942 Convention St., Baton Rouge, La.

ROBERT S. COOPER, (S.), (1940), Engineer, Bridge Dept., La. Hwy. Comm., Baton Rouge, La.

ROBERT D. COSGROVE, (J.), (1940), 1710 Pine St., New Orleans.

E. L. COWAN, (S.), (1938), Engineering Department, Gaylord Container Corporation, 701 Superior Ave., Bogalusa, La.

ERNEST A. COULOHERAS, (1933), Civil Engineer, 2627 Peniston St., New Orleans.

JOHN E. COYNE, (S.), (1938), District Engineer, Dept. of Highways, P. O. Box 872, Alexandria, La.

MARTIN J. CRAMER, (S.), Senior Highway Engineer, Bureau of Public Roads, 323 Post Office Bldg., Baton Rouge, La.

CHARLES C. CRAWFORD, (1921), Vice-President, A. M. Lockett & Co., 1315 First St., New Orleans.

L. VILLERE CRESSY, (L. Aff.), (1930), Consulting Engineer, 916 Union St., New Orleans.

MARCEL E. CRETTET, JR., (1940), Engineer and Draftsman, 6112 Laurel St., New Orleans.

HORACE E. CRUMP, (L. M.), (June 8, 1906). Maintenance Engineer, Dock Board, No. 2 Canal St., 4032 Prytania St., New Orleans.

LIONEL J. CUCULLU, (1928), Sales Engineer, New Orleans Public Service Inc., 4630 Arts St., New Orleans.

DAVID L. CULLOM, (1916), Assistant Engineer, Board of Commissioners of the Port of New Orleans, 4032 Prytania St., New Orleans.

— D —

D. J. DAIGLE, (S.), (1940), Civil Engineer, Louisiana Dept. of Highways, 2231 Pocahontas St., Baton Rouge, La.

ISAAC CRAWFORD DANIEL, (1937), Field Engineer ,Board of State Engineers, 3906 Louisiana Avenue Parkway, New Orleans.

CHARLES R. DAVID, (1940), 4341 State Street Drive, New Orleans.

FRANCIS E. DAVID, JR., (S.), (1937), 501 E. College St., Lafayette, La.

THOMAS C. DAVID, (S.), (1940), Highway Planning and Research, Louisiana Hwy. Comm., Baton Rouge, La.

ORRIS J. DAVIESON, (1937), Mechanical Engineer, Assistant Director, Delgado Trades School, 3101 Milan St., New Orleans.

ALBERT B. DAVIS, JR., (N. R.), ( ). Assistant Engineer, Corps of Engineers, Galveston District, 3219 N. 4½ St., Galveston, Texas.

B. N. DAVIS, (1913), Engineer and Contractor, 1006 Tchoupitoulas St., New Orleans.

GEORGE H. DAVIS, (L. M.), (Oct. 14, 1909), Director, Ford, Bacon & Davis, Inc., 20 Exchange Place, 55th Floor, New York, N. Y.

HOMER LEE DAVIS, (J.), (1940), Assistant Manager of Davis Manufacturing Co., 1075 So. Clark St., 3820 Vincennes Place, New Orleans.

HOWARD F. DAVIS, (S.), (1940), Resident Engineer, 712 St. Hypolite St., Baton Rouge, La.

ANON D. DAY, (S.), (1940), Engineer, Dupont Company, Baton Rouge, 2945 Elm St., Baton Rouge, La.

WALLACE V. de GRUY, (J.), (1939), Junior Engineer, Property Accounting Division, New Orleans Public Service Inc., 2539 Jonquil St., New Orleans.

W. D. deLAUREAL, (J.), (1940), Manager, Air Conditioning Dept., Gulf Engineering Co., 916 S. Peters St., New Orleans.

DONALD DERICKSON, (1912), Professor of Civil Engineering, Tulane University, New Orleans.

LEON de SALIGNAC, (1936), Chief Engineer, Pan-American Petroleum Corporation, 944 St. Charles Ave., 5124 Baronne St., New Orleans.

L. DEVALL, (1935), 6314 Magazine St., New Orleans.

CHARLES B. DICKS, JR., (1936), Consultant and Chemical Advisor to Specialty Products Company, 15 Audubon Blvd., New Orleans.

WILLIAM A. DOBBS, (1940), Shell Oil Company, Inc., 1322 Jefferson Ave., New Orleans.

FARRAR R. DODGE, (J.), (1940), Assistant Engineering Aid, U. S. E. D., 5352 Perrier St., New Orleans.

C. E. DOLHONDE, (S.), (1939), Design Draftsman, care Shell Petroleum Corporation, Norco, La.

BERNHARD DORNBLATT, (1937), Field Engineer, Portland Cement Association, P. O. Box 254, New Orleans.

FLETCHER G. DOWNS, (S.), (1940), Civil Engineer, 2068 Myrtledale Ave., Baton Rouge, La.

WILLIAM JOSEPH DRAWE, JR., (1933), Engineer, New Orleans Public Service Inc., 4235 Gen. Pershing St., New Orleans.

ROBERT J. DRUEDING, (1935), Assistant Chief Engineer, Orleans Levee Board, 4455 Lafaye St., New Orleans.

ANDRE J. DUBUS, (S.), (1940), Industrial Sales Engineer, care Gulf States Utilities Company, P. O. Box 2431, Baton Rouge, La.

ARCHIBALD LEE DUNLAP, (1925), Associate Professor of Mechanical Engineering, Tulane University, 1318 Nashville Ave., New Orleans.

S. G. DUPREE, (S.), (1940), Civil Engineer, 975 Government St., Baton Rouge, La.

B. H. DUPUY, (1932), Designer Mechanical Appliances, 1421 Harmony St., New Orleans.

ALLAN T. DUSENBURY, (L. M.), (May 25, 1909), Consulting Engineer, 2108 American Bank Bldg., New Orleans.

J. O. DYAL, (N. R.), (1937), Civil Engineer, care Engineering Dept., Bragman Bluff Lumber Company, Puerto Cabezas, Nicaragua.

— E —

RALPH EARL, (1913), 2125 Leonidas St., New Orleans.

JOHN T. EASTWOOD, (L. M.), (Jan. 8, 1901), Consulting Engineer, 1926 Milan St., New Orleans.

ELMO J. EDWARDS, (1940), Industrial Engineer, Johns Manville Products Corporation, 2030-A Broadway St., New Orleans.

FRANK W. EDWARDS, (N. R.), (1937), Senior Hydraulic Engineer, Panama Canal, P. O. Box 197, Diablo Hts., Canal Zone.

JOHN P. EGAN, (L. Aff.), (1931), Assistant Chief Engineer in Charge of Maintenance and Operation for New Orleans Public Service Inc., at Market Street Steam Electric General Station, 5436 S. Claiborne Ave., New Orleans.

L. P. ELBERSON, (L. M.), (1911), Chief Engineer, Louisiana Irrigation and Mill Company, Crowley, La.

S. W. ELBERSON, (L. M.), (1911), Vice-President and General Manager, Louisiana Public Utilities Company, P. O. Box 165, Lafayette, La.

DANIEL STANLEY ELLIOTT (1921), Professor of Physics, Tulane University, New Orleans.

LLOYD A. ELLIS, (S.), (1940), Resident Engineer on Asphalt Construction, La. Hwy. Comm., R. F. D. No. 2, Baton Rouge, La.

SYDNEY ELLIS, JR., (J.), (1940), Chemical Engineer, New Orleans Public Service Inc., 2030 Chestnut St., New Orleans.

O. H. ELVERUM, (S.), (1936), Engineer, Manager Breaux Hotel, 610 First St., Morgan City, La.

ERIC L. ERICKSON, (S.), (1937), Assistant Bridge Engineer, Louisiana Hwy. Comm., Baton Rouge, La.

CHARLES D. EVANS, (S.), (1936), Resident Engineer, Inspector, P. W. A., 732 North Blvd., Apt. 4, Baton Rouge, La.

— F —

FRANK J. FAVA, (S. J.), (1939), Junior Engineer, La. Dept. of Conservation, Eagle Hotel, Villa Platte, La.

HAROLD F. FAVRET, (J.), (1937), Civil Engineer, 4837 St. Claude Ave., New Orleans.

FRED H. FENN, (S.), (1930), Instructor, College of Engineering, L. S. U., 204 Church St., Baton Rouge, La.

CHARLES FENSTERMAKER, (S.), (1914), Chief Engineer, Industrial Lumber Company, Elizabeth, La.

ARTHUR J. FERGUSON, (S. J.), (1938), Inspector, Standard Oil Company, 604 Boyd Ave., Baton Rouge, La.

FRANK P. FISCHER, (1940), Electrical Engineer, Industrial Equipment Sales, New Orleans Public Service Inc., 1820 Audubon St., New Orleans.

CHARLES L. FISHER, (J.), (1940), 1014 Aline St., New Orleans.

EUGENE L. FITHIAN, (L. Aff.), (1940), Manager, New Orleans Office, Eugene Dietzgen Company, 318 Camp St., New Orleans.

HUBERT A. FLANAKIN, (S.), (1939), 602 East Blvd., Baton Rouge, La.

HARRY W. FLETCHER, (L. Aff.), (1937), President, Fletcher Equipment Company, Inc., 609 Tchoupitoulas St., New Orleans.

LIONEL E. FLOTTE, (L. Aff.), (1939), District Manager, United Cork Company, 1114 N. Dorgenois St., New Orleans.

COLUMBUS FLOYD, (J.), (1940), Instructor in Mechanical Engineering, Tulane University, New Orleans.

J. THAD FLOYD, (1938), Structural Engineer, Ingalls Iron Works Company, 811 Masonic Temple, New Orleans.

JOHN D. FORD, (1937), Inspector, Hartford Steam Boiler Insurance Company, 7800 Apricot St., New Orleans.

JACQUES L. FORTIER, (J.), (1938), Sales Engineer, Mundet Cork Company, 1831 Bordeaux St., New Orleans.

ROBERT B. FOSTER, JR., (N. R.), (1940), Junior Engineer (Civil), U. S. E. D., care U. S. Engineers, Kingston, Jamaica, B. W. I.

JAMES M. FOURMY, (S.), (1940), Civil Engineer, Consulting Engineer, Hammond, La.

LT. COL. FREDERICK H. FOX, (N. R.), (1922), 105th Battalion, C. A. C. (A. A.), Camp Hulen, Texas.

ALBERT J. FRANSEN, (J.), (1934), Metal Trades Co-ordinator, N. Y. A., 201 Ringgold St., New Orleans.

LOUIS T. FRANTZ, (1936), Electrical Engineer, Sewerage and Water Board, 8735 Apricot St., New Orleans.

JOHN H. FREDERICKSON, JR., (S.), (1940), Engineer, A. Farnell Blair, Carville, La.

ERNEST M. FREEMAN, (S.), (1939), Consulting Engineer, 403 City Bank Bldg., Shreveport, La.

ALVIN M. FROMHERZ, (1915), Consulting Engineer, 226 Carondelet St., New Orleans.

FRANK G. FROST, (1919), General Superintendent, Electrical Dept., New Orleans Public Service Inc., New Orleans.

DONALD E. FUELLHART, (S.), (1939), Civil and Petroleum Engineer, La. Dept. of Conservation, Natchitoches, La.

— G —

HERBERT M. GALLAGHER, (1921), State Engineer, E. R. A., Associated with J. F. Coleman Engineering Company, 2035 Palmer Ave., New Orleans.

PATRICK E. GARNER, (N. R.), (1939), General Engineering Practice, Garner Bros., Sandhill, Miss.

JOHN B. GATES, (S.), (1937), Parish and Field Engineer, W. P. A., Pollock, La.

FRANK G. GAULT, (S.), (1938), Sales Engineer, P. O. Box 553, Lake Charles, La.

JOHN STONE GENTILICH, (1933), Civil Engineer, U. S. Engineers, New Orleans Division, 2nd District, New Orleans.

F. J. GERMANO, (S.), (1937), Assistant Professor of Mechanical Engineering, L. S. U., Atkinson Hall, University, La.

JACK ALAN GERSTER, (J.), (1940), Chemical Engineer, College of Engineering, Tulane University, New Orleans.

EDWARD H. GESSNER, (N. R. J.), (1933), Chicago Bridge and Iron Company, care Standard Oil Company, Caritito, Venezuela.

JOHN HARRY GILLUM, (S.), (1934), Process Engineer, Standard Oil Company, Jackson, La.

HOWARD W. GLEASON, (1938), Engineer, Glover Construction Company, 320 Brockenbraugh Ct., New Orleans.

JOHN A. GLOVER, (1938), Assistant Superintendent, George J. Glover Construction Company, 1305 Soniat St., New Orleans.

DAVID W. GODAT, (1924), Partner, Barnard Godat & Heft, Consulting Engineers, 314 Terminal Station Bldg., New Orleans.

JULES GODCHAUX, (L. M.), (Jan. 1, 1899), Vice-President and Engineer of Operation, Godchaux Sugars, Inc., 1007 Masonic Temple, New Orleans.

MAYER GODCHAUX, (1938), Vice-President, Godchaux-Inshaw Corporation, 510 Audubon Bldg., New Orleans.

WALTER GODCHAUX, JR., (S. J.), (1938), Assistant Engineer at Godchaux Sugars Refinery, Reserve, La.

ANDRE D. GOMEZ, (J.), (1940), 2516 Joseph St., New Orleans.

JOSEPH McCORMACK GONDRAN, (1924), Structural Engineer with Jones & Laughlin Steel Corporation, Box 66, New Orleans.

ROBERT E. GOSA, (1929), Contractor, W. Horace Williams, Inc., 833 Howard Ave., New Orleans.

BERNARD GRAFF, SR., (1939), Mechanical and Electrical Engineering and Constructing, 8207 Jeannette St., New Orleans.

ARTHUR A. GRANT, (1937), Consulting Engineer, 1745 Canal Bank Bldg., New Orleans.

WALTER H. GRANT, JR., (1938), Sales Engineer in Heating and Plumbing, 209 Vincent Bldg., New Orleans.

WALTER K. GRANT, (1922), 1527 Audubon Blvd., New Orleans.

CHARLES H. GREEN, (1938), Manager, Mechanical Equipment Dept., Woodward Wight & Co., New Orleans.

W. B. GREGORY, (1907), (H. M.), (C. M.), Consulting Engineer, 630 Pine St., New Orleans.

B. H. GREHAN, (1914), Vice-President of Geo. J. Glover Company, Inc., 1670 Soniat St., New Orleans.

FRANCIS B. GREVEMBERG, (S.), (1935), Civil Engineer, Superintendent of State Buildings, State Capitol Bldg., Baton Rouge, La.

WILL S. GUEDRY, (S.), (1939), District Engineer, Dept. of Hwys, 401 West Charles St., Hammond, La.

PETER J. GUELFI, (S.), (1940), Industrial Sales Engineer, Gulf States Utilities Company, Baton Rouge, La.

MARIO R. GUELL, (S.), Chief Draftsman, Gaylord Container Corporation, Bogalusa, La.

JOHN M. GUILLORY, (1928), Sales Supervisor, New Orleans Public Service Inc., 4128 Monroe St., New Orleans.

A. H. GUILLOT, (1917), Roadway Engineer, New Orleans Public Service Inc., 317 Baronne St., New Orleans.

DONATO E. GUIZA, (J.), (1939), Civil Engineer, Boh Bros. Construction Company, 4505 So. Liberty St., New Orleans.

EARLE R. GURTLER, (J.), (1940), 624 City Park Ave., New Orleans.

— H —

JOHN A. HAASE, (1933), Chief, Proposal Section, U. S. Treasury, 9015 Nelson St., New Orleans.

S. G. FRANK HAAS, (1940), Technical Engineer, Sewerage and Water Board, New Orleans, 59 Neron Place, New Orleans.

ROBERT N. HABANS, (J.), (1939), Civil Engineer with Orleans Materials and Equipment Company, Inc., 3648 Clermont Drive, New Orleans.

ALLEN S. HACKETT, (1912), Consulting Engineer, 454 Walnut St., New Orleans.

CALLENDER FAYSSOUX HADDEN, (1928), Secretary-Treasurer, Standard Supply & Hardware Company, P. O. Drawer 620, New Orleans.

E. J. HAGSTETTE, JR., (S. J.), (1935), District Manager and Engineer, State of La. Dept. of Minerals, Lafayette, La.

DANIEL HALLARON, JR., (1939), Engineer, New Orleans Public Service Inc., 317 Baronne St., New Orleans.

JOSEPH A. HALLIDAY, (S.), (1939), Draftsman, Louisiana Hwy Comm., Building "C," Pentagon, Baton Rouge, La.

FARRAR PETRIE HAMILTON, (1915), Field Engineer, W. P. A., 408 Walnut St., New Orleans.

GEORGE HAMMETT, (1920), Assistant Sales Manager, A. M. Lockett & Company, 308 Whitney Bldg., New Orleans.

ERIC J. HANEMANN, (N. R. J.), (1933), International Boundary Commission, San Benito, Texas.

BEN J. HANEY, (J.), (1939), Draftsman, Sewerage and Water Board, 8007 Fig St., New Orleans.

HOWARD J. HANSEN, (1938), Engineer, with Southern Pine Association, 1625 Charlton Drive, Route 3, New Orleans.

WILLIAM HARDIE, JR., (1940), Sales Engineer, Trane Company, 1312 Fern St., New Orleans.

WILLIAM HARDY, (1937), Engineer, 8010 S. Claiborne Ave., New Orleans.

ALLAN J. HARRIS, (1924), President, Walter Castenado, Inc., 329 Balter Bldg., New Orleans.

JAMES E. HARVEY, JR., (J.), (1940), Power Load Inspector, New Orleans Public Service Inc., 1910 Constance St., New Orleans.

M. V. HAULARD, (L. M.), (Jan. 13, 1906), Superintendent, Municipal Repair Plant, 1154 Derville St., New Orleans.

WILLIAM WALLACE HAY (N. R.), (1928), Technical Engineer, Dept. Com. River Transp., T. V. A., Knoxville, Tenn.

ARTHUR C. HAYS, (1940), Sales Engineer, 1415 Carondelet Bldg., New Orleans.

SIDNEY HEBRARD, (S.), (1939), Squad Leader, with Dept. of Hwys., 1260 University Place, Baton Rouge, La.

GEORGE A. HEFT, (J.), (1939), Consulting Engineer, Barnard, Godat & Heft, Terminal Station Bldg., New Orleans.

NUMA J. HELWICK, (1936), Engineer with American Heating & Plumbing Company, 809 Greenwood St., New Orleans.

HARRY B. HENDERLITE, (S.), (1929), Chief Engineer, Dept. of Highways, Baton Rouge, La.

JAMES P. HENDERSON, (1938), District Erector, A. M. Lockett & Co., 1627 S. Carrollton Ave., New Orleans.

W. S. HENNING, (S.), (1919), Land Engineer, La. Hwy. Comm., Baton Rouge, La.

RUDOLPH HERPICH, (1926), Union Brewery, New Orleans, 3904 Delgado Ave., New Orleans.

W. T. HESS, (1933), Vice-President and Chief Engineer, Louisiana Power & Light Company, 202 Rosewood Drive, New Orleans.

OSCAR HIGGINBOTHAM, (N. R.), (1934), Engineer, with Compania Ongenois Azaucaveros Mat., S. A. Central Espana, Prov. Matanzas, Cuba

ARTHUR M. HILL, (1934), Associate Professor of Heat Engineering, Tulane University, New Orleans.

GEORGE W. HILL, (1936), Sales Engineering, Westinghouse Electric & Mfg. Co., 2800 Audubon St., New Orleans.

EDWARD HOGG, (J.), (1940), 8000 Nelson St., New Orleans.

W. T. HOGG, (1913), Principal Assistant Engineer, Board of Commissioners, Port of New Orleans, 8000 Nelson St., New Orleans.

JOSEPH A. HOLLAND, (N. R.), (1940), 603 So. Delaware Ave., Tampa, Fla.

WALTER HOLLOWAY, (N. R.), (1923), Division Engineer, Mississippi Power Company, Gulfport, Miss., 34 Washington Ave., Ocean Springs, Miss.

RALPH HOLT, (1938), Manager, New Orleans District, Pittsburg Testing Laboratory, 816 Howard Ave., New Orleans.

PAUL FROST HOOTS, (1927), Assistant to the President, New Orleans Public Service Inc., 317 Baronne St., New Orleans.

ALVIN E. HOTARD, (1933), Parish Engineer, Jefferson Parish, City Engineer, City of Gretna, 328 Amelia Ave., Gretna, La.

S. E. HOTTINGER,JR., JR., (1932), Engineer, Examiner Public Works Administration, 38 Allard Blvd., New Orleans.

J. B. HOWZE, JR., (S.), (1935), W. P. A. Area Engineer, Baton Rouge District, 2202 Government St., Baton Rouge, La.

JAMES T. HUEY, (S.), (1939), Bridge Designer, La. Hwy. Comm., 622 Third St., Baton Rouge, La.

S. E. HUEY, (S.), (1937), Civil Engineer, Monroe, La.

EDWARD F. HUGHES, (1933), Assistant Engineer, Sewerage and Water Board, 2303 Valmont St., New Orleans.

ROBERT H. HURD, (N. R. J.), (1940), care Dr. J. R. Ross, Woodward, Ala.

—I—

LYALL GIBSON IRELAND, (1929), Vice-President, New Orleans Public Service Inc., 1460 Henry Clay Ave., New Orleans.

C. A. IVES, JR., (S.), (1922), Civil Engineer, 940 Park Blvd., Baton Rouge, La.

—J—

A. D. JACKSON, (S.), (1939), Chief Draftsman, with La. Hwy. Comm., 830 Brasler Drive, Baton Rouge, La.

HARRY JACOBS, (1919), Civil Engineer, Violet, La.

COMMODORE ERNEST LEE JAHNCKE, (L. M.), (Jan. 1, 1900), Retired Naval Officer, care Boston Club, New Orleans.

PAUL F. JAHNCKE, SR., (Jan. 1, 1908), President, Jahncke Service, Inc., 814 Howard Ave., New Orleans.

JAMES S. JANSSEN, (1933), Civil Engineer, 8213 Neron St., New Orleans.

A. G. JARREAU, (J.), ((1939), Sales Engineer, Fairbanks Morse Company, 18 Fairview Court, New Orleans.

FRANK E. JOHNSON, JR., (1937), Assistant to Superintendent Electric Distribution, New Orleans Public Service Inc., 317 Baronne St., New Orleans.

HAMILTON JOHNSON, (S.), (1937), Professor Mechanical Engineering, Louisiana State University, Box 404, Baton Rouge, La.

WARREN JOHNSON, (L. M.), (1903), President and General Manager, Todd-Johnson Dry Docks, Inc., 6226 Marquette Place, New Orleans.

C. LEONARD JONES, (1923), Structural Designer, with Dock Board, 2747 Audubon St., New Orleans.

ERNEST W. JONES, (J.), (1939), Engineer, 3620 Napoleon Ave., New Orleans.

SARGENT F. JONES, (1940), Division Engineer, Housing Authority of New Orleans, 5507 Prytania St., New Orleans.

THOMAS J. JONES, (S.), (1939), Civil Engineer, 131 Center St., New Iberia, La.

CHARLES E. JOUBERT, (L. M.), (Jan. 1, 1909), Civil Engineer, Lafayette, La.

— K —

KARL P. KAMMER, (1931), Assistant Superintendent, Electrical Dept., New Orleans Public Service Inc., 317 Baronne St., New Orleans.

NOEL P. KAMMER, (1936), Engineering Dept., Flintkote Company, 8221 Neron St., New Orleans.

ARTHUR R. KEILER, (1940), Chief Inspector, Hartford Steam Boiler Inspection and Insurance Company, 519 Hibernia Bank Bldg., New Orleans.

CLAUDE J. KELLY, (1936), Vice-President, New Orleans Cement Products Company, 4139 Gen. Taylor St., New Orleans.

JAMES P. KEMPER, (H. M.), (L. M.), (May 25, 1909), Civil Engineer in Private Practice, Fordoche, La.

ARCH B. KENNEDY, (S.), (1939), Road Drafting, La. Hwy. Comm., 1708 Dolores St., Baton Rouge, La.

CHARLES MACDONALD KERR, (1914), Sales Engineer, American Creosote Works, Inc., 5831 So. Robertson St., New Orleans.

GERALD C. KERR, (1937), Acoustical Engineer, 1401 Tchoupitoulas St., New Orleans.

BERNARD L. KIERNAN, (1939), Chief Engineer, Jackson Brewing Company, 519 So. Scott St., New Orleans.

E. L. KING, (J.), (1939), Test Engineer, 2120 Audubon St., New Orleans.

O. G. KIRBY, (S.), (1939), Engineer and Estimator, 910 La. National Bank, Baton Rouge, La.

LEONARD R. KIRST, (1928), Civil Engineer, with Board of State Engineers, 207 New Orleans Court Bldg., New Orleans.

LEON KLEIN, (J.), (1940), 1514 Joseph St., New Orleans.

JOHN KLORER, (L. M.), (Jan. 23, 1898), Planning and Consulting Engineer, New Orleans Sewerage and Water Board, 526 Carondelet St., New Orleans.

JOHN T. KNIGHT, (1940), Consultant in Theatre Engineering and Air Conuditioning, 629 Common St., New Orleans.

WILHELM E. KOCH, (1913), Civil Engineer, 2627 Coliseum St., New Orleans.

R. B. KOHNKE, (L. M.), (1911), Civil Engineer, 932 Pichcloup Place, New Orleans.

LOUIS I. KORN, (J.), (1933), Teacher, 6030 Garfield St., New Orleans.

GUS C. KRAUSS, (L. A.), (1929), Assistant Superintendent, Rolling Stock & Shops Dept., New Orleans Public Service Inc., 2838 Iberville St., New Orleans.

PERCY C. KUHN, (1937), District Sales Manager, Truscon Steel Company, 1193 Canal Bank Bldg., 2121 Octavia St., New Orleans.

ROBERT J. KUHN, (1925), Consulting Engineer, 1644 Canal Bldg., New Orleans.

— L —

IRWIN M. LAIS, (J.), (1940), 2855 Ponce de Leon St., New Orleans.

GEORGE B. LAMBERT, (N. R.), (1939), Draftsman, Mississippi City ,Miss.

ANTIME J. LANDRY, (S.), (1939), Plan Checker, La. Hwy. Comm., 1961 Myrtledale Ave., Baton Rouge, La.

VOLNEY F. LANDRY, (N. R. J.), (1939), Student Engineer, Chrysler Corporation, 111 Highland Ave., Apt. B 1, Highland Park, Mich.

HERRICK J. LANE, (1922), Secretary, W. Horace Williams, Inc., 833 Howard Ave., New Orleans.

EDWARD S. LANPHIER, (1918), Retired, Lighthouse Engineer, 1204 State St., New Orleans.

N. E. LANT, (S.), (1937), Bridge Engineer, La. Hwy. Comm., Baton Rouge, La.

LEO J. LASSALLE, (S.), (1936), Dean of College of Engineering, Louisiana State University, University, La.

W. STONE LEAKE, (1934), Sales Engineer, 303 Betz Place Metairie, New Orleans.

PERRY LEAMING, (S.), (1939), Bridge Dept., Dept. of Hwys., 2107 University Ave., Baton Rouge, La.

STANLEY M. LECOURT, (1933), Civil Engineer, with Theodore Brent, 407 Board of Trade, 320 Magazine St., New Orleans.

RANDALL FRANK LEGEAI, (1923), Industrial Gas Engineer, New Orleans Public Service Inc., 317 Baronne St., 3830 Nashville Ave., New Orleans.

H. L. LEHMANN, (S.), (1937), Testing and Research Engineer, Dept. of Hwys., 2152 Myrtledale Ave., Baton Rouge, La.

JOSEPH E. LEININGER, (1931), Air Conditioning Engineer, 920 Music St., New Orleans.

PAUL J. LETZ, (S.), (1938), 203 E. 8th St., Crowley, La.

WILLIAM F. LEVERT, (S. J.), (1939), Civil Engineering Dept., Louisiana Conservation Department, 936 Jefferson Place, Shreveport, La.

HAROLD A. LEVEY, (1937), Consulting Chemical Engineer, 8131 Oleander St., New Orleans.

NEVILLE LEVY, (1929), President, Equitable Equipment Company, 410 Camp St., New Orleans.

RALPH E. LIND, (1930), Civil Engineer, 6624 Louis 14th St., New Orleans.

ROBERT H. LISTER, (J.), (1940), 502 So. St. Patrick St., New Orleans.

A. M. LOCKETT, (L. M.), (Jan. 1, 1900), President, A. M. Lockett & Co., Whitney Bldg., New Orleans.

ROBERT P. LOCKETT, (L. Aff.), (1931), Machinery, 348 Whitney Bank Bldg., New Orleans.

GERVAIS LOMBARD, (Jan. 1, 1898), (C. M. and H. M.), Research Engineer, Board of State Engineers, 574 Walnut St., New Orleans.

JULES A. LORIO, (1921), Superintendent of Dibert, Bancroft & Ross Company, Ltd., 124 No. Genois St., New Orleans.

L. A. LOUSTALOT, (S.), (1913), Civil Engineer, Hammond, La.

— M —

FRANK MACDONALD, (1933), Sanitary Engineer, 4918 So. Johnson St., New Orleans.

KENNETH W. MACKENZIE, (S.), (1939), Testing Engineer, 66 Chester St., Alexandria, La.

WARREN A. MACKIE, (1937), Civil Engineer ,1578 Calhoun St., New Orleans.

S. C. MAGAW, (S.), (1939), Assistant Chief Draftsman, Dept. of Hwys., Greenwell Springs, La.

WILLIAM R. MAJOR, JR., (1939), District Representative of Line Material Company, 7307 St. Charles Ave., New Orleans.

HENRY J. MALOCHEE, (L. M.), (March 5, 1898), Supervisor Mechanical Equipment, Charity Hospital, 4420 Danneel St., New Orleans.

J. D. MALONE, JR., (1937), Assistant Operating Engineer, New Orleans Public Service Inc., 234 Glendale Blvd., New Orleans.

ISHAM W. MANN, JR., (1938), Sales Engineer, A. M. Byers Company, 411 Lowerline St., New Orleans.

RALPH H. MANN, (N. R.), (1921), Field Engineer, Service Bureau, American Wood Preservers Association, 60 E. 42nd St., New York City, N. Y.

ALBERT E. MARKS, (1925), Engineer, 3320 Palmyra St., New Orleans.

N. L. MARKS, JR., (1937), City Engineer, Room 321, City Hall, New Orleans.

EDMUND B. MARTIN, (1937), Engineer, Federal Land Bank, 4118 Saratoga St., New Orleans.

SEBASTIAN V. MASSIMINI, (L. Aff.), (1931), President, Gulf Engineering Company, Inc., 916-30 So. Peters St., New Orleans.

GEORGE ELMER MAY, (1940), Engineer, New Orleans Public ervice Inc., 2031 Short St., New Orleans.

JOHN K. MAYER, (1933), Assistant Professor of Experimental Engineering, Tulane University, 2419 Audubon St., New Orleans.

JOHN F. MAYS, (1937), Engineer, 1407 First St., New Orleans.

JOHN I. McCAIN, (S.), (1939), Draftsman, La. Hwy. Comm., Colfax, La.

T. M. McCARROLL, (1926), State Board of Engineers, 2036 Marengo St., New Orleans.

JAMES P. McCULLOUGH, (S.), (1938), Engineering Dept., United Gas Pipe Line Company, United Gas Bldg., Shreveport, La.

JOHN McINERNEY, (N. R.), (1920), Superintendent Construction World's Fair, New York City, N. Y.

GORDON J. McLEAN, (N. R.), (1933), Mechanical Engineer, Ordnance Dept., 713 Bellevue Rd., Wilmington, Del.

H. L. McLEAN, (1930), Consulting Mechanical Engineer, 2604 St. Roch Ave., New Orleans.

LEAL C. H. McLEAN, (1933), Sales Engineer, Jones & Laughlin Steel Corporation, 1325 Cadiz St., New Orleans.

EDWARD A. McLELLAN, (1938), Sales Engineer, A. M. Lockett Company, 1453 Arabella St., New Orleans.

EDWARD JOSEPH McNAMARA, (S. J.), (1937), Civil Engineer, Construction and Maintenance, Freeport Sulphur Company, Port Sulphur, La.

J. A. McNIVEN, (1922), Chief Engineer, Dock Board, No. 2 Canal St., New Orleans.

GEORGE P. MEADE, (S.), (1936), Manager, Gramercy Refinery, Colonial Sugars, Inc., Gramercy, La.

FREDERIC B. MEDFORD, (S.), (1936), City Engineer, Donaldsonville, La.

GEORGE H. MENEFEE, (J.), (1938), 7739 Hampson St., New Orleans.

HERBERT A. METZGER, (S. J.), (1938), District Petroleum Engineer, Mineral Division, Department of Conservation, P. O. Box 165, Lake Charles, La.

A. J. MEYERS, (N. R.), (1933), Industrial Engineer, Shell Petroleum Corporation, Wood River, Ill.

JOHN M. MIDDLETON, (S.), (1936), Assistant to State Director of Operations, W. P. A., Hammond, La.

E. L. MIRE, (1938), Chief Engineer, Public Belt Railroad, 5420 Fontainebleau Drive, P. O. Box 1240, New Orleans.

PHILIP J. MITCHELL, (J.), (1940), Sales Engineer, Woodward Wight Company, 7922 Freret St., New Orleans.

HENRI J. MOLAISON, (1934), Chemical Engineer, Junior Engineer, U. S. Dept. of Agriculture, Bureau of Agricultural Chemistry and Engineering, 109 Sherwood Forest Drive, New Orleans.

JOHN W. MONTGOMERY, (1923), Sales Engineer, 417 Balter Bldg., New Orleans.

L. PAUL MONTGOMERY, (S. J.), (1938), Junior Petroleum Engineer, Louisiana Department of Conservation, 2161 Terrace Ave., Baton Rouge, La.

DAVID MOODIE, (1934), Engineer in Charge of Boiler Room Operations at Market Street Electric Gen. Station, New Orleans Public Service Inc., 2839 Audubon St., New Orleans.

RICHARD A. MORNHINVEG, (S.), (1937), Maintenance Engineer, at L. S. U., 1912 Cherokee St., Baton Rouge, La.

JOHN E. MOREHISER, JR., (J.), (1938), Instructor, Dept. of Industrial Arts, Orleans Parish School Board, 3800 St. Claude Ave., New Orleans.

DEWITT L. MORRIS, (S. J.), (1937), Mechanical Engineering Draftsman, Port Sulphur, La.

P. L. MORRIS, (S.), (1939), Squad Leader, La. Hwy. Comm., 747 Boyd Ave., Baton Rouge, La.

WALTER B. MOSES, (1912), Consulting Engineer, 425 So. Peters St., New Orleans.

W. U. MOSS, (1939), Engineer, Equitable Equipment Company, 1221 Webster St., New Orleans.

JOHN W. MULLEN, (1939), Civil Engineering, 1312 Marengo St., New Orleans.

JACOB F. MULLER, JR., (1932), Vice-President, Muller Furniture Mfg. Company, No. 3, Fairview Court, New Orleans.

RICHARD F. MULLER, (1938), Engineer, Allis-Chalmers Company, 1124 Canal Bank Bldg., New Orleans.

THOMAS JOSEPH MULLIN, JR., (J.), (1940), Engineering Dept., Celotex Corporation, Box 26, Marrero, La.

D. W. B. MURPHY, (1940), Engineer, New Orleans Public Service Inc., 317 Baronne St., New Orleans.

LEO J. MUSE, (S.), (1939), Assistant Professor, Civil Engineering, Louisiana State University, University, La.

CHARLES A. MYERS, (S.), (1937), Structural Engineer, La. Hwy. Comm., Baton Rouge, La.

HU. B. MYERS, JR., (1929), Civil Engineer, 1409 State St., New Orleans.

— N —

EDWARD M. NABERSCHNIG, JR., (1923), Assistant to Works Superintendent, Southern Cotton Oil Company, Nine Mile Post, Westwego, La.

MERWYN H. NABORS, (1938), Manager Lubricating and Industrial Sales, Shell Petroleum Corporation, 2520 Fern St., New Orleans.

CLAYTON L. NAIRNE, (1929), General Superintendent, Gas Dept., New Orleans Public Service Inc., 317 Baronne St., New Orleans.

ROBERT L. NALL, (1936), Plant Engineer, Flintkote Company, 1139 State St., New Orleans.

ARTHUR A. NAQUIN, (1924), Superintendent of Schedules, New Orleans Public Service Inc., 2515 Pine St., New Orleans.

ALLEN NEGROTTO, (1920), Regional Engineer, Works Progress Administration, 129 Beverly Drive, New Orleans.

BERNARD STANLEY NELSON, (L. M.), (1911), Chief Engineer, A. M. Lockett & Company, Ltd., Whitney Bldg., New Orleans.

LAURENCE K. NELSON, (1940), Consulting Engineer, Associate James M. Todd, 624 Gravier St., New Orleans.

WALDEMAR STANLEY NELSON, (J.), (1936), Engineer, 7319 Panola St., New Orleans.

LEROY L. NEWMAN, (1923), Superintendent of Distribution, New Orleans Public Service Inc., 317 Baronne St., New Orleans.

HARRY P. NEWTON, (1939), Technical Assistant to the Director, Southern Regional Research Laboratory, Q. & C. Bldg., New Orleans.

J. CHRIS NIELSEN, JR., (1933), Engineer Inspector, 7468 Garfield St., New Orleans.

CULLEN M. NILSON, (S.), (1940), Coordination Division, Engineering Dept., Standard Oil Company of Louisiana, 3956 Main Drive, N. Highlands, Baton Rouge, La.

C. B. NORRIS, (1936), Assistant Professor Electrical Engineering, Tulane University, 1312 Fern St., New Orleans.

— O —

CECIL K. OAKES, (1937), Civil Engineer, U. S. Engineer's Office, Foot of Prytania St., New Orleans.

WILLIAM F. OAKES, (1918), General Contractor, 344 Camp St., New Orleans.

BERNY OAKLAND, (S.), (1934), with La-Del Oil Properties, Inc., 603 Ouachita Bank Bldg., Monroe, La.

JOSEPH T. O'BRIEN, (S.), (1940), Mechanical Supervisor, Chemical Products Division, Standard Oil Co. of Louisiana, 1990 Locust St., Baton Rouge, La.

CHARLES W. OKEY, (L. M.), (1911), Principal Civil Engineer, Tennessee Valley Authority, Knoxville, Tenn.

OLE K. OLSEN, (L. M.), (1907), President, Ole K. Olsen, Inc., 823 Perdido St., New Orleans.

JOHN H. O'NEILL, (1916), Sanitary Engineer, 637 Lowerline St., New Orleans.

ADLOE ORR, JR., (1938), Civil Engineer, 6505 Wuerpel St., New Orleans.

WILLIAM P. OSTER, (1928), Vice-President, Equitable Equipment Co., Inc., 410 Camp St., New Orleans.

— P —

WILLIAM E. PADEL, (L. Aff.), (1940), Estimating and Designing, Lester F. Alexander Co., 1627 So. Carrollton Ave., New Orleans.

W. O. W. PANKEY, (N. R.), (1939), Engineer, Georgia Highway Commission, Atlanta, Ga.

PASCAL PARETI, JR., (1933), Engineer, 619 Bourbon St., New Orleans.

ALBERT B. PATERSON, (1923), President, New Orleans Public Service Inc., 15 Audubon Place, New Orleans.

HAROLD J. PATTERSON, (1940), General Contractor, 5216 Danneel St., New Orleans.

WILLIAM M. PAYNE, (N. R. J.), (1938), Instructor in Mechanical Engineering, New Mexico State College, Box 561, Las Cruces, New Mexico.

CHARLES M. PECOT, (S.), (1939), Bridge Detailer, La. Hwy. Comm., 2228 Cherokee St., Baton Rouge, La.

BOYKIN W. PEGUES, (L. M.), Head of Department of Civil Engineering, Louisiana State University, University, La.

BRISTER P. PIERCE, (S.), (1929), Chief Engineer, Mill Division, Gaylord Container Corporation, Bogalusa, La.

JAMES F. PIERSON, (S.), (1940), Construction Engineer, Asphalt Division La. Hwy. Comm., 937 Richland Ave., Baton Rouge, La.

FREDERICK F. PILLET, (S.), (1922), Professor, Civil Engineering, Louisiana State University, 730 No. 10th St., University, La.

ROYAL S. POLHAMUS, (1940), Chief Engineer, Southern Advance Bag & Paper Co., Inc., 2608 Carrollton Ave., New Orleans.

ARTHUR C. PORTER, (S. J.), (1940), Assistant Superintendent, Engineering Dept., W. Horace Williams Co., Camp Claiborne, Alexandria, La.

JOHN L. PORTER, (L. M.), (1924), Consulting Engineer, 8407 Panola St., New Orleans.

W. D. POSTELL, (S.), (1939), Assistant Office Engineer, La. Hwy. Comm., 631 St. Anthony St., Baton Rouge, La.

JOHN E. POTTHARST, (1937), President, Mechanical Equipment Corporation, 861 Carondelet St., New Orleans.

CRAWFORD POWELL, (J.), (1937), Assistant Engineer, New Orleans Purification Plant, 7725 Belfast St., New Orleans.

IRVING R. PRAY, (S.), (1939), Bridge Department, La. Hwy. Comm., Baton Rouge, La.

H. E. PRITCHARD, JR., (J.), (1939), Engineer, 2414 Palmer Ave., New Orleans.

— Q —

PAT H. QUINLAN, (1925), Drainage Engineer, Sewerage and Water Board, 526 Carondelet St., New Orleans.

— R —

GROVER CLEVELAND RACKERBY, (1926), Permit Section, U. S. Engineers ,1st New Orleans District, 51 Neron Place, New Orleans.

WALTER S. RAINVILLE, JR., (1934), Director of Research Department, New Orleans Public Service Inc., 317 Baronne St., New Orleans.

EDWARD S. RANDOLPH, (N. R.), (1939), Consulting Engineer, Panama Canal, Box 441, Balboa Hts., Canal Zone.

MOSES L. RANDOLPH, (S.), (1939), Civil Engineer, Arkansas Natural Gas Corporation, Shreveport, La.

CHARLES FREDERICK RANTZ, (1924), Refrigerator Engineer, 436 Elmira St., New Orleans.

STANFORD RAYNE, SR., (S.), (1940), Department Foreman, Mechanical Dept. Standard Oil Company of Louisiana, R. F. D. No. 4, Baton Rouge, La.

LEROY P. RAYNOR, (1940), Lieutenant Commander, U. S. Coast and Geodetic Survey, Room 314, Customhouse, New Orleans.

MICHAEL H. REILLY, (1940), Draftsman, Illinois Central R. R., 4402½ Canal St., New Orleans.

THOMAS J. RENNIE, (J.), (1940), 4904 Baronne St., New Orleans.

FRANK L. REYNOLDS, (N. R.), (1916), Vice-President, Irons & Reynolds, Inc., Building Construction, 420 Lexington Ave., New York City, 115 Ocean Ave., Brooklyn, N. Y.

HAMPTON REYNOLDS, (1937), Consulting Engineer, Room 404, Sewerage and Water Board Bldg., New Orleans.

GERALD L. RHODES, (1934), Electrical Engineer, Power Dept., New Orleans Public Service Inc., 2437 Marengo St., New Orleans.

WILLIAM H. RHODES, (1927), Asphalt Dept., Shell Oil Co., 505 Canal Bldg., New Orleans.

GEORGE P. RICE, (1924), Rice and Staples, Consulting Engineers, 1006 Baronne Bldg., New Orleans.

R. B. RICHARDSON, (S.), (1937), Construction and Maintenance Engineer, Dept. of Highways, Baton Rouge, La.

GEO. J. RICHAUD, (1937), Engineer, New Orleans Public Service Inc., 317 Baronne St., New Orleans.

C. W. RICKER, (1928), Professor, Head of School of Electrical Engineering, Tulane University, New Orleans.

A. F. RIDEOUT, (S.), (1937), City Engineer, De Ridder, La.

FRANK RIESS, (J.), (1940), Mechanical Engineer, Estimator and Field Supervisor, George J. Glover Company, 4320 Pitt St., New Orleans.

JOHN RIESS, (L. M.), (1906), Civil Engineer and Contractor, Carondelet Bldg., New Orleans.

CHARLES L. RITTENBERG, (1937), Engineer with Myers, Whitty & Hodge, 8333 Pritchard Place, New Orleans.

WILLIAM S. ROATEN, (N. R.), (1940), Erecting Superintendent, Worthington Pump & Machinery Corporation, Buffalo, N. Y.

JAMES M. ROBERT, (L. M.), Dean, College of Engineering, Tulane University, New Orleans.

A. RODI RODRIGUEZ, (1938), Civil Engineer, 1628 No. Dupre St., New Orleans.

EDWIN J. H. RODRIGUEZ, (1918), care Johns-Manville Corporation, 143 Sherwood Forest Drive, New Orleans.

EVERETT G. ROESSLE, (1926), Engineer, with Geo. P. Rice, 1019 Leontine St., New Orleans.

C. O. ROOME, (1937), Sales Engineer, Goodyear Tire & Rubber Company, 2439 General Taylor St., New Orleans.

NORMAN H. ROSS, (L. Aff.), (1938), Secretary and Salesman, Ole K. Olsen, Inc., 823 Perdido St., New Orleans.

ALFRED J. ROTH, JR., (1938), Civil Engineer, 1502 Gov. Nicholls St., New Orleans.

RALPH K. ROTHROCK, (1938), Sales and Design Engineer, 5316 Dryades St., New Orleans.

— S —

LT. H. S. SALZER, (1927), Assistant Maintenance Officer, U. S. Coast Guard, 327 Customhouse Bldg., New Orleans.

HYMAN SAMUELSON, (J.), (1940), Fellowship in Civil Engineering, Tulane University, 3938 Delachaise St., New Orleans.

W. H. SCALES, (1930), Architectural Engineer, Southern Division Manager, National Lumber Manufacturers Association, 520 Canal Bldg., New Orleans.

J. GILBERT SCHEIB, (1935), Assistant Supervisor of Management, Housing Authority of New Orleans, 2412 General Pershing St., New Orleans.

CARL SCHNEIDER, (1940), Consulting Engineer, 7711 Plum St., New Orleans.

ARTHUR M. SCOTT, (1938), Structural Engineer, Ole K .Olsen, 7035 Chestnut St., New Orleans.

HARRY D. SCOTT, (N. R.), (1920), Manager, Bragman's Bluff Lumber Company, Puerto Cabezas, Nicaragua.

ROBERT MALLARD SEAGO, (1938), Efficiency Engineer, New Orleans Public Service Inc., Market Street Station, New Orleans.

PAUL T. SEASHORE, (1934), Vice-President, La. Land and Exploration Co., 1026 Whitney Bank Bldg., New Orleans.

GEORGE ARTHUR SEAVER, (1920), Member of Firm, Geo. J. Glover Co., Inc., 1219 Eleonore St., New Orleans.

SOLIS SEIFERTH, (1927), Architect, Secretary-Treasurer, Weiss, Dreyfous & Seiferth, Inc., 600 Maison Blanche Bldg., New Orleans.

ARTHUR M. SHAW, (Nov. 14, 1910), Consulting Engineer, 1622 Cadiz St., New Orleans.

RICHARD M. SHAW, (J.), (1937), Engineering, U. S. Engineers, 6308 Camp St., New Orleans.

HERBERT M. SHILSTONE, (1932), Chemical Engineer, 1662 Valmont St., New Orleans.

HERBERT M. SHILSTONE, JR., (N. R. J.), (1933), Civil Engineer, Shilstone Testing Laboratory, 301 M. & M. Bldg., Houston, Tex.

HARRY H. SHUTTS, (S.), (1935), Civil Engineer, 92½ Ryan St., Lake Charles, La.

WALTER S. SIMPSON, (1933), Engineer, 1103 Soniat St., New Orleans.

LESTER C. SMITH, (1920), Vice-President, Doullut & Ewin, Inc., 3503 Prytania St., New Orleans.

S. C. SMITH, (S.), (1939), Engineer, Box 31, New Roads, La.

T. BAKER SMITH, (S.), (1919), Civil Engineer, P. O. Box 266, Houma, La.

EDWIN J. SONIAT, (J.), (1940), Assistant Electrical Engineer, 2807 Bell St., New Orleans.

HERFORD B. SOUTHWOOD, (1938), U. S. Engineers, 7933 Maple St., New Orleans.

W. HOBSON SPAAR, (1934), Office Engineer, State Board of Engineers, 3400 Nashville Ave., New Orleans.

WILLIAM F. STANDKE, JR., (S. J.), (1940), Engineering Dept., United Gas & Pipe Line Company. P. O. Box 1407 ,Shreveport, La.

LEROY AUGUSTUS STAPLES, (1931), Structural Engineer, with Geo. P. Rice Consulting Engineers, 1915 Short St., New Orleans.

DAVID STAYER, (N. R.), (1933), Assistant Radio Engineer, U. S. Engineers, Louisville, Ky.

REINHARD A. STEINMAYER, (1925), Associate Professor of Geology, Tulane University, 7933 Oak St., New Orleans.

ERICH R. STEPHAN, (1938), Instructor in Mechanical Engineering, Tulane University, New Orleans.

DAVID WHITE STEWART, (1920), Chief Engineer, Market Street Station, New Orleans Public Service Inc., Market and So. Peters Sts., New Orleans.

FRANK M. STONE, (1937), Architect and Engineer, 1800 Masonic Temple, New Orleans.

THOMAS M. SUTTER, (1938), Manager, W. F. Jackson Co., 222 Balter Bldg., New Orleans.

HERBERT C. SWAN, (1923), Electrical Instructor, Delgado Trade School, 6314 Magazine St., New Orleans.

E. H. SWICK, (S.) (1939), Junior Highway Engineer, Bureau of Public Roads, 725 Concordia St., Baton Rouge, La.

IRA W. SYLVESTER, (L. M.), (March 25, 1901), City Engineer, Rapides Bank Bldg., Alexandria, La

— T —

FRANCIS M. TAYLOR, (1938), Assistant Professor of Chemical Engineering, Tulane University, New Orleans.

W. W. TENNANT, (S.), (1937), Co-ordination Division, Standard Oil Company of Louisiana, 520 Convention St., Baton Rouge, La.

L. W. TERRY, (S.), (1940), Highway Engineer ,Box 349 DeRidder, La.

H. L. THACKWELL, (N. R.), (1937), Consulting Engineer, 209 E. Cotton St., Longview, Texas.

S. A. THEARD, (S.), (1920), Engineer and District Sales Manager, Oyster Shell Products Corporation, Inc., Morgan City, La.

IRA L. THOMAS, (S.), (1939), Office Manager, State Wide Highway Planning Survey, La. Hwy. Comm., Baton Rouge, La.

W. L. THOMPSON, (S.), (1939), Bridge Construction Engineer, La. Hwy. Comm., Baton Rouge, La.

STEWART TICKNOR, (S.), (1922), Civil Engineer, 155 Royal St., Baton Rouge, La.

JOHN PAUL TOBIN, (J.), (1940), Mechanical Engineer, Gas Dept., New Orleans Public Service Inc., 4909½ Carondelet St., New Orleans.

JAMES M. TODD, (1923), Consulting Mechanical and Electrical Engineer, 405 Citizens Bldg., 1561 Exposition Blvd., New Orleans.

LOUIS TOGNONI, (J.), (1933), Industrial Sales Division, New Orleans Public Service Inc., 2814 Serantine St., New Orleans.

JAMES F. TOMKINS, (N. R.), (1932), Engineer Salesman, Tennessee Coal, Iron & R. R. Co., Carnegie Steel Co., Box 159, Houston, Texas.

NELSON W. TREMBLAY, (1933), 730 Orion Ave., New Orleans.

SIDNEY E. TROUARD, JR., (1928), Electrolysis Engineer, New Orleans Public Service Inc., 317 Baronne St., New Orleans.

ADAM S. TROWBRIDGE, (1938), Assistant Superintendent, Dibert, Bancroft & Ross, 1324 Fern St., New Orleans.

WILLIAM N. TULLER, (S. J.), (1937), Chemical Engineer, Freeport Sulphur Company, Box 691, Port Sulphur, La.

GEORGE H. TUNNER, (1939), Resident Engineer in Charge, Local Engineering and Inspection, Travellers Insurance Co., 2830 Palmer Ave., New Orleans.

W. O. TURNER, (1931), President and General Manager, Louisiana Power & Light Co., 142 Delaronde St., Algiers, La.

—V—

S. J. VAN NORMAN, (1937), Division Engineer, Sewerage and Water Board, in charge of Sewer and Water Construction and Maintenance, 4211 S. Rocheblave St., New Orleans.

A. P. VILLA (S.), (1939), Chief Coding Clerk and Assistant Inventory Analyst, La. Hwy. Comm., (S. W. H. P. S.), 228 N. 11th St., Baton Rouge, La.

LUCIEN T. VIVIEN, JR., (1926), Assistant Construction Superintendent, with Gulf Refining Company, Maison Blanche Bldg., New Orleans.

WM. VON PHUL, (L. M.), (July 1, 1908), President, Ford Bacon & Davis Inc., 39 Broadway, New York, N. Y.

ALVIN A. VOSS, C. E., (N. R. J.), (1927), Assistant Engineer, U. S. D. A.—S. C. S. Lake Ella Drive, Tallahassee, Fla.

—W—

FRANK H. WADDILL, (L. M.), Civil Engineer, 1820 Canal Bank Bldg., New Orleans.

GEORGE D. WADDILL, (L. M.), (1911), Civil Engineer, 7433 Maple St., New Orleans.

RICHARD E. WAGNER, (J.), (1933), Civil Engineer, 4201 Elba St., New Orleans.

J. D. WALKER, (L. M.), (Jan. 8, 1908), Engineer for Craven & Lang, American Bank Bldg., New Orleans.

WAYNE PAUL WALLACE, (S. J.), (1936), Instructor in Civil Engineering, College of Engineering, Louisiana State University, Atkinson Hall, University, La.

WILLIAM WALLACE, (L. A.), (1931), General Contractor, 131 No. Jefferson Davis Parkway, New Orleans.

STEPHEN J. WALLBILLICH, (1926), Engineer, 4214 State St., New Orleans.

HARRY W. WATERFALL, (S.), (1937), Associate Professor Mechanical Engineering, Louisiana State University, University, La.

R. I. WATTS, (S. Aff.), (1939), Draftsman, La. Hwy Comm., 320 Connel St., Baton Rouge, La.

ALVIN A. WEHRMAN, (1940), Dredging Inspector, Second New Orleans Eng. District, 1036 Jefferson Ave., New Orleans.

IRWIN C. WEIDIG, (J.), (1940), 4319 Orleans Ave., New Orleans.

LEO S. WEIL, (1918), Consulting Engineer, 425 So. Peters St., New Orleans.

C. O. WEILBACHER, (J.), (1940), 2835 Esplanade Ave., New Orleans.

LEON C. WEISS, (1918), Weiss, Dreyfous & Seiferth, Architects, 600 Maison Blanche Bldg., New Orleans.

EDWARD J. WELSCH, JR., (J.), (1938), 7 Allard Blvd., Apt. 1, New Orleans.

WILLIAM WHIPPLE, (S.), (1936), Professor of Steam Engineering, L. S. U., University, La.

MAJOR J. LESTER WHITE, (1937), Resident Engineer, U. S. Army, Jackson Barracks, New Orleans.

W. S. WHITE, (L. M.), (Jan. 1, 1898), Civil Engineer, Surveying, Box 82, Sulphur, La.

LAWRENCE V. WILLEY, (S.), (1939), Assistant Engineer, Dept. of Highways, 430 Centenary Drive, Baton Rouge, La.

GERALD C. WILLIAMS, (S.), (1940), Inspector, Standard Oil Company of Louisiana, 2021 Chestnut St., Baton Rouge, La.

R. W. WILLIAMS, (S.), (1940), Process. Engineering Division, Standard Oil Company of La., 2936 Adams St., Baton Rouge, La.

W. HORACE WILLIAMS, (L.M.), (1908), President and General Manager, W. Horace Williams Co., Inc., Engineer and General Contractor, Southern Bldg., 833 Howard Ave., New Orleans.

C. S. WILLIAMSON, (1916), Head of School of Chemical Engineering, Tulane University, New Orleans.

GEORGE F. WILLIAMSON, (J.), (1939), Junior Engineer, Housing Authority of New Orleans, 7830 Burthe St., New Orleans.

ARMAND L. WILLOZ, (1922), Chief Engineer, Orleans Levee Board, 1626 Fern St., New Orleans.

VICTOR L. WILLOZ, (L. M.), (Jan. 1, 1900), Distribution Engineer, New Orleans Public Service Inc., 317 Baronne St., New Orleans.

J. NORMAN WILSON, (L. M.), (1911), Assistant Technical Engineer, Sewerage and Water Board, 2425 Audubon St., New Orleans.

A. R. WINGATE, JR., (1924), Manager, Fabricating Dept., Jones & Laughlin Steel Corporation, 1525 Exposition Blvd., New Orleans.

A. A. WOODS, (N. R.), (1914), Chief Engineer, Maintenance of Way and Structures, Southern Railway System, Lines West, 307 East Fourth St., Cincinnati, Ohio.

D. F. WOODS, (S.), (1922), Lutcher, La.

CHARLES J. WYLER, (1919), Assistant Chief Engineer, A. M. Lockett & Co., Ltd., 530 Jackson Ave., New Orleans.

—Z—

MARIO G. ZERVIGON, (J.), (1937), Instructor in Electrical Engineering, Tulane University, 2222 Lowerline, New Orleans.

ROBERT ZIFFLE, (J.), (1937), Research Department, New Orleans Public Service Inc., 317 Baronne St., New Orleans.

STUDENT ENGINEERS

R. T. BASNETT, 4600 Prieur Place.
HENRY J. BULTMAN, JR., 2320 Joseph St.
JOHN S. BURWELL, 7011 Freret St.
JOHN CULBERTSON, 328 Audubon St.
THEODORE W. DIETZE, 5923 Chestnut St.
STANLEY G. DINKEL, 2540 Wisteria St.
JAMES T. DWYER, JR., 1537 Pine St.
M. J. deLERNO, 3029 Louisiana Ave. Parkway.
LLOYD P. FADRIQUE, 6853 West End Blvd.
MORRIS H. GOLD, 2221 Calhoun St.
RICHARD A. HERROD, JR., St. Rose, La.
ELLIS LEVIN, 2713 Chestnut St.
S. C. MURPHY, 15 Rosa Park.
RALPH NOLAN, JR., 237 Bermuda St.
F. J. ORY, 312 Millaudon St.
JOSEPH ALBERT POLACK, 401 Walnut St.
IRWIN A. RABENOVITZ, 3625 Napoleon Ave.
DOUGLAS SCHERER, 1205 No. Lopez St.
GEORGE H. THOMPSON, 8236 Panola St.
WALTER J. VERLANDER, 1140 Louisiana Ave.
W. A. WOOD, JR., 1302 Broadway.

SUMMARY

Honorary Members	4
Life Members	33
Local Members	238
State and Non-Resident Members	136
Associate Members	3
Affiliate Members	14
Junior Members	60
State and Non-Resident Junior Members	25
Student Members	21
Total	534

PAST PRESIDENTS

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

MINUTES OF THE MEETINGS AND BUSINESS OF THE SOCIETY

Minutes of the Meeting of the Board, November 11, 1940.

The meeting was called to order by President Rhodes with the following present: Crump, Godat, Kammer, Ricker, Hill.

President Rhodes announced that the A. S. C. E. had appointed the following committee to cooperate with the American Institute of Architects in revising the building code: F. N. Billingsley, John Klorer, M. H. Bell, Bernard Dornblatt. The following committee was appointed to represent Louisiana Engineering Society: F. N. Billingsley, John O'Neill, W. H. Scales, H. J. Malochee, G. E. May.

A letter from Dean Robert was presented, in which he stated that due to press of work, it would be necessary for him to resign as Editor of the Proceedings. The Board took no action, as Dean Robert will finish out the year 1940. The incoming Board will consider the matter of appointing a new editor.

A resolution committee, consisting of A. J. Harris, J. M. Todd, G. R. Hammett was appointed to present at the next meeting a resolution on the death of Charles Wiggin, Jr.

Mr. Karl P. Kammer reported progress made on plans for the formation of a Junior Group. He stated that he hopes to have information to present to the members at the next meeting of the Society.

There being no further business, the meeting adjourned.

A. M. HILL, Secretary-Treasurer.

Minutes of the Meeting of the Society, November 11, 1940.

The meeting was called to order in the Hunt Room of the St. Charles Hotel by President Rhodes. Approximately 80 members and guests were present.

The reading of the minutes of the previous meeting was dispensed with.

President Rhodes announced that in order to cooperate with the American Institute of Architects in revising the building code, the following committee had been appointed: F. N. Billingsley, J. H. O'Neill, M. H. Bell, H. J. Malochee, G. E. May.

President Rhodes also called attention to the names of the Nominating Committee, which appeared on the announcement cards for the meeting.

A letter in connection with National Art Week was presented, the letter being written to the Society by Miss Angela Gregory.

Mr. W. H. McClendon spoke about the needs of the Community Chest and made an appeal for generous donations during the present drive.

President Rhodes then introduced Mr. W. L. Lehmkuhl, Plant Superintendent of Flintkote Co., who spoke on "Utilization of Waste Materials, Evolution of a Local Industry."

Following his talk, a moving picture depicting plant operations was shown.

Mr. Lehmkuhl then answered questions, after which a rising vote of thanks was tendered the speaker.

The meeting then adjourned to the usual collation.

A. M. HILL, Secretary-Treasurer.

Minutes of the Meeting of the Society, December 9, 1940.

The meeting was held in the Mirror Room, Jung Hotel, and was called to order by Vice-President Ricker. Approximately 110 members and guests were present.

The reading of the minutes was dispensed with.

Mr. D. W. Godat, Chairman of the Nominating Committee presented the report. Other members of committee: A. L. Dunlap, A. T. Dusenbury.

President, D. W. Stewart; First Vice-President, L. J. Lassalle; Second Vice-President, C. G. Cappel; Secretary-Treasurer, J. K. Mayer; Director, 2 years, C. M. Kerr; Director, 2 years, R. B. Kohnke; Director, 1 year, to fill term of Mr. Barnett, A. M. Fromherz.

Mr. Godat stated that the present Secretary-Treasurer was not renominated since national defense duties occupied so much of his time that he had asked to be relieved of the office of Secretary-Treasurer.

A resolution was presented on the death of Mr. Charles Wiggin, Jr.

Mr. Karl P. Kammer, General Chairman of the Annual Meeting in 1941, presented a resumé of the program. Additional information about recreational features was presented by Mr. D. W. Stewart, Chairman of the Recreation Committee.

Prof. C. S. Williamson introduced the speaker of the evening, Mr. Sidney D. Kirkpatrick, Editor of the Chemical and Metallurgical Engineering. He spoke on "Preparedness in Terms of Men, Money and Materials." His talk was illustrated with slides and was intensely interesting. Previous to his address colored movies were shown of various synthetic materials produced by a large manufacturer of rayon, plastics, etc.

Prof. B. W. Pegues invited membrs to be present at the Baton Rouge Annual Meeting on Thursday, December 12.

A rising vote of thanks was extended to Mr. Kirkpatrick.

The meeting adjourned to the collation.

A. M. HILL, Secretary-Treasurer.

ANNUAL REPORTS

REPORT OF THE PRESIDENT OF THE LOUISIANA ENGINEERING SOCIETY FOR THE YEAR 1940.

At this tme it is customary for the retiring president of the Society to make a brief report of the events, whether successes or failures, that took place during the past year, together with a statement as to the condition of the Society. The Society has had a most successful year as to increase in membership, a slight increase in our treasury, a larger attendance at our meetings, and a most excellent schedule of speakers at the regular monthly meetings.

The Annual Meeting was held January 12th and 13th, 1940. It had by far, the largest attendance of any annual meeting so far held by ourselves. There were 416 engineers and students registered and 168 attended the banquet held that Saturday night. The papers presented were very instructive and interesting with each session well attended. All of the meetings were held in the St. Charles Hotel.

During the year our regular technical meetings were held each month. The previous policy of meeting during the summer months was continued, as the hotels are now all air-conditioned and no discomfort was experienced due to hot weather. Your president has always been of the opinion that the Louisiana Engineering Society should consider itself as the general representative engineering group in the state and as such should cooperate as closely as possible with the various local chapters of national engneering societies. Accordingly, letters were written to the various local chapters and we were able to arrange joint meetings with the American Society of Mechanical Engineers, the Society of American Military Engineers, the American Society of Heating and Ventilating Engineers, and the American Institute of Chemical Engineers.

The membership in the Society has shown a healthy increase. At the beginning of the year we had 560 members, of which 49 were students. For various reasons beyond our control the student membership dropped to 17, but our junior members jumped to 75. This, to my mind, is one of the brightest spots in our report. This large increase in Juniors would indicate that our activities are interesting the younger engineers who wish to become members in our Society. It has been the purpose of the Board of Direction to further this interest and place the younger members in more active participation and responsibility. The total membership of the Society as of January 1, 1941, is 577, which is a very substantial increase.

You have already heard the report of the Treasurer. The report indicates that we have lived well within our income, have paid all our

accounts up to date, and have a few dollars more than last year at this time.

The Baton Rouge Section of the Society has made excellent progress. It has its own set of officers, holds a regular series of technical meetings and has more than doubled its membership since last year. Since Baton Rouge is becoming more and more a large industrial center with many mechanical, electrical, and chemical engineers there, I believe that the Baton Rouge Section can easily grow to over 100 members.

The regular meeting of the Society held in Baton Rouge was very well attended. Supper was served in the Venetian Room at the University. One hundred and fourteen members and guests were present. Professor Pegues welcomed the members and outlined the program. We then adjourned to the Physics Building, where technical papers were read. The Society enjoyed this most pleasant gathering with the Baton Rouge members as hosts.

During the year two most enjoyable events were held. On June 20th the Annual Golf Tournament was held at Metairie Golf Club. The attendance was the largest yet for this event. The prizes were rich, much desired, and plentiful, thanks to the very active and efficient Golf Committee. Those not participating in golf were intrigued with horse-shoe throwing and other stimulating activities. At night was the Golf Banquet with award of prizes followed by a very pepped-up floor show.

On Sunday, October 6th, the Society held its first picnic. As Chairman of the Entertainment Committee, Mr. Ole K. Olsen suggested to the Board and later to the Society that we should hold a picnic to which the members should bring their wives and children and guests. The suggestion was unanimously accepted and the picnic planned and held at Camp Salmen on Bayou Liberty. There were over 160 present, of which 56 were members. The rest were the wives and children and guests. Games, races, and other sports were participated in and prizes were donated by the Woman's Auxiliary of the Society, who also contributed to the expense of the picnic. The affair was voted a wonderful success, and it is hoped that we will make the picnic a regular event to be held at least once and possibly twice during the year.

I wish especially to point out the excellent record made by the Employment Committee, of which Mr. R. H. Baumbach was Chairman. Since the death of Mr. Baumbach the work has been carried on very ably by the other members, including Mr. R. P. Bassich and Mr. E. L. Fithian, who has acted as Chairman. The Committee received 120 applications for work. There were 74 vacancies reported and of these they were able to fill 43. I believe the securing of positions for 43 engineers is a most noteworthy attainment.

It is somewhat difficult and possibly not exactly fair to single out one committee over another for excellence of performance. The

Technical Papers Committee, with C. M. Kerr, Chairman, were able to bring to us most excellent speeches on a varied schedule of subjects. The Entertainment Committee, Ole K. Olsen, Chairman, has furnished us with delightful collations after the meetings and also directed the picnics. Mr. David W. Stewart very effectively arranged the Golf Tournament. The finances have been closely watched and checked by the Finance Committee, Horace Crump, Chairman.

It is desired to give very prominent mention of the efforts of the Legislative Committee to secure passage through the last Legislature of an act to require the license and registration of all professional engineers engaged in responsible practice of their profession in Louisiana. As mentioned in my address a year ago, I stated that if the membership of the Society so voted, the Legislative Committee would draw up such an act and attempt to secure its passage. Major Bedell was the first Chairman and he and his committee held many meetings long into the night. They also called in others not on the committee, and at last drew up a proposed bill that was satisfactory to all those interested enough to attend the meeing. Meanwhile, the increased business through the port took so much of Major Bedell's time that he was compelled to resign and we were indeed fortunate to have Dean LaSalle take over. Many meetings were held in Baton Rouge in efforts to secure agreements with various groups. At last hearings were arranged before the Legislature Committee and although the Committee were favorable the first day, I regret to report that the next day the report was unfavorable. The Committee made another later attempt to secure a favorable hearing without success. I am convinced that the bill never received proper consideration by the Legislature and furthermore, that due to the rush of passing new "must" legislation by the new Legislature, bills of such general importance as ours were neglected. I personally believe the Louisiana Engineering Society should continue in its efforts to secure proper registration and licensing laws similar to those in adjacent states to apply to all those who engage in professional engineering. I wish to give especial credit for efforts by Dean LaSalle, F. B. Grevenberg, C. S. Williamson, H. L. McLean, and many others.

The Society has been hit especially hard by death during the past year. We have lost many dear and beloved members, friends who have taken very prominent part in the conduct of our affairs. We will remember always with deep affection our friendship with them.

Floyd Hamilton	James M. Robert, Jr.	Ben Willard
Wade Barnett	R. H. Baumbach	Charles Wiggins
George Earl		

At this time I take great pleasure in giving our thanks to the Woman's Auxiliary. At the Annual Meeting a year ago the ladies served coffee in Dixon Hall, entertained the visiting ladies from out of town, assisted on the Reception Committee and at the Banquet and

Dance. On St. Patrick's Day the Auxiliary invited the Society to attend their entertainment and dance at the Yacht Club. The ladies helped make our picnic the success that it was. President Mrs. Frost and her assistants have given the Society the greatest of help and inspiration and I am sure that Mrs. Dunlap, the incoming president, will do as well with our Society's incoming administration.

I wish at this time to officially thank Karl Kammer and all on his General Committee of Arrangements for this Annual Meeting. He and his committees have worked hard and very efficiently in bringing forth such a splendid program. The list of nationally famous speakers, the arrangement for trips and entertainment, publicity in the papers,—all these results have been carefully planned and consummated.

Today is the last time that the Society is honored by having our good friend Arthur M. Hill as Secretary-Treasurer. Due to the greatly increased duties and responsibilities put on Mr. Hill at Tulane in the present national defense program a few months ago, he advised the Board that he wished to be relieved of the position he has held for five years. Much to the deep regret of every member of the Board and of the entire Society, his resignation was accepted. Mr. Arthur Hill has been the hardest working member of the Board. He has labored faithfully and very efficiently at all times and much of the success of the Louisiana Engineering Society is due to the untiring efforts of our retiring genial Secretary-Treasurer. We wish to thank him for the things he has done and hope we will always have him with us.

In conclusion I wish to thank all those who served on committees and also those not on committees but who did their part unsolicited. I have found that no matter what the requirements are there are always members of the Society ready to step forward and help the Board of Direction whenever help is needed. I have immensely enjoyed being president and will always be happy to serve in any way I can.

WILLIAM H. RHODES.

REPORT OF THE SECRETARY-TREASURER

Receipts, 1940:

Dues	$3,004.65	
Advertising	364.40	
Contributions	1.00	
Proceeding Sales	3.10	
Income from Investments	73.50	
Dividends from Frozen Funds	256.37	
Miscellaneous Income	177.45	
		$3,880.47

Expenses, 1940:

Proceedings	$1,230.66	
Entertainment and Outing	124.21	
Scholarships	165.00	
Printing and Postage	501.10	
Present for President	29.75	
Library Expenses	24.50	
Bond for Secretary-Treasurer	10.00	
Refreshments	257.38	
General Expenses	166.38	
Annual Meeting	559.48	
American Engineering Council	25.00	
Salary Secretary-Treasurer	600.00	
Porter for 422 St. Charles	30.00	
		$3,723.46

Balance ..... $ 157.01

Assets:

Cash, Whitney National Bank, Checking Account		$1,972.33
Sixth District Building and Loan Association	$ 500.00	
Greater New Orleans Homestead Association	1,208.76	
Union Homestead Association	500.00	
Commonwealth Homestead Association	300.00	
Security Building and Loan Association	500.00	
Columbia Building and Loan Association	300.00	
Savings Account, National Bank of Commerce	705.84	
Total Insured Investments	$4,014.60	
Total Available Assets		$5,986.93
Frozen Funds, Canal Bank, Book Value	$ 238.18	
Frozen Funds, Interstate, Book Value	2,109.59	

Submitted by

A. M. HILL, Secretary-Treasurer.

PROCEEDINGS
OF THE
LOUISIANA ENGINEERING SOCIETY

FEBRUARY, 1941

"PATRONIZE OUR ADVERTISERS"

INDEX TO ADVERTISEMENTS

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.

LASEC NEWS

SECTION OFFICERS

President,
J. A. McNIVEN
1st Vice-President,
F. N. BILLINGSLEY
2nd Vice-President,
V. J. BEDELL
Secretary-Treasurer,
D. W. GODAT

NEW ORLEANS, LA.

PUBLICITY COMMITTEE

J. M. LeDOUX, Chm.
CHARLES M. KERR
GEORGE JANVIER, JR.

Address Communications to:
5700 Garfield Street,
New Orleans, La.

Vol. III, No. 1 | Published Bi-Monthly | February, 1941

THE PRESIDENT'S LETTER

To the Membership
Louisiana Section A. S. C. E.:

Through this medium, I wish to express my appreciation of the honor which you have conferred upon me in electing me to the presidency of the Section. I am deeply grateful too for the selection of the very able Officers whom you have chosen to serve with me.

The Louisiana Section has enjoyed a material and steady growth, and it is our sincere purpose that with your help and cooperation we may still further advance the aims and objectives of the Section and the Society.

At this time when our thoughts are turning toward public service, community safety and national defense, a very definite opportunity is afforded the membership of this Society to be of real service. It is the sincere desire of your Officers and your Board of Directors to aid in any way possible our community and our State in their efforts to cooperate with the National Government and expedite national defense.

The fulfillment of this ambition, however, depends to a large extent upon the earnest cooperation of the membership, and of the committee personnel in particular. To this end the Officers and the Board will be glad to receive comments and suggestions which may be helpful in carrying out this policy.

We wish also to take this opportunity to welcome to this community the officers and engineers of the Army, Navy, and Air Corps who have been assigned to the various sections of this State, and to offer our assistance in their adjustment of themselves to the business, professional and social life of this community.

Very sincerely yours,

J. A. McNiven, *President.*

NEWS ITEMS

The Louisiana Section of the American Society of Civil Engineers participated actively in the Annual Convention of the Louisiana Engineering Society at New Orleans, January 10th and 11th.

A well attended meeting held in connection with the convention was presided over by President N. E. Lant.

An interesting and timely technical paper, "The Story of Steel," was presented by Mace H. Bell, Jr., District Engineer, American Institute of Steel Construction, followed by motion pictures tracing each successive step in the manufacture of steel and the rolling of structural shapes.

Acting Governor Marc Mouton has announced the appointment of Prof. B. W. Pegues and Col. Edward S. Bres as members of the State Board of Engineering Examiners, succeeding John Klorer, resigned, and the last Frank A. Muth.

The description of a novel and effective method employed to rehabilitate timber piles destroyed by marine life in the harbor at Pensacola, Fla., by C. G. Cappel, Vice-President, W. Horace Williams Co., Inc., appeared among the featured articles in Civil Engineering for October.

A booklet, "The Protection of Piles Against Damage by Marine Life," by the same author, is available to Engineers and organizations interested in the subject.

On January 24th, the members of the Louisiana Section again assembled at the home of Ole K. Olsen to attend the Annual New Orleans Meeting. An exceptionally large attendance participated.

The meeting moved through the order of business and heard Col. Edward S. Bres give an extemporaneous account of the aims and activities of the Society. This was followed by the presentation of a certificate of Life Membership to Colonel Arthur M. Shaw. To this recognition, the members added their congratulations and good wishes.

Continuing, officers were elected for this year. J. A. McNiven was elected President, F. N. Billingsley, 1st Vice-President, Maj. V. J. Bedell, 2nd Vice-President, and David Godat, Secretary-Treasurer.

The technical feature of the evening was a paper, "The Bayonne New Jersey Terminal," presented by Col. Marcel Garsaud, Manager, New Orleans Dock Board, who is a recognized authority on harbor development and management.

Traditional climax to the Annual New Orleans Meeting, the Rathskeller supper occupied all interests for the remainder of the evening.

The new Board of Directors has announced committee chairmen to serve during the current year, as follows:

Committee on Licensing of Engineers: Bernard H. Grehan.

Committee on Scholarship Awards: Col. Edward S. Bres.

Committee on Membership: Maj. V. J. Bedell.

Committee on Employment: E. L. Mire.

Committee on Publicity: J. M. LeDoux.

Committee on Aims, Activities and Professional Objectives: Alvin M. Fromherz.

Committee on Foundation Study: G. A. Heft.

Special Committee to Study the Advisability of Increasing Dues for Expansion of Lasec News: Maj. V. J. Bedell.

Special Committee on Civilian Protection in War Time: Maj. V. J. Bedell.

PERSONALS

This column wishes to convey the appreciation of the membership to N. E. LANT, J. A. McNIVEN, F. N. BILLINGSLEY and MAJ. V. J. BEDELL, for the splendid administration of the affairs of the Section during their term of office. Their leadership has stimulated an increased interest and activity and contributed greatly towards the further development of the Section.

CAPT. BERNHARD DORNBLATT has recently been called to active duty with the U. S. Engineers. The Committee on Publicity is aware of the responsibility which rests upon it to adequately continue the splendid work he inaugurated and takes this means to express to him its best wishes for the best of luck.

Until the millennium produces a more gracious host, we cast our vote for OLE K. OLSEN.

We welcome CAPT. G. S. BURRELL, LT. COMDR. H. M. SYLVESTER and LT. E. E. GIBSON, who have recently come to New Orleans to open the Public Works Office of the Eighth Naval District.

MAJ. V. J. BEDELL has been appointed Vice-Chairman of the Commercial Co-Ordinating Council of New Orleans, a city-wide committee for co-ordinating information and data concerning projects sponsored by various city groups and agencies.

COL. EDWARD S. BRES is now Engineering Consultant to Brig. Gen. P. S. Smith, U. S. A., Commanding the Fourth Corps Area, with headquarters at Atlanta, Ga.

October 26th to 29th will bring to New Orleans the Annual Convention of the American Public Works Association. DAVE GODAT is Vice-Chairman of the General Committee on Arrangements.

Our new 1st Vice-President, FRED N. BILLINGSLEY, has been elected a member of the Board of Directors of the New Orleans Association of Commerce, for a three-year term.

Welcome to W. L. BENHAM, President of Benham Engineering Company of Oklahoma City, who

is now in Louisiana in connection with the construction of Camp Livingston near Alexandria.

BOB GOSA and ALEC BEREA were on hand to point out details of the Standard Oil Docks at the Baton Rouge meeting of the Section.

STUDENT CHAPTERS

Tulane University and Louisiana State University are completing first semester examinations. During this period of preparation and examination, the usual activities of the Student Chapters have necessarily been suspended.

MEMBERSHIP CHANGES

ADDITIONS TO MEMBERSHIP

Junior:

THOMAS J. RENNIE, New Orleans, La.
MILLARD P. SNYDER, Shreveport, La.
WILLIAM F. STANDKE, JR., Shreveport, La.
FRED. C. CULPEPPER, JR., Baton Rouge, La.
RICHARD R. WEBERLING, JR., Baton Rouge, La.
CHARLES L. FISHER, New Orleans, La.
EDWARD D. HOGG, Alexandria, La.
THOMAS J. MAKAL, Camp Beauregard, La.
HYMAN SAMUELSON, New Orleans, La.
WALTER E. BLESSEY, Iowa, La.
CHESTER A. FOREMAN, De Ridder, La.
DIETRICH W. JESSEN, Port Sulphur, La.

Associate:

JAMES B. DIVEN, JR., Baton Rouge, La.
JOHN H. FREDERICKSON, JR., Carville, La.

APPLICATIONS FOR TRANSFER

For Associate:

WALTER S. MASK, New Orleans, La.
ROY T. SESSUMS, Ruston, La.

For Member:

GLEN N. COX, University, La.

MEMBERSHIP TRANSFERS

From Junior to Associate:

MACE H. BELL, New Orleans, La.
CHARLES B. SPENCER, New Orleans, La.

EMPLOYMENT OPPORTUNITIES

Civil Service examinations are scheduled for all grades Assistant Engineer, all classes engineering work. Salary $2600 to $4600. Address: U. S. Civil Service Bureau, Customhouse Building, New Orleans, La.

Chief Draftsman and three engineering draftsmen. Salaries open. Address: Mr. C. G. Melville, Chief Engineer, W. Horace Williams Co., Inc., Alexandria, La.

Engineering inspectors for work on the Bomber Base at New Orleans Airport. Temporary. Salary $1800 to $2000. Address: Personnel Office, U. S. Engineers, Foot of Prytania St., New Orleans, La.

DID YOU KNOW THAT:—

The Pontchartrain Railroad, "open for public travel . . . from the Mississippi River . . . to and into Lake Pontchartrain" in September, 1832, was the second railroad built in the United States?

THE PROCEEDINGS
OF THE
LOUISIANA ENGINEERING SOCIETY

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

ARTHUR M. HILL, Editor.

Subscription, $2.00 per annum Single copy, 35 cents

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

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

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

LOUISIANA ENGINEERING SOCIETY

Suite 422 St. Charles Hotel

OFFICERS FOR 1941

President,	DAVID W. STEWART, 317 Baronne St.
1st Vice-Pres.,	LEO J. LASSALLE, University, La.
2nd Vice-Pres.,	C. GLENN CAPPEL, 833 Howard Ave.
Sect.-Treas.,	JOHN K. MAYER, P. O. Station 20.

DIRECTORS

ALVIN M. FROMHERZ, 226 Carondelet St.
KARL P. KAMMER, 317 Baronne St.
CHARLES M. KERR, 5831 S. Robertson St.
RICHARD B. KOHNKE, 932 Picheloup Place.
WILLIAM H. RHODES, 505 Canal Building.

BATON ROUGE SECTION OFFICERS FOR 1941

President,	W. W. TENNANT
1st Vice Pres.,	N. E. LANT
2nd Vice Pres.,	F. F. PILLET
Sect.-Treas.,	CHAS. A. MEYER

STATE BOARD OF ENGINEERING EXAMINERS

J. T. BULLEN, Pres.
E. S. BRES
DONALD DERICKSON
B. H. GREHAN
B. W. PEGUES

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

LOUISIANA ENGINEERING SOCIETY

STANDING COMMITTEES FOR 1941

Committees Sponsored by C. Glenn Cappel

Awards
F. F. Pillet, Chairman
Donald Derickson
B. W. Pegues
J. M. Robert
H. W. Waterfall
C. S. Williamson
J. C. Bendler

Finance
O. K. Oleson, Chairman
D. W. Godat
G. C. Kerr
J. K. Mayer
H. L. McLean
J. L. Fortier

Defense
E. S. Bres, Chairman
V. J. Bedell, Vice-Charman
Donald Derickson
A. M. Hill
L. G. Ireland
John Klorer
A. E. Marks
J. A. McNiven
H. P. Newton
J. H. O'Neill
W. H. Rhodes
A. M. Shaw
C. Floyd

Professional Advancement
J. M. Todd, Chairman
V. J. Bedell
F. N. Billingsley
H. Johnson
R. J. Kuhn
L. J. Lassalle
H. A. Levey
G. E. May
B. S. Nelson
C. B. Norris
John Riess
J. E. Morehiser

Committees Sponsored by Alvin M. Fromherz

Civic and Industrial Affairs
C. L. Nairne, Chairman
A. E. Abaunza
R. T. Burwell
C. C. Crawford
E. L. Cowan
C. B. Dicks
R. E. Gosa
A. J. Harris
P. F. Hoots
S. E. Huey
W. S. Leake
H. L. McLean
A. J. Naquin
J. L. Porter
G. A. Seaver
J. L. White
W. N. Tuller

Legislation
D. W. Godat, Chairman
S. V. Applewhite, Vice-Chairman
F. N. Billingsley
E. S. Bres
A. M. Fromherz
B. H. Grehan
W. B. Gregory
H. B. Henderlite
W. T. Hess
F. E. Johnson, Jr.
T. J. Jones
K. P. Kammer
L. J. Lassalle
G. E. May
J. A. McNiven
F. F. Pillet
W. H. Rhodes
F. M. Stone
C. S. Williamson
W. P. Wallace

Library
L. T. Frantz, Chairman
M. C. Abrahm
W. H. Scales
R. A. Steinmayer
R. M. Shaw

Committees Sponsored by Karl P. Kammer

Engineering Education
C. W. Ricker, Chairman
S. W. Elberson
L. T. Frantz
F. G. Frost
W. B. Gregory
A. M. Hill
W. H. Rhodes
F. M. Taylor
J. M. Todd
H. W. Waterfall
Wm. Whipple
Sidney Ellis, Jr.

Publicity
J. J. Bulliung, Chairman
B. H. Bell
H. W. Fletcher
J. A. Glover
O. K. Olsen
W. S. Rainville, Jr.
Frank Riess

Student and Junior Activity
L. J. Cucullu, Chairman
M. C. Abrahm
J. E. Harvey
G. A. Heft
W. S. Nelson
M. G. Zervigon
W. P. Wallace

Technical Papers
W. S. Rainville, Jr., Chairman
H. M. Blain, Jr.
J. M. Guillory
F. E. Johnson, Jr.
C. M. Kerr
G. C. Kerr
H. A. Levey
E. A. McLellan
E. L. Mire
R. A. Steinmayer
B. J. Haney

Committees Sponsored by Charles M. Kerr

House
R. L. Nall, Chairman
E. S. Bres
H. E. Crump
A. H. Guillot
W. T. Hogg
E. S. Lanphier
W. S. Nelson
M. J. Cramer
C. E. Dolhonde
L. P. Elberson
S. W. Elberson
O. H. Elverum
C. H. Fenstermaker
D. E. Fuellhart
J. B. Gates
A. E. Hotard
J. B. Howze
S. E. Huey
T. J. Jones
N. E. Lant
H. L. Lehmann
C. A. Myers
H. P. Newton
B. W. Pegues
B. B. Pierce
A. F. Rideout
P. T. Seashore
Harry Shutts
T. B. Smith
I. W. Sylvester
S. A. Theard
A. G. Jarreau

Entertainment and Outings
B. H. Bell, Chairman
L. F. Alexander
J. J. Bulliung
R. J. Dreuding
A. L. Dunlap
H. W. Fletcher
R. P. Lockett
David Moodie
H. B. Myers
A. J. Naquin
O. K. Olsen
N. H. Ross
R. M. Seago
A. J. Fransen

Membership, Division "A"
A. L. Dunlap, Chairman
C. E. Abrahamson
F. R. Adams
V. J. Bedell
J. L. Bourgeois
J. T. Bullen
E. L. Cowan

Publications, Division "A"
A. M. Hill, Chairman
J. C. Baehr
H. J. Molaison
J. M. Robert
H. S. Salzer
F. M. Taylor
G. F. Williamson

Committees Sponsored by Richard B. Kohnke

Membership, Division "B"
B. S. Nelson, Chairman
D. S. Elliott
C. A. Myers
J. H. O'Neill
H. I. Brown

Publications, Division "B"
N. H. Ross, Chairman
E. C. Coburn
H. W. Fletcher
J. T. Floyd, Jr.
J. D. Ford
W. H. Grant, Jr.
S. L. Hebrard
G. W. Hill
C. J. Kelly
G. C. Kerr
H. J. Lane
R. P. Lockett
N. L. Marks
L. C. H. McLean
W. P. Oster
E. J. McNamara

Employment
R. P. Bassich, Chairman
E. L. Fithian
G. A. Heft
E. A. McLellan
R. F. Muller
J. C. Bartley

Public Relations
A. T. Dusenbury, Chairman
L. F. Alexander
J. C. Baine, Jr.
B. H. Grehan
A. S. Hackett
G. R. Hammett
A. C. Hays
Noel P. Kammer
A. R. Keiler
N. E. Lant
H. P. Newton
D. H. L. Morris

The last name on each committee is the Junior member, who sits with the committee, but without vote.

THE PROCEEDINGS
OF THE
LOUISIANA ENGINEERING SOCIETY

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

ARTHUR M. HILL, Editor.

Subscription, $2.00 per annum Single copy, 35 cents

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

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

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

LOUISIANA ENGINEERING SOCIETY

Suite 422 St. Charles Hotel

OFFICERS FOR 1941

President, DAVID W. STEWART, 317 Baronne St.
1st Vice-Pres., LEO J. LASSALLE, University, La.
2nd Vice-Pres., C. GLENN CAPPEL, 833 Howard Ave.
Sect.-Treas., JOHN K. MAYER, P. O. Station 20.

DIRECTORS

ALVIN M. FROMHERZ, 226 Carondelet St.
KARL P. KAMMER, 317 Baronne St.
CHARLES M. KERR, 5831 S. Robertson St.
RICHARD B. KOHNKE, 932 Picheloup Place.
WILLIAM H. RHODES, 505 Canal Building.

BATON ROUGE SECTION OFFICERS FOR 1941

President, W. W. TENNANT
1st Vice Pres., N. E. LANT
2nd Vice Pres., F. F. PILLET
Sect.-Treas., CHAS. A. MEYER

STATE BOARD OF ENGINEERING EXAMINERS

J. T. BULLEN, Pres.
E. S. BRES
DONALD DERICKSON
B. H. GREHAN
B. W. PEGUES

DISTRICT CONTACT REPRESENTATIVES

3rd Dist. THOMAS J. JONES, New Iberia, La.
4th Dist. J. T. BULLEN, 4026 Curtis Lane, Shreveport, La.
5th Dist. S. E. HUEY, Ouachita Bank Bldg., Monroe, La.
6th Dist. C. A. MYERS, Dept. of Highways, Baton Rouge, La.
7th Dist. L. P. ELBERSON, Crowley, La.
8th Dist. D. E. FUELLHART, Natchitoches, La.

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

LOUISIANA ENGINEERING SOCIETY

STANDING COMMITTEES FOR 1941

Committees Sponsored by C. Glenn Cappel

Awards
F. F. Pillet, Chairman
Donald Derickson
B. W. Pegues
J. M. Robert
H. W. Waterfall
C. S. Williamson
J. C. Bendler
L. G. Ireland
John Klorer
A. E. Marks
J. A. McNiven
H. P. Newton
J. H. O'Neill
W. H. Rhodes
A. M. Shaw
C. Floyd

Finance
O. K. Oleson, Chairman
D. W. Godat
G. C. Kerr
J. K. Mayer
H. L. McLean
J. L. Fortier

Defense
E. S. Bres, Chairman
V. J. Bedell, Vice-Charman
Donald Derickson
A. M. Hill

Professional Advancement
J. M. Todd, Chairman
V. J. Bedell
F. N. Billingsley
H. Johnson
R. J. Kuhn
L. J. Lassalle
H. A. Levey
G. E. May
B. S. Nelson
C. B. Norris
John Riess
J. E. Morehiser

Committees Sponsored by Alvin M. Fromherz

Civic and Industrial Affairs
C. L. Nairne, Chairman
A. E. Abaunza
R. T. Burwell
C. C. Crawford
E. L. Cowan
C. B. Dicks
R. E. Gosa
A. J. Harris
P. F. Hoots
S. E. Huey
W. S. Leake
H. L. McLean
A. J. Naquin
J. L. Porter
C. A. Seaver
J. L. White
W. N. Tuller

Legislation
D. W. Godat, Chairman
S. V. Applewhite, Vice-Chairman
F. N. Billingsley
E. S. Bres
A. M. Fromherz
B. H. Grehan
W. B. Gregory
H. B. Henderlite
W. T. Hess
F. E. Johnson, Jr.
T. J. Jones
K. P. Kammer
L. J. Lassalle
G. E. May
J. A. McNiven
F. F. Pillet
W. H. Rhodes
F. M. Stone
C. S. Williamson
W. P. Wallace

Library
L. T. Frantz, Chairman
M. C. Abrahm
W. H. Scales
R. A. Steinmayer
R. M. Shaw

Committees Sponsored by Karl P. Kammer

Engineering Education
C. W. Ricker, Chairman
S. W. Elberson
L. T. Frantz
F. G. Frost
W. B. Gregory
A. M. Hill
W. H. Rhodes
F. M. Taylor
J. M. Todd
H. W. Waterfall
Wm. Whipple
Sidney Ellis, Jr.

Publicity
J. J. Bulliung, Chairman
B. H. Bell
H. W. Fletcher
J. A. Glover
O. K. Olsen
W. S. Rainville, Jr.
Frank Riess

Student and Junior Activity
L. J. Cucullu, Chairman
M. C. Abrahm
J. E. Harvey
G. A. Heft
W. S. Nelson
M. G. Zervigon
W. P. Wallace

Technical Papers
W. S. Rainville, Jr., Chairman
H. M. Blain, Jr.
J. M. Guillory
F. E. Johnson, Jr.
C. M. Kerr
G. C. Kerr
H. A. Levey
E. A. McLellan
E. L. Mire
R. A. Steinmayer
B. J. Haney

Committees Sponsored by Charles M. Kerr

House
R. L. Nall, Chairman
E. S. Bres
H. E. Crump
A. H. Guillot
W. T. Hogg
E. S. Lanphier
W. S. Nelson
M. J. Cramer
C. E. Dolhonde
L. P. Elberson
S. W. Elberson
O. H. Elverum
C. H. Fenstermaker
D. E. Fuellhart
J. B. Gates
A. E. Hotard
J. B. Howze
S. E. Huey
T. J. Jones
N. E. Lant
H. L. Lehmann
C. A. Myers
H. P. Newton
B. W. Pegues
B. B. Pierce
A. F. Rideout
P. T. Eeashore
Harry Shutts
T. B. Smith
I. W. Sylvester
S. A. Theard
A. G. Jarreau

Entertainment and Outings
B. H. Bell, Chairman
L. F. Alexander
J. J. Bulliung
R. J. Dreuding
A. L. Dunlap
H. W. Fletcher
R. P. Lockett
David Moodie
H. B. Myers
A. J. Naquin
O. K. Olsen
N. H. Ross
R. M. Seago
A. J. Fransen

Membership, Division "A"
A. L. Dunlap, Chairman
C. E. Abrahamson
F. R. Adams
V. J. Bedell
J. L. Bourgeois
J. T. Bullen
E. L. Cowan

Publications, Division "A"
A. M. Hill, Chairman
J. C. Baehr
H. J. Molaison
J. M. Robert
H. S. Salzer
F. M. Taylor
G. F. Williamson

Committees Sponsored by Richard B. Kohnke

Membership, Division "B"
B. S. Nelson, Chairman
D. S. Elliott
C. A. Myers
J. H. O'Neill
H. I. Brown

Publications, Division "B"
N. H. Ross, Chairman
E. C. Coburn
H. W. Fletcher
J. T. Floyd, Jr.
J. D. Ford
W. H. Grant, Jr.
S. L. Hebrard
G. W. Hill
C. J. Kelly
G. C. Kerr
H. J. Lane
R. P. Lockett
N. L. Marks
L. C. H. McLean
W. P. Oster
E. J. McNamara

Employment
R. P. Bassich, Chairman
E. L. Fithian
G. A. Heft
E. A. McLellan
R. F. Muller
J. C. Bartley

Public Relations
A. T. Dusenbury, Chairman
L. F. Alexander
J. C. Baine, Jr.
B. H. Grehan
A. S. Hackett
G. R. Hammett
A. C. Hays
Noel P. Kammer
A. R. Keiler
N. E. Lant
H. P. Newton
D. H. L. Morris

The last name on each committee is the Junior member, who sits with the committee, but without vote.

PROCEEDINGS
OF THE
LOUISIANA ENGINEERING SOCIETY

VOL. XXVII. APRIL, 1941 NO. 2

CONTENTS

EDITORIAL NOTES AND COMMENT

A MESSAGE FROM THE PRESIDENT

To the Members:

It is always gratifying and stimulating to the President and his Board of Direction when each Committee Chairman and Committee member exerts his best efforts to the upbuilding of the organization of which he is a member.

This work should not be left to the few, which seems customary. All members appreciate that the Louisiana Engineering Society has definite objectives, and these cannot be accomplished unless each and every member does his part. **Are you doing yours?**

At this time I want to thank the following sponsors, chairmen and committeemen for their good work during this term of the administration: Technical Papers, Employment, Membership A and Membership B, Publication A and Publication B, Finance and Publicity.

I want to congratulate the Baton Rouge Chapter and the New Orleans Ladies' Auxiliary for the splendid work that they are doing.

Do not forget that the President and the Board are at your service on whatever proposition you may have to bring before them.

Are you an **active** member?

DAVID W. STEWART, *President.*

Hail and Farewell. With considerable and sincere regret it has been necessary for me to lay down my pen as Editor of the PROCEEDINGS. To have been the editor of this publication has been a signal honor and the experience has been a happy one. It is impossible to express here the gratitude and sincere appreciation for all the willing and cheerful cooperation given by the members and past officers of the Society.

The PROCEEDINGS now has a new editor. He is Professor Arthur M. Hill, whom we have all known for so many years as the energetic and efficient SecretaryTreasurer of this Society. The Board of Direction was wise in its choice of Professor Hill. He is an able young man whose energy and personality have made him one of the best known and popular members of the engineering profession in this community. Under his editorship the PROCEEDINGS will enjoy many more years of prosperity and increasing usefulness to the Society.

By JAMES M. ROBERT.

Baton Rouge Meeting. Each year a regular meeting of the Society is held in Baton Rouge, upon invitation of the members of that city and surrounding territory.

This year the date is set for Saturday, April 19, 1941. Plans are not complete at this writing, but there will probably be golf during the afternoon. A dinner is planned, followed by a technical paper, both events to be on the University campus.

If you have not been a regular attendant at these annual meeting you have missed something, **come.** If you've gone other years, then you'll want to come to this one. Let's have a large crowd from New Orleans.

The Pan American Fiesta. March the fifteenth was a gala night at the Yacht Club. Under the able guidance of General Chairwoman Mrs. Mario G. Zervigon, seven hundred people were entertained with an interesting and timely floor show and dance. An event similar to this is staged each year by the Woman's Auxiliary to raise money for the Student Aid Fund. Charlie (Tennessee) Williamson as a classic "Uncle Sam" introduced various young ladies representing Pan American nations. They were escorted around the floor by members of the Tulane Band. Consuls from various countries were present.

The woman's Auxiliary to L. E. S., under whose auspices the affair was given, should be justly proud of the "fiesta."

Gratitude is expressed to all who took part in making the evening so successful, the Tulane Band, the dancers, Mr. Michaels, and others who did not "appear before the footlights" but whose untiring efforts contributed much to the evening's enjoyment.

Consuls and representatives of the various countries were as follows:

Argentina—Consul: Mr. and Mrs. Lorenzo A. Servente, represented by Miss Anna May Hayden

Bolivia—Consul: Dr. and Mrs. Gustavo A. Guerrero, represented by Mrs. I. W. Mann, Jr.

Brazil—Consul: Mr. and Mrs. Pedro N. de Abreu, represented by Miss Ethel Story.

Canada—Consul: Mr. David J. Rodgers (England), represented by Mrs. Robert Kuhn.

Chile—Consul: Mr. and Mrs. Fernando Dahmen, represented by Miss Olga Dahmen.

Colombia—Consul: Mr. and Mrs. Luis C. Nieto, represented by Mrs. Arthur Naquin.

Costa Rica—Consul: Mr. and Mrs. J. M. Quintero, represented by Miss Cecile Stewart.

Cuba—Consul: Mr. and Mrs. Rafael Nieto, represented by Miss Lydia Ramirez.

Ecuador—Consul: Mr. Hernan Pallarez, represented by Mrs. John K. Mayer.

Guatemala—Consul: Mr. and Mrs. Felix Estrada Arentes, represented by Miss Shirley Dunlap.

Haiti—Consul: No Consul at present in New Orleans ,represented by Mrs. Charles Williamson, Jr.

Honduras—Consul: Mr. Vincente Williams, represented by Mrs. Charles Mitchel.

Mexico—Consul: Mr. and Mrs. Rafael Jimenez, Castro, represented by Mrs. Mario Zervigon.

Nicaragua—Consul: Mr. and Mrs. Luis J. Bravo, represented by Mrs. Albert Fransen.

Panama—Consul: Mr. and Mrs. Roberto de la Guardia, represented by Miss Helen Monasterio.

Paraguay—Consul: Dr. and Mrs. Francisco Banda, represented by Mrs. Francis Taylor.

Peru—Consul: Mr. Antonio Picasso, represented by Miss Frances Todd.

Salvador—Consul: Mr. and Mrs. Jose F. Morales, represented by Miss Adele Story.

Santo Domingo—Consul: Mr. and Mrs. Marcos A. Guerrero, represented by Mrs. Walter Bosch.

Uruguay—Consul: No Consul at present in New Orleans, represented by Mrs. Erich Stephan.

Venezuela—Consul: Dr. and Mrs. Fernando Velasco, represented by Mrs. Columbus Floyd.

The Woman's Auxiliary to the Louisiana Engineering Society—A Brief History.

At a meeting held on April 13, 1932, Mrs. W. B. Gregory laid before a group of about forty wives of engineers a plan for giving financial aid to engineering students. The plan included graduate as well as undergraduate students.

In order to place this assistance on a sound basis, a goal of $6,000.00 for this fund was set. Thus far four students have received aid. Loans are made from the fund, repayment being over a long period of time and at a low interest rate.

At the first meeting Mrs. Gregory was elected president of the Auxiliary. She was re-elected two successive times. She is now Honorary President.

Much praise is due to Mrs. Gregory for her enthusiasm and determination to make this plan a success. In her efforts she has been ably assisted by the members of the Auxiliary, numbering about 175.

The organization is doing a splendid work and should be supported by the wives of the Louisiana Engineering Society members.

New Advertisers. President Stewart mentioned in his message the good work done by Publications Committee "B," among others.

Our genial Mr. Norman H. Ross heads this committee and this issue carries four new advertisers: J. H. Bodenheimer & Son, Freeport Sulphur Co., Louisiana Materials Co., and Ole K. Olsen, Contractor.

Remember our slogan: "Patronize Our Advertisers."

New Members. The Society welcomes new members who are listed below. Read over the information giving their field of endeavor. Some of these newcomers you probably already know. When next you meet them, give them a personal welcome into the Society.

New Members

Atkinson, Francis D. State Member. Age 40. Endorsed by L. J. Lassalle, C. A. Myers, M. J. Cramer. 1923-30 Bethlehem Steel Corp. Open Hearth Dept., Coke Plant, Technical Asst. to Supt.; Blast Furnace Dept. (Operator, Foreman) and Metallurgical Asst. to Gen. Supt. and Asst. Operating Supt. 1930-39 Standard Oil Devel. Co. and Subsidiaries as Supervisor of Hydrogen Plant Installation and Mfg.; Technical Supervisor of Mfg. of Fatty Acids, Aldehyde, Catalyst; Super. of Devel.—Aldehyde and Ethyl Chloride Snythesis. 1939 to date Ethyl Gasoline Corp. as Manager of Engineering Division. Ethyl Gasoline Corp., Box 1711, Baton Rouge, La.

Becnel, William K. Member. Age 27. 1934 B. E. in Civil Engineering from Tulane. Summer of 1933 as Inspector on Construction of Main River Piers of Miss. Bridge at New Orleans for Siems Helmers, Inc. 1934 to date with New Orleans Public Belt Railroad as Instrumentman, now as Asst. Engineer. 1218 Pine Street, New Orleans, La. Endorsed by J. M. Robert, V. J. Bedell, E. L. Mire.

Daigle, Raymond J. State Junior Member. Age 29. Endorsed by S. L. Hebrard, H. Waugh, R. M. Allen. Graduate of Marion Institute, Marion, Ala. 1929-31 attended Annapolis. 1931-33 Instrumentman and Field Draftsman with La. Hwy. Comm. 1935-present Engineering Draftsman with La. Dept. Hwys. 356 Connell Street, Baton Rouge, La.

Galloway, Benjamin E. Local Affiliate Member. Age 33. Endorsed by P. F. Hamilton, B. Dornblatt, A. J. Negrotto. 1 year as Rodman on Land Surveys highway and levee construction. 1930-34 Instrumentman, La. Hwy. Comm. 3 mos. Field Engr., E. L. Bruce Lumber Co., Oak Grove, La. 2 yrs. W. P. A. Planning and Construction Engr.—sewer systems, swimming pools, etc. 1 yr. 10 mos. as Resident Engr., sewerage system, Oak Grove, La. 2 yrs. W. P. A. as Area Engr. checking plans, in charge of all types of construction. Present, Project Engr. on State-wide Highway Project, sponsored by La. Dept. of Hwys. 1204 Canal Bldg., P. O. Box 1070, New Orleans, La.

Godchaux, P. Leon II. State Junior Member. Age 23. Endorsed by C. S. Williamson, H. Levey, W. Godchaux, Jr. B. E. in Chemical Engineering from Yale Univ. in 1938. 1939 M.S. from Iowa State College. Research and Development for Godchaux Sugars, Inc. for 18 mos. up to present. Reserve, La.

Hall, W. Hansen. State Junior Member. Age 24. Endorsed by S. L. Hebrard, L. W. Terry, A. J. Landry. B.S. from Southwestern Louisiana Institute. M.S. from Louisiana State Univ. Presently employed on Construction Party for La. Dept. of Hwys. 212 Fourth Street, DeRidder, La.

McCowan, Charles S. State Member. Age 26. Endorsed by L. J. Lassalle, C. A. Myers, S. L. Hebrard. B.S. in Electrical Engineering from Louisiana State Univ. 1934. 1934-35 Head Electrical Dept., Colonization Project E. R. A. of Arkansas. 1935-present Draftsman Road Design Dept., La. Dept. of Hwys. 306 Belford Drive, Baton Rouge, La.

Peak, T. Ellis. State Member. Age 45. Endorsed by B. W. Pegues, G. H. Hammett, C. A. Myers. 1918-19 U. S. Army Engineering Corps. 1919-20 Babcock & Wilcox Boiler Co., Production Dept. 1920 to date Standard Oil Co. of La., Engineering Dept. 2028 Lake Shore Drive, Baton Rouge, La.

Riley, John A. Junior Member. Age 23. Endorsed by W. T. Hess, S. V. Applewhite, H. Molaison. B.S. in Mechanical Engineering from Notre Dame. 14 mos. Junior Draftsman at Shell Petroleum Co., Norco, La. 9 mos. as Instrumentman and Draftsman with F. C. Gandolfo, Jr. 14 mos. La. Power & Light Co. in Reclassification and Inventory Dept. Present Mfg. Representative for American Well Works, Aurora, Ill.; Ideal Electric Mfg. Co., Mansfield, Ohio.; etc. 323 So. Solomon Street, New Orleans, La.

Taulbee, Bretch. Local Affiliate Member. Age 31. Endorsed by C. H. Green, Wm. Castille, Chas. Kerr. 1931-38 Construction Industry as Construction Engineer, Supt. and later Mgr. for a concern constructing heavy foundation bridges, etc. Designed some of first heavy piling foundations for major oil companies for drilling operations in coastal La. and Texas. 1938 to date Woodward Wight & Co. as Sales Representative

and Engineer relative to drilling, production, pipe line and refinery machinery, equipment and supplies. 422 Brockenbraugh Court, New Orleans, La.

Tudury, Wilday. Junior Member. Age 29. Endorsed by D. W. Stewart, K. P. Kammer, J. M. Robert, J. J. Bulliung. B.E. in Mechanical and Electrical Engineering, Tulane Univ. Present, Mechanical Engineer with Dixie Machine Welding and Metal works. 1813 Cadiz Street, New Orleans, La.

Re-instatement

Zibilich, Anthony M. Member. Age 43. Endorsed by Donald Derickson, E. S. Lanphier, H. S. Salzer. B.E. in Civil Engineering from Tulane Univ. At present Lieutenant Commander in U. S. Coast Guard, assigned to Office of Commanderfi N. O. District on special duty (administrative and Lighthouse Engineering work). 119 Ringgolid Street, New Orleans, La.

PAPERS AND DISCUSSIONS

"LOUISIANA'S EXPERIENCE WITH PORTLAND CEMENT—LOW HEAT TYPE."

By

H. L. Lehman *

Read before the Society at its regular meeting on February 10, 1941.

The use of a Portland cement with low heat of hydration characteristics was not given any serious consideration until we were actually faced with a project, whose construction and design gave evidence of certain conditions that required correction—This evidence made its appearance in the construction of the Mississippi River Bridge piers at Baton Rouge.

Upon removal of the shaft forms, an unusual number of hair line cracks showed up which were sufficient to warrant investigation and to work out some corrective measures.

To reduce the excessive cracking being experienced, three methods of attack were considered as follows:

(1) To reduce the cement content of the concrete.

(2) Use a coarser ground standard cement to retard the rate of the heat hydration.

(3) To use a modified or low heat type of cement, having a low tricalcium Aluminate content thereby reducing the heat of hydration.

The first method, that of reducing the cement content, was discarded, it being considered that this might, to some extent, effect the durability if not the strength of the concrete.

The second method thought of was to a coarser ground standard cement, but the results obtained were not up to ex-

* Member of the Louisiana Engineering Society and Testing and Research Engineer, Louisiana Department of Highways.

pectation. The cement showed a lower heat of hydration, but not sufficiently low to give the desired results. (Test results, 7 and 28 days, 69.4 and 89.6 calories per gram cement, respectively.)

The third method of attack was then tried ,that is, to reduce cracking of the surface of the concrete by modification of the chemical composition of the cement. With information obtained from the U. S. Bureau of Reclamation and the Missouri Highway Department through Mr. F. V. Reagal, Engineer of Materials, a tentative specification was drawn. The Lone Star Cement Company of New Orleans, who were furnishing the contractor cement on the project, signified their willingness to manufacture such a cement. The specification did not effect the requirements, chemical or physical, of A. S. T. M. Standard Specification C-8-37. The requirements specified that in addition to the requirements of the specification A. S. T. M. C-9-37, it must meet the following:

1. The ratio of the percentage of iron oxide to the percentage of aluminum oxide shall not exceed..... 1.50
2. *The Tricalcium Aluminate ($3CaO1_2O_3$) not more than 7.0%

   * When computed from the cement analysis by the method Bogue as published in the analytical edition "Industrial and Engineering Chemistry," Volume 1, No. 4, Page 192, October 15, 1929."

In order to obtain some information regarding this low heat type cement, as compared to the standard cement, tests were conducted in the Department of Highway's Laboratory. Four different cements, manufactured by the same company, were used in these experimental tests. Cylinders and beams were cast using aggregate produced for this project.

The four cements referred to are—high early strength No. 1, standard Portland (Surface area 1435) No. 2, fine ground portland (Surface area 2050) No. 3, and special cement which is designated as low heat cement No. 4. Cement No. 1 meets standard requirements high early strength; No. 2 and No. 3 are standard Portland, same composition but different fineness;

No. 4 meets requirements of standard Portland cement. The composition of the latter was modified to limit the percentage of tricalcium aluminate ($3CaOAl_2O_3$) to 7% and the ratio of the percentage of iron oxide (Fe_2O_3) to the percentage of aluminum oxide (Al_2O_3) not to exceed 1.50. The initial and final sets are slower than the No. 2 or 3. The surface area exceeds No. 2 (Regular Cement).

TABLE NO. 1.

(A) Chemical Analysis—Percent

Type Cement—	High Early	Standard	Standard Fine Ground	Low Heat
Laboratory No.	91989	91990	91991	91992
Number	1	2	3	4
Loss on Ignition	1.5	1.2	0.9	0.94
Insoluble Matter	0.8	0.7	0.9	4.8
Sulphuric Anhydride, SO_3	2.2	1.7	1.7	1.84
Silica Oxide, S_1O_2	20.0	21.3	20.9	22.94
Iron Oxide, Fe_2O_3	3.7	2.8	2.8	4.70
Aluminum Oxide, Al_2O_3	6.1	7.1	7.2	4.62
Calcium Oxide, CaO	64.6	64.6	64.5	63.68
Magnesium Oxide, MgO	1.3	1.1	1.2	1.20

(B) Computed Compound Composition—Percent

Number	1	2	3	4
Tricalcium Silicate, C_3S	54.3	46.0	45.3	40.5
Dicalcium Silicate, C_2S	16.5	27.8	26.2	35.5
Tricalcium Aluminate, C_3A	10.0	13.9	14.2	4.3
Tetracalcium Aluminum Ferrite, C_4AF	11.3	8.6	8.6	14.2
Calcium Sulphate, $CaSO_4$	3.7	2.9	2.9	3.1
Free Lime, CaO	0.97	0.31	0.70	0.23
Ratio Iron to Aluminum	0.61	0.39	0.39	1.08

(C) Physical Tests

Number	1	2	3	4
Surface Area	2345	1435	2050	1859
Initial Set (Hrs.)	3:00	2:25	2:35	2:50
Final Set (Hrs.)	4:05	4:20	4:25	5:25
Soundness	O.K.	O.K.	O.K.	O.K.
Normal Consistency	24.6	24.0	24.0	24.0
*Tensile Strength, 24 Hrs.	345			
*Tensile Strength, 72 Hrs.	497			
*Tensile Strength, 7 Days		377	443	360
*Tensile Strength, 28 Days		455	477	468
Heat of Hydration:				
Calories per G.-Cement 7 Days		80.0		56.8
Calories per G.-Cement 28 Days		102.2		74.2

*Tensile Strength on Mortar 1:3 by weight, pounds per square inch.

The aggregate was proportioned by dry rodded volume and weighed.

Mix 1—1.95—3.10.

Cement Fator 1.50 bbls. per cu. yd.

Water 5.5 gals. per bag.

Water/cement ratio .73.

All mixes even though made on separate days were made as nearly as possible under similar conditions.

TABLE NO. 2-A

Compressive Strength Lbs. Per Sq. In.

Age of cylinders	No. 1	No. 2	No. 3	No .4
8 hrs.	760	344	495	241
12 hrs.	1447	734	801	621
1 day	3053	1692	2005	1590
2 days	3884	2583	3057	2373
3 days	4344	3104	3684	2765
7 days	5202	3933	4624	3511
14 days	5596	4617	5101	4321
28 days	5611	5237	5541	5401

Comparing the compressive strength of cement No. 4 and No. 2 which is a regular grade as to per cent of strength of the former against the latter, we find a slight variation from the curve which could be drawn at the 7 day test.

TABLE NO. 2-B

Age of test	No. 2	No. 4
8 hrs.	100%	70.05%
12 hrs.	100%	84.60%
1 day	100%	93.97%
2 days	100%	91.48%
3 days	100%	89.08%
7 days	100%	89.27%
14 days	100%	93.59%
28 days	100%	103.13%

The beams (6'' x 6' x 40'') were made on two different days. One complete set per day using each type cement and one beam (two breaks) each age shown.

The test results of the beams, modulus of rupture, average 4 tests, lbs. per sq. inch, are as follows:

TABLE NO. 3

Age. of Beams	No. 1	No. 2	No. 3	No. v
12 hrs.	258	161	202	122
24 hrs.	473	300	402	267
7 days	833	689	804	681
14 days	821	798	766	720

The results of the 14 day beam test are comparable to the compressive strength of cylinders at the same age.

Cylinders and beams were tested at an early age to check the values as compared to the time forms are ordinarily stripped. It is interesting to note that even though the strength of cement No. 4 is much lower at the earliest age, the strength increases with age to compare very favorably with the standard Portland cement (No. 2).

Subsequent to the experiments and before permitting the use of low heat cement in the construction of piers, samples were taken by the highway inspector at the rate of one (1) sample for every two hundred (200) barrels, and all tests including 28 days briquetts tensile strength were completed.

From the results of the laboratory experiments, it was realized by all concerned that the cracking which had been experienced could be materially reduced by the use of the modified Portland cement low heat type, and with the cooperation of the general contractor, the Kansas City Bridge Company, the cement was used in the balance of the work with gratifying results.

The first pier in which the low heat type cement was used was No. 3. The pours varied in volume for the pier shaft from 244 to 762 cubic yards, and cylinders were made under average job conditions. The materials, including water, were accurately controlled by weight. Cylinders were cured as nearly as possible under the same conditions as was the concrete from which they were taken. The strengths obtained compared favorably to those that would be obtained under like conditions with Standard Portland cement. There was no change made necessary in the regular construction procedure due to the use of the low heat type cement from that followed on those parts of the work where standard Portland cement had been used, that is, forms were not held in place for longer periods and curing was done in no different manner. Caisson forms were held in place only twelve hours before removal and resetting. Shaft forms were held in place 24 hours to insure satisfactory curing.

The class "A" concrete was used in the shafts above the top of the caisson and contained six sacks of cement per cubic

yard. The class "B" concrete used in the pier caissons contained five sacks of cement to the cubic yard. Comparative tests are:

Class "A" Concrete

Age	7 Days (2000 lbs. Required)		28 Days (3000 lbs. Required)	
Tests	Low Heat	Standard	Low Heat	Standard
No. of Cylinders	15	4	25	19
Compressive Str., lbs. per sq. in.	2875	2829	4166	4953

Class "B" Concrete

Age	7 Days (1700 lbs. Required)		28 Days (2200 lbs. Required)	
Tests	Low Heat	Standard	Low Heat	Standard
No. of Cylinders	42	2	43	43
Compressive Str., lbs. per sq. in.	2008	2748	3191	3842

Careful inspection showed that where the modified low heat type cement had been used, which was in the shafts of Piers 2, 3, 4 and 5, very little cracking was in evidence, and none of these large enough to cause any alarm.

Pier 6 was constructed of standard Portland cement and shortly after removal of forms approximately 365 linear feet of hair line cracks were visible. Pier 3, approximately one-half greater volume of concrete than Pier 6, was constructed using the low heat type cement and shortly after removal of forms approximately 17¼ linear feet of hair line cracks were visible.

In the past the Highway Department has experienced considerable cracking of concrete roadway slabs on steel bridge structures, and with the cement company furnishing cement for this project, manufacturing the modified low heat type cement, the contractor for this portion of the work, (W. Horace Williams Company) was prevailed upon to use this material on this part of the structure. Concrete used in roadway slabs contained six sacks of cement to the cubic yard and it was found that the cracking, usually experienced in this type of work, was practically, if not completely, eliminated. The slab thickness in this instance is 7½" at the center and 6¼" at the curb. Roadway has width of 20 feet. It is often said that

a low heat cement tends to bleed more than an ordinary standard Portland cement. This material proved otherwise, for in constructing the roadway slab on the bridge proper, it presented an excellent opportunity to "bleed" for the concrete was confined in oiled forms, preventing any absorption as would ordinarily be found in roadway slab poured directly on the subgrade.

Incidental to the construction of the bridge, the new highwas approaching the bridge east and west of the Mississippi River was built and the low heat type cement was required,—principally to secure data with the use of this type cement on roadway pavement.

As a matter of comparison during the construction of the roadway slab on March 2, 1940, a carload of standard Portland cement was ordered by the contractor, at our request, and used in a section of the pavement.

Subgrade Condition

Sections 1 and 2, good, slightly sandy clay, not necessary to sprinkle.

Section 3, good, slightly sandy clay, sprinkled very lightly.

Sections 1 and 3, low heat type; section 2 standard Portland cement.

Concrete

Mix 1—2:00—3:00 (Dry Weight)

Water—40.8 gal. (Temperature 74°) slump—2 inches.

Joint Cutting

Section 1—waited 45 minutes after belting before starting joint cutting.

Section 2 and 3—Joints cut immediately behind belting.

Removal of Forms

It was possible to remove forms on both types of cement after 24 hours; however, it was noted that more care was required with the low heat type.

Cores were obtained 144 days and tested 158 days after construction from these three sections, during the drilling of the balance of the project and the comparative results are as follows:

Core No.	Sec. No.	Compressive Strength, Lbs. per Sq. In. Low Heat—Type	Regular Portland	Age at Tests Months
1	3	8680		5.3
2	1	8717		5.3
3	1	8821		5.3
4	2		8717	5.3
5	2		8793	5.3
6	2		8576	5.3

From the foregoing results the Portland cement low heat type did not suffer any loss of strength compared to the standard Portland cement.

In the construction of roadway slabs, this cement offers some advantage over the regular Portland cement and undoubtedly will produce less cracks, however, no serious difference has been noted in standard Portland concrete pavement, where the cement itself is concerned. Our experience has definitely shown the advantages in the use of a low heat type cement where concrete of any quantity is required.

The foregoing data presented gives a picture of the behavior of this modified Portland cement subjected to various conditions in the laboratory, its use in bridge piers, bridge roadway slabs and roadway pavement.

A strictly low heat cement has been widely used in the past few years, especially in the construction of large dams, with very good results. Specifications have been adopted by the U. S. Bureau of Reclamation and other Federal agencies, which permit a lower strength requirement.

Information obtained from both laboratory and actual construction with this low heat type cement indicates that very encouraging results are obtained with its use. Further, it is of interest to note that this cement:

1. Can be purchased at the same price as standard cement,
2. Specifications are not so rigid as to be unwelcome by the cement companies,

3. That the strength, tensile and compressive, compare favorably with stanlard cement both in early and later ages, and last but not least,
4. The reduction of cracking, hair line and larger, to a minimum, both in mass and light construction.

It is evident that when consideration is given to these facts this type of cement cannot be overlooked by the progressive engineers when preparing specifications whether they be for bridges, buildings, highways or other construction.

MINUTES OF THE MEETINGS AND BUSINESS OF THE SOCIETY

Minutes of the General Meeting of the Society, January 10, 1941.

Meeting was called to order by President Rhodes with approximately 150 members and guests present.

It was voted to dispense with the reading of the minutes of the last meeting.

Presidents and Chairmen of the local sections of the founder societies and distinguished guests were presented.

Dean L. J. Lasalle was asked to present the members and guests from Baton Rouge.

The recipient of the L. E. S. Scholarship at L. S. U., Mr. J. A. Falvey, was presented since he was unable to attend the banquet.

The Honorable Gung-Hsing Wang, Vice-Consul of China, gave a most interesting and inspiring keynote address entitled "Engineers as Civic Pioneers."

Secretary-Treasurer Hill presented a brief financial report, the full report to be printed in the "Proceedings."

President Rhodes gave his report on the principal activities, growth and conditions of the Society during 1940. He also briefly summarized the accomplishments of the various committees, the Woman's Auxiliary, the Board of Direction and Secretary Hill, and thanked all for their cooperation and services.

Mr. Horace Crump reported for the Tellers Committee and announced that 85 letter ballots had been cast. The following were declared elected: President, David W. Stewart; First Vice-President, Leo J. Lasalle; Second Vice-President, C. Glenn Cappel; Secretary-Treasurer, J. K. Mayer; Director for two years, Charles M. Kerr; Director for two years, Richard B. Kohnke; Director for one year, Alvin M. Fromherz (this Director filling the unexpired term of Wade Barnett).

Retiring President Rhodes presented President Stewart with the new gavel. The newly elected officers and board members were escorted to the front and presented to the members present.

Several announcements in regard to the program for the balance of the Annual Meeting were made by Mr. K. P. Kammer.

There being no further business, the meeting adjourned.

J. K. MAYER, Secretary-Treasurer.

Minutes of the Meeting of the Board, January 22, 1941

The meeting was called to order by President Stewart with the following present: Fromherz, Hill, Kammer, Kerr, Kohnke, Rhodes and Mayer.

President Stewart presented a proposed executive organization plan in which each Board member was to sponsor certain standing committees. The plan also proposed the formation of two new committees: (1) Defense and, (2) Student and Junior Activities. The plan was adopted.

Standing committees to be sponsored by each Board member are as follows:

C. Glenn Cappel—Awards, Defense, Finance, Professional Advancement.

Alvin M. Fromherz—Civic and Industrial Affairs, Legislation, Library.

Karl P. Kammer—Engineering Education, Publicity, Student and Junior Activities, Technical Papers.

Charles M. Kerr—Entertainment, House, Membership, Division "A," Publications, Division "A."

Richard B. Kohnke—Employment, Membership, Division "B," Publications, Division "B," Public Relations.

Chairmen of the standing committees were selected and the selection of tentative committee members begun.

The following District Contest Representatives were selected:
Third District—Tom Jones, New Iberia.
Fourth District—J. T. Bullen, Shreveport.
Fifth District—S. E. Huey, Monroe.
Sixth District—C. A. Myers, Baton Rouge.
Seventh District—L. P. Elberson, Crowley.
Eighth District—D. E. Fuellhart, Natchitoches.

After setting January 28th as the next meeting date the meeting adjourned.

J. K. MAYER, Secretary-Treasurer.

Minues of the Meeting of the Board, January 28, 1941.

The meeting was called to order by President Stewart with the following present: Godat, Kammer, Kerr, Kohnke and Mayer.

The selection of tentative members of Standing Committees for 1941 was completed.

Mr. Kammer reported on the Annual Meeting and stated that the total registration was approxivately 360, with 185 attending the banquet. The total cost of the meeting was $396.91. He suggested that the chairmen for the Annual Meeting me appointed in the spring. The report was accepted and the expenditure approved.

The report of the Employment Committee was read, accepted and filed.

President Stewart reported that he had written letters of thanks to all of the speakers who presented papers at the Annual Meeing.

Mr. Kammer announced that he had held a meeting of the Chairmen of the Founder Societies in regard to the organization of the Junior group and that he would pursue the matter in the future.

It was voted that the entrance fee to the Society be waived for the year 1941.

Mr. Kammer moved to determine whether or not a vacancy exists on the Louisiana State University Board of Trustees, and, if so, to attempt to have an engineer appointed to this position. The motion was seconded by Mr. Kerr and was passed. President Stewart offered to write Dean Lassalle in regard to this matter.

It was decided to notify the government and the city agencies of the formation of the Defense Committee. Chairman Bres is to be requested to handle this matter.

The House Committee is to consider the possibilities of obtaining a new location for headquarters for the Society.

There being no further business the meeting adjourned.

J. K. MAYER, Secretary-Treasurer.

Minutes of the Meeting of the Board, March 3, 1941.

The meeting was called to order by President Stewart with the following present: Fromherz, Kammer, Kerr, Kohnke.

President Stewart stated that he would write Governor Jones regarding vacancies on the Board of Trustees of Louisiana State University.

The following committees were appointed to present resolutions on the deaths of members during the month of February:

For Horace C. Welman—L. L. Newman, Chairman; A. L. Dunlap and B. H. Bell.

For M. V. Haulard—D. W. Godat, Chairman; C. M. Kerr and John Klorer.

A motion was made by Mr. Kerr and seconded by Mr. Kammer that the Secretary write Messrs. Howard E. McCaleb, Sr., and Arthur Yancey inviting them to discuss Mr. A. F. Flournoy's paper on March 10. The abstract of said paper on "Patents and the Professional Engineer" was approved by the Board and will be transmitted to Mr. J. J. Bulliung, Chairman of the Publicity Committee, by Mr. Kammer.

It was decided that only one paper should be presented at the next meeting and that the paper prepared by Mr. Thomas Bruns be offered the Baton Rouge Section for the Joint Meeting at Baton Rouge on April 19th. Mr. Rainville, Chairman of the Technical Papers Committee, is to write Mr. Meyers in regard to this matter.

It was moved by Mr. Kohnke and seconded by Mr. Fromherz that the Finance Committee be requested to review the accounts of the Society and recommend to the Board their opinion as to the necessity for employing an auditor.

The next meeting notices are to carry an announcement of the party to be given on March 15th by the Woman's Auxiliary to raise money for their Scholarship Fund.

Mr. Kerr is to consult with the House Committee in regard to possibilities of obtaining a new location for headquarters for the Society.

The following applications were approved for the grade of member:

Francis D. Atkinson, Wm. K. Beenel, Chas. S. McCowan, and T. Ellis Peak.

And for the grade of Junior Member:

Raymond J. Daigle, P. Leon Godchaux II, W. Hansen Hall, John A. Riley and Wilday Tudury.

And for the grade of Affiliate:

Benjamin E. Galloway and Bretch Taulbee.

The application of Anthony M. Zibilich for reinstatement as member was approved.

The above applications are to be placed on a letter ballot and mailed to the voting membership.

The pplication of G. H. Holloway was referred back to Membership Committee, Division "B," for a more definite decision.

There being no further business the meeting adjourned.

J. K. MAYER, Secretary-Treasurer.

Minutes of the Meeting of the Society, February 10, 1941.

The meeting was called to order by First Vice-President Lassalle. Approximately 80 members and guests were present.

Mr. Charles Rogers extended an invitation to the membership to attend a lecture at Tulane University on February 17 ,entitled "In Defense of the Universe," by Dr. Harlow Shapley of Harvard University, the lecture being under the auspices of the Society of Sigma Xi and the Graduate School of Tulane University.

The minutes of the General Meeting were read and approved.

The report of Mr. Karl P. Kammer, Chairman of the General Committee for the Annual Meeting,was reada nd filed, as was that of Mr. E. L. Fithian for the Employment Committee.

The technical paper of the evening entitled "Louisiana's Experience with Portland Cement—Modified Low Heat Type" was presented by Mr. H. L. Lehman, Testing and Research Engineer, Department of Highways, State of Louisiana.

Brief summaries of the Engineering Defense Training Courses being conducted at Louisiana State University and at Tulane University were presented by Dean L. J. Lassalle and Mr. J. K. Mayer.

The meeting adjourned to the usual collation.

J. K. Mayer, Secretary-Treasurer.

PROCEEDINGS
OF THE
LOUISIANA ENGINEERING SOCIETY

APRIL, 1941

"PATRONIZE OUR ADVERTISERS"

INDEX TO ADVERTISEMENTS

LASEC NEWS

SECTION OFFICERS

President,
J. A. McNIVEN

1st Vice-President,
F. N. BILLINGSLEY

2nd Vice-President,
V. J. BEDELL

Secretary-Treasurer,
D. W. GODAT

LOUISIANA SECTION
AMERICAN SOCIETY OF CIVIL ENGINEERS
FOUNDED 1852
1914

NEW ORLEANS, LA.

PUBLICITY COMMITTEE

J. M. LeDOUX, Chm.
CHARLES M. KERR
GEORGE JANVIER, JR.

Address Communications to:
5700 Garfield Street,
New Orleans, La.

Vol. III, No. 2 | Published Bi-Monthly | April, 1941

AS WE SEE IT

The Journal of the Engineering Societies of New England remarks quite pointedly, as follows:

"For decades engineers have quietly performed their tasks . . . with . . . devotion to duty equalled only by the theological and medical professions. The public has not generally been cognizant of the role of the engineer in the tremendous advances which have contributed mightily to their safety and comfort. They have been led to believe that all of these improvements are the handiwork of those elected to political office, or of the corporations who give these matters publicity."

One must acknowledge the stark and simple truth of this statement. It cannot be denied that in civic, economic and political spheres, the engineer is playing a part disproportionate to his background, training, ability and integrity.

In the light of this deficiency, let us review our aims and see what we hope to achieve. Ideally, we want to reap a just and equitable recompense and respect and to achieve a more progressively civilized life for mankind. Practically, we want more money; we want greater recognition; we want more influence.

In these times, one may build the world's finest mousetrap and not sell a single one, if the world is not made aware of its effectiveness and availability, through publicity. Similarly, a stride towards realization of our objectives lies in giving the professional and business activities of civil engineers, the publicity they justly deserve. Through the medium of the Committee on Publicity, this is ethically and unobstrusively accompished. We are eager for your cooperation.

NEWS ITEMS

The Society has purchased a full length film showing the failure of the Tacoma Narrows Bridge. The film is in color and shows the movements of the bridge for a considerable period of time before the failure and the action of the bridge during and at the moment of collapse. An effort is being made to secure these pictures, which should be of great interest to all engineers. Although this film is very much in demand, every effort is being made to obtain it for exhibition at an early meeting.

The NEXT MEETING of the Section will be held in the Hunt Room of the St. Charles Hotel at New Orleans on April 29th. The principal address will be by Thomas N. Bruns, Project Engineer, who will read a paper on the Lafitte Housing Project. In view of the fact that Alvin M. Fromherz, of the Housing Authority of New Orleans, presented a paper dealing with the proposed construction of similar projects in New Orleans before construction started, Mr. Bruns' paper should be of unusual interest.

In accordance with the provisions of the State Departmental Reorganization Act, the offices of the Board of State Engineers have been moved from New Orleans to Baton Rouge, La.

Numerous inquiries have been received concerning the personnel of various committees. In response to demand for this information, the complete list is given below.

Committee on Licensing Engineers: B. H. Grehan, Chairman; Prof. Donald Derickson, Col. Marcel Garsaud, A. T. Dusenbury, W. H. Rhodes, F. N. Billingsley, Col. E. S. Bres, J. T. Bullen, H. B. Henderlite, John Klorer, J. H. O'Neill, Prof. B. W. Pegues, Harold Sylvester, E. E. Schuts, George Janvier, Jr., Jack S. Burk.

Committee on Scholarship Awards: Col. E. S. Bres, Chairman; Prof. Donald Derickson, Prof. B. W. Pegues, A. S. Hackett, F. P. Hamilton, Ed. Hogg, W. P. Wallace.

Membership Committee: Maj. V. J. Bedell, Chairman; J. T. Bullen, I. W. Sylvester, E. E. Schutts, J. W. Wendt, Sr., A. H. Guillot, Prof. B. W. Pegues, C. C. Culpepper, Jr., Jerome E. Haas.

Publicity Committee: J. M. Le Doux, Chairman; C. M. Kerr, George Janvier, Jr.

Employment Committee: E. L. Mire, Chairman; G. A. Heft, John D. Lockwood, Eric L. Erickson, John Riess, W. H. Werner.

Aims, Activities and Professional Objectives Committee: Alvin M. Fromherz, Chairman; Col. Clark Kittrel, Geo. P. Rice, E. C. Paulet, Col. E. S. Bres, A. T. Dusenbury, Frank Reiss, Ian M. Davidson.

Special Committee on "Civilian Protection in War Times" to work in cooperation with the National Committee of same title: Maj. V. J. Bedell, Chairman; Alvin M. Fromherz, Structures; John O'Neill, Sanitary and Public Health; E. L. Mire, Transportation; Frank Carey, Emergency Control, Local Applications; Fred N. Billingsley, Power.

Committee on Foundation: Geo. A. Heft, Chairman; Prof. Donald Derickson, A. J. Negrotto, John Reiss, C. G. Cappel, F. P. Hamilton, T. N. C. Bruns, Martin M. Gurtler, II.

Special Committee to Study Necessity for Increasing Dues: Maj. V. J. Bedell, Chairman; J. M. Le Doux, A. T. Dusenbury.

PERSONALS

F. N. BILLINGSLEY, who is very much in the news, is Vice-President of the Louisiana Shipyards, Inc., in actual charge of shipyard construction.

KING WOOLF is in New Orleans after several trips to Houston and a flying trip to the East.

MAJ. V. J. BEDELL addressed the M. & E.'s at Tulane on March 4. His subject, "The Engineer and the Labor Unions."

We congratulate BARNARD, GODAT & HEFT on being awarded the contract for engineering work in connection with the Grade Separation Projects at Gentilly and Peoples Avenues, Elysian Fields and Florida Avenues, St. Bernard and Florida Avenues, and the Downman Road Crossing at New Orleans.

We are pleased to note, also, that GEORGE RICE has been awarded the contract for the engineering work at the Baton Rouge Airport.

JEROME H. BAEHR has recently become a member of the faculty of the College of Engineering of Tulane University, and will lecture in Railroad and Highway Engineering.

CHARLES M. KERR recently addressed the students of the McMain High School on "The Place of the Civil Engineer in Civilization."

JAMES A. WRIGHT, JR., is now with the S. & W. Construction Company at Camp Livingston, near Tioga, La.

HYMAN SAMUELSON, JR., has been appointed an instructor in Surveying in the College of Engineering of Tulane University.

L. J. MUSE, Assistant Professor of Civil Engineering at Louisiana State University, recently addressed the Student Chapter on Dr. Karl Terzaghi's report on "Pile Foundations," as delivered before the Fourth Annual Conference at the University of Texas.

CHAS. A. MYERS, formerly bridge designer, Louisiana Highway Commission, is now connected with the J. G. White Engineering Corporation, at New Orleans.

DID YOU KNOW THAT:—

Seventeenth century bidding was done "by inch of candle?" After the engineer had exhibited his plans and read the specifications to the contractors assembled, a candle was lighted and the bidding begun. Whoever among the contractors offered the last bid before the candle flickered out, was declared to be the successful (? ? ?) bidder.

STUDENT CHAPTERS

Louisiana State University

The Senior Class in Civil Engineering recently inspected several bridges in the vicinity of Baton Rouge. The principal purpose of these inspections was to compare the various types, observe the changes in design over a period of years and in some instances to measure certain structural members in order that the class may check the stresses for which they were designed.

More recently, the chapter inspected the Baton Rouge Waterworks and found the deep wells, pumping equipment and metering devices of great interest.

A meeting of the Student Chapter was addressed by Mr. C. A. Hogentogler, Senior Highway Engineer, U. S. Bureau of Public Roads, whose subject was "Soil Mechanics."

Tulane University

Through the courtesy of Mr. J. A. McNiven and Col. Marcel Garsaud, the Student Chapter inspected the harbor facilities at New Orleans from aboard the Dock Board yacht McClosky. On another occasion the locks at the Industrial Canal were visited.

A tour through the Jones & Laughlin Steel Corporation's plant and a visit to the Army Base Hospital now under construction on the lake front at New Orleans, were of great interest.

Regularly scheduled meetings of the chapter were addressed by prominent speakers.

Wm. R. Burk, Jr., J. A. Allison and W. O. Hudson attended the Southeastern Conference of Student Chapters at Atlanta, Ga., April 2, 3 and 4.

MEMBERSHIP CHANGES

ADDITIONS TO MEMBERSHIP

Junior:

IRVIN JAY GOLDBERG, New Orleans, La.

APPLICATIONS FOR ADMISSION

For Member:

CLAIBORNE PERRILLIAT, New Orleans, La.

For Associate:

RALPH EDWARD LIND, New Orleans, La.

For Junior:

ARTHUR EDWARD, HULME, University, La.

APPLICATIONS FOR TRANSFER

For Associate:

FRANCIS WEIR GRANT, Shreveport, La.

ROBERT WINSTON HART, New Orleans, La.

EMPLOYMENT OPPORTUNITIES

Structural steel designer of broad experience, thoroughly competent to handle important work. Position temporary. Address: J. G. White Engineering Corporation, Mr. W. C. Sage, Chief Engineer, Hibernia Bldg., New Orleans, La.

PROCEEDINGS

of the

LOUISIANA

ENGINEERING SOCIETY

VOL. XXVII, 1941

PUBLISHED BI-MONTHLY

BY THE
LOUISIANA ENGINEERING SOCIETY
NEW ORLEANS

CONTENTS

EDITORIAL NOTES AND COMMENT:

THE PROCEEDINGS
OF THE
LOUISIANA ENGINEERING SOCIETY

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

ARTHUR M. HILL, Editor.

Subscription, $2.00 per annum Single copy, 35 cents

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

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

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

LOUISIANA ENGINEERING SOCIETY

Suite 422 St. Charles Hotel

OFFICERS FOR 1941

President, DAVID W. STEWART, 317 Baronne St.
1st Vice-Pres., LEO J. LASSALLE, University, La.
2nd Vice-Pres., C. GLENN CAPPEL, 833 Howard Ave.
Sect.-Treas., JOHN K. MAYER, P. O. Station 20.

DIRECTORS

ALVIN M. FROMHERZ, 226 Carondelet St.
KARL P. KAMMER, 317 Baronne St.
CHARLES M. KERR, 5831 S. Robertson St.
RICHARD B. KOHNKE, 932 Picheloup Place.
WILLIAM H. RHODES, 505 Canal Building.

BATON ROUGE SECTION OFFICERS FOR 1941

President, W. W. TENNANT
1st Vice Pres., N. E. LANT
2nd Vice Pres., F. F. PILLET
Sect.-Treas., CHAS. A. MEYER

STATE BOARD OF ENGINEERING EXAMINERS

J. T. BULLEN, Pres.
E. S. BRES
DONALD DERICKSON
B. H. GREHAN
B. W. PEGUES

DISTRICT CONTACT REPRESENTATIVES

3rd Dist. THOMAS J. JONES, New Iberia, La.
4th Dist. J. T. BULLEN, 4026 Curtis Lane, Shreveport, La.
5th Dist. S. E. HUEY, Ouachita Bank Bldg., Monroe, La.
6th Dist. C. A. MYERS, Dept. of Highways, Baton Rouge, La.
7th Dist. L. P. ELBERSON, Crowley, La.
8th Dist. D. E. FUELLHART, Natchitoches, La.

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

LOUISIANA ENGINEERING SOCIETY

STANDING COMMITTEES FOR 1941

Committees Sponsored by C. Glenn Cappel

Awards
F. F. Pillet, Chairman
Donald Derickson
B. W. Pegues
J. M. Robert
H. W. Waterfall
C. S. Williamson
J. C. Bendler
L. G. Ireland
John Klorer
A. E. Marks
J. A. McNiven
H. P. Newton
J. H. O'Neill
W. H. Rhodes
A. M. Shaw
C. Floyd

Finance
O. K. Oleson, Chairman
D. W. Godat
G. C. Kerr
J. K. Mayer
H. L. McLean
J. L. Fortier

Defense
E. S. Bres, Chairman
V. J. Bedell, Vice-Charman
Donald Derickson
A. M. Hill

Professional Advancement
J. M. Todd, Chairman
V. J. Bedell
F. N. Billingsley
H. Johnson
R. J. Kuhn
L. J. Lassalle
H. A. Levey
G. E. May
B. S. Nelson
C. B. Norris
John Riess
J. E. Morehiser

Committees Sponsored by Alvin M. Fromherz

Civic and Industrial Affairs
C. L. Nairne, Chairman
A. E. Abaunza
R. T. Burwell
C. C. Crawford
E. L. Cowan
C. B. Dicks
R. E. Gosa
A. J. Harris
P. F. Hoots
S. E. Huey
W. S. Leake
H. L. McLean
A. J. Naquin
J. L. Porter
G. A. Seaver
J. L. White
W. N. Tuller
F. N. Billingsley
E. S. Bres
A. M. Fromherz
B. H. Grehan
W. B. Gregory
H. B. Henderlite
W. T. Hess
F. E. Johnson, Jr.
T. J. Jones
K. P. Kammer
L. J. Lassalle
G. E. May
J. A. McNiven
F. F. Pillet
W. H. Rhodes
F. M. Stone
C. S. Williamson
W. P. Wallace

Legislation
D. W. Godat, Chairman
S. V. Applewhite, Vice-Chairman

Library
L. T. Frantz, Chairman
M. C. Abrahm
W. H. Scales
R. A. Steinmayer
R. M. Shaw

Committees Sponsored by Karl P. Kammer

Engineering Education
C. W. Ricker, Chairman
S. W. Elberson
L. T. Frantz
F. G. Frost
W. B. Gregory
A. M. Hill
W. H. Rhodes
F. M. Taylor
J. M. Todd
H. W. Waterfall
Wm. Whipple
Sidney Ellis, Jr.
B. H. Bell
H. W. Fletcher
J. A. Glover
O. K. Olsen
W. S. Rainville, Jr.
Frank Riess

Student and Junior Activity
L. J. Cucullu, Chairman
M. C. Abrahm
J. E. Harvey
C. A. Heft
W. S. Nelson
M. G. Zervigon
W. P. Wallace

Publicity
J. J. Bulliung, Chairman

Technical Papers
W. S. Rainville, Jr., Chairman
H. M. Blain, Jr.
J. M. Guillory
F. E. Johnson, Jr.
C. M. Kerr
G. C. Kerr
H. A. Levey
E. A. McLellan
E. L. Mire
R. A. Steinmayer
B. J. Haney

Committees Sponsored by Charles M. Kerr

House
R. L. Nall, Chairman
E. S. Bres
H. E. Crump
A. H. Guillot
W. T. Hogg
E. S. Lanphier
W. S. Nelson
M. J. Cramer
C. E. Dolhonde
L. P. Elberson
S. W. Elberson
O. H. Elverum
C. H. Fenstermaker
D. E. Fuellhart
J. B. Gates
A. E. Hotard
J. B. Howze
S. E. Huey
T. J. Jones
N. E. Lant
H. L. Lehmann
C. A. Myers
H. P. Newton
B. W. Pegues
B. B. Pierce
A. F. Rideout
P. T. Seashore
Harry Shutts
T. B. Smith
I. W. Sylvester
S. A. Theard
A. G. Jarreau

Entertainment and Outings
B. H. Bell, Chairman
L. F. Alexander
J. J. Bulliung
R. J. Dreuding
A. L. Dunlap
H. W. Fletcher
R. P. Lockett
David Moodie
H. B. Myers
A. J. Naquin
O. K. Olsen
N. H. Ross
R. M. Seago
A. J. Fransen

Membership, Division "A"
A. L. Dunlap, Chairman
C. E. Abrahamson
F. R. Adams
V. J. Bedell
J. L. Bourgeois
J. T. Bullen
E. L. Cowan

Publications, Division "A"
A. M. Hill, Chairman
J. C. Baehr
H. J. Molaison
J. M. Robert
H. S. Salzer
F. M. Taylor
G. F. Williamson

Committees Sponsored by Richard B. Kohnke

Membership, Division "B"
B. S. Nelson, Chairman
D. S. Elliott
C. A. Myers
J. H. O'Neill
H. I. Brown

Publications, Division "B"
N. H. Ross, Chairman
E. C. Coburn
H. W. Fletcher
J. T. Floyd, Jr.
J. D. Ford
W. H. Grant, Jr.
S. L. Hebrard
G. W. Hill
C. J. Kelly
G. C. Kerr
H. J. Lane
R. P. Lockett
N. L. Marks
L. C. H. McLean
W. P. Oster
E. J. McNamara

Employment
R. P. Bassich, Chairman
E. L. Fithian
G. A. Heft
E. A. McLellan
R. F. Muller
J. C. Bartley

Public Relations
A. T. Dusenbury, Chairman
L. F. Alexander
J. C. Baine, Jr.
B. H. Grehan
A. S. Hackett
G. R. Hammett
A. C. Hays
Noel P. Kammer
A. R. Keiler
N. E. Lant
H. P. Newton
D. H. L. Morris

The last name on each committee is the Junior member, who sits with the committee, but without vote.

PROCEEDINGS
OF THE
LOUISIANA ENGINEERING SOCIETY

VOL. XXVII. JUNE, 1941 NO. 3

CONTENTS

EDITORIAL NOTES AND COMMENT

Baton Rouge Meeting. In the minutes of the Society for April 19, the events of the Baton Rouge Meeting are described in detail. It was most successful and enjoyable. About seventy-five members and guests were present. An added feature this year was the awarding of a golf trophy, won by the delegation from New Orleans.

American Institute of Electrical Engineers. This organization will hold its Southeastern District meeting in New Orleans on December 3, 4 and 5. This seems a long time off, but better mark your calendar now. More details later. Our member, Robert J. Kuhn, is Chairman of Publicity.

Scholarships. The Society awards each year one Scholarship to a student at Louisiana State University, another at Tulane University. The value of the L. S. U. Scholarship is

$40.00, that at Tulane, $125.00. Applications should be directed to Professor F. F. Pillet, University, Louisiana.

Our District Contact Representatives. In 1935, under the administration of Colonel Edward S. Bres, District Contact Representatives were appointed throughout the State. These men are listed on the title page of the "Proceedings." They are important in interesting eligible engineers in becoming members of the Society.

Panama Canal. Mr. Frank W. Edwards, who has been stationed for some time at the Panama Canal, will be in New Orleans June 30 and July 1. He will interview engineers, engineering aides and draftsmen for work in connection with the third set of locks. Compensation will be more than for corresponding work in the States. Mr. Edwards will be at the St. Charles Hotel. Those interested may contact him there.

PAPERS AND DISCUSSIONS

PATENTS AND THE PROFESSIONAL ENGINEER

By A. F. Flournoy *

Friends: This address is intended to answer some of the questions you have had in your mind about Patent Law, but on the other hand, no attempt is here made to give you any working knowledge of these laws. Each problem in patent law has its own peculiar aspects and must be analyzed separately if the correct answer is to be obtained.

What is a patent?

A patent is a contract between the United States Government and the inventor, whereby the government gives the inventor the right to prevent others from making, using, and selling his invention as it is claimed for a period of 17 years in exchange for a full and complete disclosure of the invention sufficient to teach the public how to make and use the invention. The public becomes privileged to make, use and sell the invention free of royalty after the 17 years. The United States can never be prevented from using an invention at any time, but it gives the inventor the right to sue it and collect reasonable royalties from it during the 17-year period.

Contrary to the general impression of the public at large, and contrary to the apparent meaning of the language in a patent, the United States Government does not grant to the inventor the right to make, use and sell his invention. The inventor or anyone else has always had this right. Patents merely partially affect this basic right. A person will be prohibited by another man's patent claim, whether he is an inventor or not. An inventor's patent is no defense when he is infringing another patent. A patent may be used as a club, but not as a shield.

When a patent is issued, the Patent Office sends the patentee a certificate testifying formally to the granting of the patent and describing the invention in detail. This document is called

* Patent Attorney and Mechanical Engineer, Monroe, La.

the Letters Patent. It is not the actual patent, which is a set of rights and obligations and not a material thing. Although it is customary as a matter of record for a person who gets title to a patent to take possession of the Letters Patent at the same time, it is not legally necessary that this be so. The patent can be transferred quite independently of the Letters Patent and possession of the latter does not prove ownership of the former.

The primary purpose of the patent law is not to reward inventors, but to promote the progress of science and useful arts. While I can authoritatively state that the patent office is fair to inventors, on the other hand it is principally concerned with getting a disclosure of any invention before the public. The patent office expects the inventor to see for himself that his claims are good.

Time will not permit me to go into the question of what is or is not patentable with a thoroughness to guide you, but I will now touch on some of the interesting, high spots.

Our patent laws have provisions for granting two types of patents: The design patent, which is granted to protect decorative advances in the appearance of articles of commerce, and the mechanical patent, to which class belong the patents for composition of matter, the manufacturing process, and patents for plant discoveries.

Until the patent laws were amended in 1930 to allow the issuance of plant patents, plant breeders had no way of protecting new varieties that they developed. But the language of the plant clause is indefinite, and at present the clause has not yet been clarified by court decisions.

The experts seem to agree that a plant patent gives the right to prevent others from asexually reproducing a new plant, that is, from reproducing it by grafting, cutting, inarching, etc., but not by seed.

Are **Minor Improvements** patentable if within the range of the expected skill of a competent worker in that field? Answer: No. Not all improvement is patentable invention. To be patentable, even if new, a thing must be the product of the inventive faculties.

Is it patentable invention to enlarge or strengthen a machine so that it works on larger or tougher material? Answer: Absolutely not.

May a patentable invention be made by changing the proportions of the ingredients of a chemical combination or other composition of matter? Answer: Yes, if the difference in the properties of the compositions brought about by the change in proportion is one of kind rather than degree.

May a function be patented? Answer: No, but the means or structure that performs the function may be the subject of a patent. The distinction between functions and means is one of the most important in determining what is and what is not patentable.

Is the omission of one or more parts of a machine or a manufacture patentable invention? Answer: Omission of a part without omission of its function, that is, getting the same result with fewer parts, may be patentable invention of a high order; but if the function of the part is also absent from the final result, then the change resulting from the omission would not be patentable invention.

Is it invention to make in one piece what was previously made of several parts? Answer: Usually not. It is not invention if the improvement brought about is merely a reduction in weight, cost, or difficulty of maintenance, because uniting parts into a single piece for these purposes is a step that should be obvious to any competent engineer.

Is it patentable invention to apply an old thing to a new use or purpose? Answer: Generally speaking, no. If the new use or purpose is analagous to one described in some previous patent, a valid patent cannot be obtained; but if the new use or purpose is non-analagous to the one described in the previous patent, the valid patent may be obtainable. Usually some slight change in structure is introduced.

Is bringing together or combining old processes, materials, machines ,or manufactures patentable invention? Answer: That depends upon the results. Legally the invention is either an aggregation or a combination. Aggregations are not patentable. Combinations are, but it is sometimes difficult to de-

termine on which side a case falls. The decision of Justice Matthews (Pickering v. McCullough, 104 U. S. 318, 1881) on this subject has been quoted in so many subsequent decisions as practically to have become a rule of law. He said: "It must form either a new machine of a distinct character and function, or produce a result due to the joint and cooperating action of all the elements, and which is not the mere adding together of separate contributions. 'To make a valid claim for a combination, it is necessary that the several elementary parts are so arranged that the successive action of each contributes to produce some one practical result, which result, when attained is the product of the simultaneous or successive action of all the elementary parts, viewed as one entire whole, a valid claim for thus combining those elementary parts may be made'."

In the case of Reckendorfer v. Faber (92 U. S. 347, 1875) the patents involved the right to lead pencils patents. The Supreme Court, at the end of much litigation, held that there was no invention in combining an eraser to a lead pencil, since the function of one did not modify the function of the other. The decision of the Supreme Court has been criticized on the ground that the court was overstrict in its definition of "joint function," that the great commercial success of the article implied that inventive genius had been required to conceive it. It is significant that the decision was not unanimous; three of the justices dissented. The case may be considered a border line one, with strong arguments on both sides.

May a Theory be Petented? Answer: No. But the embodiment of a theory (in the form of drawings or a description) may furnish the basis of a patent. Much the same rules apply to theories as to bare ideas. A valid patent can be granted for an invention that has not been reduced to actual practice, if the operativeness (workability) of the structure shown is self-evident or is afterward proven by actual reduction to practice. But if a patent is granted on an invention that has never been reduced to practice, and the invention later turns out to be inoperative (unworkable), the patent will be liable to invalidation regardless of how plausible was the theory upon which it was based.

Is a Law of Nature Patentable? Answer: No. The finding of a thing that previously existed, but that was unknown, is not invention. Inventions must be created, not merely found. For instance, if a patent is granted on a composition of matter that is thought to be new, and it is later found to exist in nature, even though very rarely, for example, monel metal, the patent could be invalidated. "Laws of nature refer to all those physical forces, principles, and phenomena which are utilized by man but not created by him, such as those governing gravity, heat, light, electricity, magnetism, radiation, convection, chemical action, etc. The laws of nature are not patentable, though they may have been previously unknown. Neither is the use of a law of nature for a given purpose invention. But a means or apparatus for making use of a law of nature may be patentable as a machine or an article, and a human action whereby advantage is taken of a natural law may be patentable as a process.

Is a new system of doing business, such as a new system of accounting, a patentable invention? Answer: No Such a system is a process in the general sense, but in the patent law sense a process must act upon material things and produce tangible results A system of conducting a business does not do so, and hence is unpatentable.

PATENTS VERSUS SECRET PROCESSES:

The types of patents that lend themselves most readily to secret manufacture and use are processes and compositions of matter. Secret manufacture does not in itself bar the grant of a patent. Many difficulties arise in attempting to sell or license trade secrets because they do not have property rights like patents which may be sold and carry a clear title like merchandise or real estate. As long as an inventor keeps his invention secret he has control of it, and can use it pretty much as he pleases. A very few inventions, such as chemical processes, have been kept secret for many years and profits made from them. An inventor may be so successful in his secrecy that death or accident may place his invention irrecoverably beyond the reach of the public, unless another inventor rediscovers it; and this may not occur until many years later. Ob-

viously it is against public policy that an inventor should be encouraged to take his secret with him to the grave. A number of secret processes have been lost in just that way. The founders of the United States recognized these facts, and, when they wrote the Constitution, included an article permitting the Congress to enact laws to enable the inventor to profit by his invention without keeping it secret, on condition that the public also be allowed to derive benefit from it.

An inventor in attempting to keep his invention secret may lose his rights to ever get a patent on it. It has been held that the attempted secret practice of a process or manufacture is sufficient to nullify novelty where the public acquires or has opportunity to acquire therefrom such knowledge as would enable one skilled in the art to practice the invention.

The discoverer of a formula and process relating to the manufacture of glass kept the same secret for nearly 10 years before applying for a patent thereon, in which period they were known to some of the company's employees and their product was sold to the public, a patent thereafter granted on such formula and process was void both upon the ground of abandonment and of prior public use . Curtain Supply Co. v. National Lock Washer Co., 174 Federal 45 (1909): "The keeping of a process secret for years by the inventor constitutes an abandonment of the invention."

On the other hand, the courts have said: We doubt, however, that the filing of an application for a patent is the dedication of a secret to the public. At the time of the application, the inventor or discoverer has no means of knowing whether the patent will ultimately be granted.

In the case of MacBeth-Evans Glass Co. v. General Electric, Macbeth elected to use his invention as a trade secret for some ten years before applying for a patent. It was there said: "If the right to secure protection of the patent laws can be effectively repudiated, it certainly has been here." The inventor's course of conduct was construed as in effect an abandonment of his right to patent monoply and inconsistent with the duty of diligence resting upon an inventor desiring to patent his invention.

Prior to patenting, the inventor not only risks the loss of his secret through inadvertence or breach of confidence, but likewise through independent discovery. During his period of monopoly he incurs no such hazard.

Most of the lawsuits involving trade secrets arise from betrayal by employees. In large-scale production, where many employees must participate in the use of the secret, the chances of disclosure are correspondingly increased. A manufacturer who employs a trade secret in making his products must see to every precaution to guard the secret if he wants to enjoy the protection of the courts. He must prevent unauthorized employees from learning the secret—a difficult task when they are buying the material, keeping the stores, and mixing the ingredients as well as performing operations in the plant. He must put up "Keep Out" signs and exclude visitors. Machines and equipment of a secret character must be kept behind locked doors. Repairs must be made by trusted employees. They and other workmen necessary for using the secret should be sworn to secrecy and cautioned about each operation and device that is supposed to be secret. Likewise, nightwatchmen should be cautioned that the plant has trade secrets and that visitors must not be allowed. These and many other precautions are necessary both from a practical standpoint and to establish, in any court action, proof that the manufacturer has used caution anud diligence to protect his secret.

The owner of a secret has no recourse in law against another person who obtains possession of the secret in any legitimate way. Public use of a new art immediately starts others working in that art, with the result that the same or similar inventions are frequently made by two or more people at about the same time. Neither the inventor nor anybody else has any legally enforceable exclusive rights to a secret invention, such as are established by a patent. The statutes and the courts regard the betrayal of trade secrets as a breach of confidence or trust, and will protect the owners of a trade secret against a person who has been confidentially entrusted with the secret by actual agreement either oral or written, or by an agreement implied by the business relationship between the parties, but that is all.

SHOP RIGHTS

In the absence of any agreement to the contrary, an employee owns any patent on an invention that he makes while working for his employer, even if the invention is made on the employer's time and with the use of his materials and facilities and with the aid of his other employees. If the invention is applicable to the employer's regular business, the employer will, under such circumstances, be entitled to a shop right which is in effect an unwritten license of the employer's business or company giving it the right to make, use, and sell specimens of the invention without compensating the inventor. This right belongs to the business and not to any individual. In the absence of any agreement, if the inventor makes an invention on his own time outside the hours of his employment and does not use any of his employer's facilities, he is the sole owner of the invention and the employer has no right or interest in it even if it is applicable to his business, and even if it is an improvement upon the employer's articles and is likely to displace them if placed in the hands of a competitor.

When there is a clear, specific, written agreement there can, of course, be no question; but when there is no express agreement, then the acts of the parties over a term of years must be considered to interpret what they both understood by the relationship.

It is strange that the rights of employer and employee with regard to inventions is so little understood, for the law is clear. Again and again the courts have held that there is no obligation on the part of an employee to assign to his employer patents obtained for inventions made in the course of his meployment—that is, there is no obligation arising out of the mere relation of employer and employee. The obligation can be created only by contract.

An oral contract to assign patents is, of course, admissable, and if you can prove it, it will be enforced. The extent of this implied license depends upon the facts and circumstances in the particular case. Thus it may cover all the specimens which were made, used, or sold with the inventor's knowledge, during the time of the inventor's employment. Can a "shop

right'' be transferred? No. It is a mere license and not transferable.

RELATIONSHIP BETWEEN ENGINEERS AND INVENTORS

This discussion of shop rights leads naturally to the subject of the relationship between engineers and inventors. The engineer comes into the picture after the inventor has conceived his invention. The engineer's work in assisting the inventor in reducing his invention to a practical working device is often called patent engineering. After the inventor and engineer have worked out a practical working model of the invention, the job of the production and the sales engineer begins. The inventor needs the engineer not only to assist him in reducing his invention to a practical working model, but also to analyze for him his inventive concepts in the light of scientific and engineering principles to keep him from attempting the impossible. My experience shows me that this is a very necessary function for engineers to perform even though many of their inventor clients, in the face of the advice, will continue to butt theier heads against stone walls of impossibility. The inventor needs the engineer to advise him whether or not his invention can be manufactured economically enough to compete with existing substitutes of the invention. This is especially true of the inventor who makes an invention entirely outside of his own special field. The invention must be designed before a set of working drawings can be made, design being here used in the engineer's sense. When the inventor and engineer are making his model they should keep in mind the obtaining of maximum results with a minimum effort and operating costs. I was once told by a successful inventor that inventions worked by trifles; oftentimes it is the mere matter of friction that prevents an invention from working. In some inventions the question of mechanical efficiency is not paramount. In the art of toys many mechanisms can be used to advantage, where in a working machine their poor mechanical efficiency would spell failure.

The inventor and engineer should keep in mind also the question of service. By this I mean the strength of the model and its length of life under actual working conditions. They

should keep in mind the question of accessibility, and by this I mean the arrangement of the component parts of the model to facilitate its maintenance and repairs. They should also keep in mind the question of ease of production. It would often be wise to sacrifice some of the advantages of the invention in order to bring it down to a low production cost. For what an engineer must keep in mind is that the article must sell at a profit to compete with existing substitutes. Very few revolutionary inventions are brought out. Most patents are granted for slight improvements on existing machines and articles of manufacture. The matter of appearance is of the utmost importance. At this stage in the development of the working model the services of an artist and an advertising man should be brought in if possible. The new thing should follow the outline of the old as nearly as possible. We all remember the old air-cooled Franklin automobile that had the unusual shaped hood. A hood, by the way, that was designed to cool an air-cooled engine, but it looked so queer in comparison with other automobiles that the Franklin people finally had to do away with it and make a car that looked like other automobiles. The engineer is needed to test the model after it is made. Time will not permit me to attempt to go into details on this important phase of the engineer's assistance to the inventor, but briefly stating it: the working models should be tested to determine their durability and their mechanical efficiency.

If our forefathers, the founders of our national government, and patent system, had been living today in this era of unemployment I believe that they would have thought of the patent system as being useful, not only for the purpose of promoting the progress of science and useful arts, but for the still bigger purpose of producing many industries and new jobs for idle hands.

We, engineers, by working with inventors can do much to help the unmployment right here in our State. We have many problems that need attention and many natural products and by-products that we can put to good use. I think that the Spanish moss itself is a challenge to the inventor and engineer. Here we have a unique and durable fiber that is just handed to us on a silver platter, so to speak. This fiber must have more

uses than the simple, obvious uses to which it is being put today.

Pause with me and think a moment of the numbers of jobs in the collecting and processing of this moss could be brought into being if some of us would think up new uses to put it to. We have many varieties of woods that have special uses waiting to be discovered. We in Louisina, are not awake to the possibilities of invention.

Many of you would be surprised to find out that you really could invent and what we few engineers here in Louisiana could really accomplish if we just made up our minds to try. Let us not wait another fifty years until another Eli Whitney by chance comes down to help us. Invention is not such a marvelous thing. It is largely common sense and perseverance. Many of the very simple inventions have amassed fortunes. With the ever-increasing possibility of the United States having to compete with slave labor, the need for new inventions becomes greater than ever before. Inventors are the greatest benefactors of the human race, yet they are accorded very shabby treatment. An inventor should be given some credit merely for trying to invent something useful, even though he produces a "nutty" idea.

Inventors are temperamental the same as artists, writers and other people whose minds are devoted to the creation of new things. We engineers are closer to the inventors than any other people. We can set the example to others by giving inventors more encouragement and assistance than we have in the past. We stand between the inventor and the manufacturer. If our opinion of the inventor is raised, the chances are the opinion of manufacturers, bankers and others will be raised. The inventors need all the help and encouragement you can give them. You never know how far-reaching your assistance to an inventor may be. A few new inventions could accomplish much in making our State of Louisiana a better place to live in.

Before closing this paper, I want to say something about Invention as an aid to National Defense. The National Inventors' Council in the Department of Commerce, Washington,

D. C., functions to aid the various departments of the government in selecting inventions of assistance in our program of National Defense. While a great many inventions relating to defense at the present time are being given to our government free of charge, all of the provisions under the law through which the national government compensates inventors are preserved in this national emergency.

Some of you are, no doubt, familiar with the activities of The National Inventors' Council.

An article entitled "Calling All Inventors" in the January 1941 issue of the "Readers Digest" will throw more light on the activities of the National Inventors' Council than I can can possibly do at this time. Rules and regulations or procedure of the National Inventors' Council can be obtained by anyone, free of charge, by merely writing to National Inventors' Council, Department of Commerce, Washington, D. C. The council does not attempt to pass upon the patentability of the inventions presented to it. It is merely interested in finding new ideas, patentable or unpatentable, that our national government can use.

Before I close this paper, I want you to share with me a hope that I have been striving toward a number of years: that is the working out of a practical service designed to assist inventors in their engineering problems on inventions to the end that the efforts of our inventors here in Louisiana can be centered upon the more practical ideas they have conceeived, the ideas most likely to be the foundation stones for new industries for Louisiana.

MINUTES OF THE MEETINGS AND BUSINESS OF THE SOCIETY

Minutes of the Meeting of the Society, March 10, 1941.

The meeting was called to order by President Stewart. Approximately 80 members and guests were present.

It was voted to dispense with the reading of the minutes of the previous meeting.

The report of Chairman Raymond Bassich of the Employment Committee was read and accepted.

President Stewart urged all committee chairmen to contact their sponsors frequently and to submit regular reports on committee activities.

Resolutions were presented on the deaths of M. V. Haulard and H. C. Welman.

President Stewart made the following announcements: That the next meeting of the Society will be a joint meeting with the Baton Rouge Section to be held at Louisiana State University on April 19th; that a benefit dance will be sponsored by the Woman's Auxiliary on March 15 to raise money for their Scholarship Fund; that a Vocational Conference will be held at Rabouin School in the near future at which Engineers and Engineering teachers are to speak.

Chairman B. H. Bell of the Entertainment Committee reported that plans were in progress for a golf tournament in Baton Rouge on the afternoon of April 19th.

President Stewart introduced the speaker of the evening, Mr. A. F. Flournoy, Registered Patent Attorney and Mechanical Engineer of Monroe, La., who spoke on "Patents and the Professional Engineer."

The speaker answered a number of questions at the conclusion of his paper.

President Stewart extended to Mr. Flournoy the thanks of the Society.

The meeting adjourned to the usual collation.

J. K. MAYER, Secretary-Treasurer.

HORACE CHRISTIAN WELMAN

It is with deep regret that the Society recognizes the untimely passing of one of its ablest young members, Horace Welman.

Born February 3, 1911, he was educated in local public elementary and high schools, and graduated from Tulane University in 1932 with a degree in Architectural Engineering.

Throughout his school and college career he was held in highest esteem and respect by teachers, instructors and classmates for his ability as a scholar, his genial personality and his sense of fairness in all his relations. An honor student at Tulane, he was a member of Sigma Phi Delta, the Gargoyle Society, and winner of the Labouisse prize.

For his graduation thesis at Tulane, he chose the subject, "The Union Station," in preparation for which he devoted intensive study to the principles of trackage layout and terminal building design. The complete thesis showed a comprehensive understanding of this complex problem.

In keeping with his calling as an architect, his spare moments were spent in developing meritorious sketches of many of the historic buildings in the Vieux Carre. An entire book projection and aerial perspective drawing of the various plant facilities at Port Sulphur, La., was a tribute to his architectural ability.

Upon graduation from Tulane, he was first associated with William T. Nolan, architect, for whom he created several very creditable architectural designs. Following this, he was employed for a short time by the Jones-Laughlin Steel Company, engaged in design work. From there he was next employed by the U. S. Industrial Alcohol Company, where his work brought him to the attention of the Air Reduction Sales Company. With this company his efforts were productive of excellent ideas and designs in the field of industrial advertising.

Ever keen and active, with obviously little thought of physical consequences in his strenuous efforts for perfection in his work, his passing is truly a great loss, not only to this Society, but to the Engineering profession.

BE IT RESOLVED, That the Louisiana Engineering Society extend its profound and heartfelt sympathy to his parents, Mr. and Mrs. George Welman, and family, in this

President Stewart expressed the appreciation of the Society for the hospitality and cooperation received in Baton Rouge and stated that he would like to see other sections of the Society organized throughout the state. He also announced that a trophy had been procured for the golf matches between the Baton Rouge and New Orleans members. This trophy was won by the New Orleans delegation in a match earlier in the afternoon.

The meeting then adjourned to the Geology Auditorium, where Major Phillip R. Garges gave an interesting paper on "The Engineer and National Defense." At the conclusion of the paper he showed numerous slides of the progress of the construction of the Baton Rouge Airport and the Bombardment Base in New Orleans.

President Tannant expressed to Major Garges the appreciation of the Society and the meeting then adjourned.

J. K. MAYER, Secretary-Treasurer.

Minutes of the Meeting of the Society, May 12, 1941.

The meeting was called to order by President Stewart. Approximately 100 members and guests were present.

The reading of the minutes of the last meeting were dispensed with.

The Secretary reported briefly on the activities of a number of the standing committees.

Mr. H. A. Levey announced the organization of the National Inventors' Council in Washington to consider new ideas, especially those concerning National Defense.

The meeting was turned over to Dean L. J. Lassalle, Chairman of the New Orleans Section, American Society of Mechanical Engineers, who introduced Professor Lawrence S. Reid of the University of Oklahoma. Professor Reid spoke on "The Need for Further Development in Gas Cycling and Condensate Recovery." The speaker answered several questions at the conclusion of his paper.

Dr. William A. Hanley, National President of the American Society of Mechanical Engineers was then introduced by Dean Lassalle. Dr. Hanley gave an inspiring and instructive address on National Defense and the part which the engineer must play in this connection.

The meeting was turned back to President Stewart, who expressed to the speakers the appreciation of the Society.

The meeting adjourned with a rising vote of thanks to the two speakers.

J. K. MAYER, Secretary-Treasurer.

Minutes of the Meeting of the Board, April 7, 1941.

The meeting was called to order by President Stewart with the following present: Fromherz, Kerr, Kohnke and Mayer.

The minutes of the last Board meeting were read and approved. The financial report for the month of March was read.

President Stewart stated that he had written Governor Jones requesting the consideration of engineers to fill any vacancies on the Louisiana State University Board of Supervisors and that a reply had been received stating that there were no vacancies at present, but requesting a list of engineers for future consideration. President Stewart asked Mr. Kohnke to contact Mr. Todd, Chairman of the Professional Advancement Committee, and request the preparation of such a list.

A letter from Professor Pillet outlining the plans for the meeting in Baton Rouge on April 19th was read.

President Stewart reported the following committee activities:

1. That the Publicity Committee was obtaining ample publicity for the coming meeting in Baton Rouge.
2. That the Entertainment and Outings Committee is planning a spring outing.
3. That at the recent Vocational Conference for senior high school students the following engineers had spoken: W. Barnes (E. E.), F. J. Heffman (Ch. E.), K. P. Kammer (M. E.), C. M. Kerr (C. E.), G. E. May (H. & V. E.), and C. W. Ricker (E. E.).
4. That Chairman Ross of Publications Committee "B" has received advertisements for the Proceedings amounting to over $100.
5. That both Membership Committee "B" and the Employment Committee have been very active.

A proposed President's letter was read and approved for publication in the Proceedings.

The March report of the Employment Committee was read and approved.

A letter of thanks from the Welman family was read and filed.

Mr. Kerr reported that the House Committee had met and discussed plans for moving the headquarters of the Society. This matter is to be pursued and a report made to the Board.

It was moved by Mr. Kerr and seconded by Mr. Kohnke that the Civic and Industrial Affairs Committee sound out the feeling of the Society in regard to the proposed St. Lawrence Waterway and, if advisable, to present a resolution at the next Board meeting. The motion was passed.

Mr. Fromherz stated that he had conferred with Chairman Frantz of the Library Committee concerning the improvement of the Society library. It was suggested that the library be handled by the Howard-Tilton Library and that a good selection of current handbooks be purchased. Chairman Frantz was requested to obtain such pertinent information as administrative costs, number and cost of new books which should be purchased.

Mr. Fromherz proposed that a paper concerning liberalizing and increasing the length of engineering education be presented at a Society meeting. The Engineering Education Committee was requested to consult with the Technical Papers Committee on this matter.

Meeting notices for the Baton Rouge meeting are to carry announcements of the regional conferences of the Illuminating Engineering Society on April 15 and the joint American Society of Civil Engineers-Society of American Military Engineers on April 29.

President Stewart appointed Mr. C. M. Kerr as General Chairman for the 1942 Annual Meeting.

There being no further business the meeting adjourned.

J. K. MAYER, Secretary-Treasurer.

Minutes of the Meeting of the Board, May 5, 1941.

The meeting was called to order by President Stewart with the following present: Fromherz, Kerr, Kohnke, Rhodes and Mayer.

The minutes of the last meeting were read and approved. The Financial Report for the month of April was read.

Mr. Kohnke reported for the Committee on Professional Advancement in regard to the submission of a list of engineers to Governor Jones for consideration in filling any future vacancies on the Louisiana State University Board of Supervisors. The following names are to be submitted: F. N. Billingsley, C. G. Cappel, S. W. Elberson, J. P. Ewin, A. M. Fromherz, D. W. Godat, G. P. Meade and John Reiss.

Mr. Kerr reported that the Entertainment and Outing Committee has scheduled the Annual Golf Tournament for June 3rd and that arrangements are near completion. He also reported that the House Committee is still investigating the possibilities of securing a new location for the Society headquarters.

A report of Chairman Nairne of the Civic and Industrial Affairs Committee recommended that President Stewart write letters to a number of interested officials stating that the Society opposes any treaty between the United States and Canada with regard to the proposed St. Lawrence Waterway. One of the two letters submitted was selected.

Mr. Fromherz reported that Chairman Frantz of the Library Committee is working on plans for improving the Society library and considering the question of moving it to the Howard-Tilton Library.

A letter from B. E. Galloway declining recent election as Affiliate Member was read. It was decided to return his application to Membership Committee "B" for review.

Mr. S. E. Huey of Monroe was appointed chairman of a committee to present resolutions on the death of Mr. Berny Oakland. Mr. Huey is to select two other committee members.

The resignation of Mr. M. L. Randolph of Shreveport was accepted with regrets. Mr. J. T. Bullen and Mr. E. M. Freeman are to be requested to consider the possibilities of organizing a Shreveport Section of the Society.

Mr. S. E. Trouard was granted a leave of absence from April 10, 1941, until the completion of his Selective Service enlistment.

A letter from Mr. H. A. Levey proposing that the membership list carry more information was read. It was decided that the matter would be considered further before the compilation of the next membership list.

Mr. Fromherz reported that the A. S. C. E. would hold a joint meeting with the Society on December 8th.

There being no further business the meeting adjourned.

J. K. MAYER, Secretary-Treasurer.

PROCEEDINGS
OF THE
LOUISIANA ENGINEERING SOCIETY

JUNE, 1941

"PATRONIZE OUR ADVERTISERS"

INDEX TO ADVERTISEMENTS

LASEC NEWS

SECTION OFFICERS

President,
J. A. McNIVEN
1st Vice-President,
F. N. BILLINGSLEY
2nd Vice-President,
V. J. BEDELL
Secretary-Treasurer,
D. W. GODAT

LOUISIANA SECTION
AMERICAN SOCIETY OF CIVIL ENGINEERS
FOUNDED 1852
1914
NEW ORLEANS, LA.

PUBLICITY COMMITTEE
J. M. LeDOUX, Chm.
CHARLES M. KERR
GEORGE JANVIER, JR.

Address Communications to:
5700 Garfield Street,
New Orleans, La.

Vol. III, No. 3 | Published Bi-Monthly | June, 1941

AS WE SEE IT

Civil Engineers, the essential nucleus of the national defense construction program, have responded by thousands to the urgent call for their services. Every branch of the profession has contributed unstintingly of its knowledge, skill, effort and ingenuity. Amazing accomplishment has been the result.

Capable engineers who were available, men of broad experience and high standing in the profession, have contributed services indispensable to the conception, development and execution of this program. But the job is not completed. Each month hundreds of millions are being allocated for further development and extensions.

Unfortunately, projects in many localities are being delayed, due to the inavailability of engineering personnel qualified for important key positions. This deficiency can now be met only by drawing upon those who are securely and permanently employed otherwise. It is a call for volunteers.

Difficult considerations confront those faced with a decision in this matter. The grave uncertainty of their position upon return to normal life, together with the serious economic implications involved, and the net remunerative return, after deduction of living expenses while away from home, do not constitute an attractive perspective.

Defense construction must be expedited to the utmost. The services of the most competent engineers are required in order to attain maximum speed, engineering economy, and proper organization and coordination of effort. At this time our country needs the best. And in justice to these, their remuneration must be fully commensurate with their responsibilities and the sacrifices they are called upon to make.

NEWS ITEMS

The Board of Directors has announced the appointment of Wm. B. Gregory to serve as Vice-Chairman of the Committee on Civilian Protection in War Time.

A well attended meeting of the Section was held in the St. Charles Hotel at New Orleans on April 29th. The S. A. M. E. and the Louisiana Engineering Society, as special guests for the occasion, were well represented.

The technical feature of the meeting was provided by Thomas N. Bruns, of the Housing Authority of New Orleans, who presented a paper very interestingly describing the valuable research information and engineering data compiled from the records of unusually extensive test pile driving and withdrawing operations carried out under his direction at the site of the Lafitte Housing Project. Stereopticon reproductions of charts, drawings and photographs, clearly illustrated the soil formations into which the piling were driven and their condition after withdrawal, and also gave substantial support to the speaker's conclusions and recommendations.

Discussion of the paper was opened by Charles M. Kerr, to which much of interest was added by Maj. V. J. Bedell, F. N. Billingsley and Walter Scales.

The NEXT MEETING will be at the St. Charles Hotel in New Orleans on June 24th. On this occasion S. E. Travis, Jr., Supervisor of Airports, Civil Aeronautics Administration, connected with the office of the Regional Manager at Fort Worth, Texas, will be the principal speaker. His topic, the development of civilian airports, will be viewed in the light of the full maturity of air travel and aerial warfare.

Members of the Society of American Military Engineers and of the Louisiana Engineering Society have been invited to attend.

By recent action of the Board of Directors of the Section, approval has been given to the recommendations of the Committee on Awards, relative to the annual Junior Membership Award. The students designated for this honor are Bernard Greenberg, of Louisiana State University, and Paul H. Ricker, of Tulane University.

PERSONALS

Our compliments to PROF. DONALD DERICKSON, whose Tulane University Student Chapter stands second to none.

MAJOR J. L. WHITE was recently appointed Engineer Advisor on Occupational Deferment in Louisiana.

And our old friend CAPT. BERNHARD DORNBLATT, we are told, is assigned to the Mobile District office of the U. S. Engineers.

L. M. ODOM, formerly with the U. S. Engineers, is now with the Louisiana Department of Public Works.

We hear that the Golf Committee of the Louisiana Engineering Society has discussed the advisability of providing OLE K. OLSEN with a caddy, when he pitches horse shoes.

C. N. JOYNER, who spent more than a decade in Peiping, China, is now at Alexandria on defense work.

R. B. FOWLER is now Construction Engineer for the 122nd Observation Squadron, Louisiana National Guard.

Are YOUR dues to the Section paid for 1941? Mail your check NOW to David W. Godat, Secretary, Terminal Station Bldg., New Orleans, La.

"DON'T HIT TIMBER PILES TOO HARD"

By THOMAS N. BRUNS

(A brief resume of a paper presented before the Section April 29, 1941)

Eighty-eight test piles driven, carefully logged, immediately pulled and the extent of the damage observed and recorded, on the site of the Lafitte Housing Project at New Orleans, constitute the most extensive test pile work carried out in the South.

Mr. H. A. Christie of the Raymond Concrete Pile Company, builder of the Pontchartrain Bridge, The Watson - Williams Bridge, and the Army Supply Base foundations, recently stated that: " . . . it is my opinion you cannot safely drive an ordinary southern pine pile having a 6" tip and a 12" butt to more than one-half inch per blow with a Vulcan No. 1 hammer." Until a great deal more research has been done on the subject, the experience of this paper, as well as the speaker's experience backs Mr. Christie's half-inch per blow 100% and recommends adherence to it.

In the light of the facts observed in these tests, two DON'TS are recommended:

(1) If a condition is encountered where the tip of a pile will be brought up on a hard stratum entirely overlain by soft material, DON'T buy piles with 6" tips, buy them with 8" or 9" tips if possible, and see to it that they are as free from knots and bends in the lower twelve feet as possi-

ble, and DON'T keep pounding them after the tip has reached the hard stratum.

(2) If a condition is encountered where a hard stratum of say one-half inch to three-quarters inch per blow with a No. 1 Vulcan hammer is overlain and underlain with soft material and it is desirable to penetrate the upper stratum and land on the lower, thicker, and more solid stratum, again DON'T buy 6" piles but buy larger tip piles. Then DON'T ever use these stronger piles until several test piles have been driven through the hard stratum, through the underlying soft material, and landed on the lower hard stratum, and then pulled in order to definitely prove that this penetration can be effected without breaking the piles.

As a general pile driving principle, DON'T consider the spending of increased money to increase pile strength or pile length, as an increase of building cost, but consider it as plain good insurance.

STUDENT CHAPTERS

Tulane University

The recent Southeastern Conference of Student Chapters A. S. C. E. at Atlanta, Ga., honored two members of the Tulane University Chapter. W. O. Hudson II was elected president of the Conference for the coming year, and a paper presented by Wm. R. Burk, Jr., "Proposed Steel Gates in the Mississippi River to Prevent Salt Water Intrusion Upstream," placed first in the technical paper contest.

All seniors to be graduated in Civil Engineering have made application for Junior Membership in the Society and have secured positions effective immediately upon graduation.

MEMBERSHIP CHANGES

ADDITIONS TO MEMBERSHIP

Junior:

STANLEY STEVEN CARNEGIE, New Orleans.

APPLICATIONS FOR ADMISSION

For Associate:

QUINCY ADAMS HESTER, JR., Baton Rouge, La.

For Junior:

GEORGE STAEHLE SCHRENK, New Orleans, La.

DID YOU KNOW THAT:—

A former Kansas statute provided that "two trains meeting at a crossing shall stop, and neither proceed until the other has passed" . . . ? ?

THE PROCEEDINGS
OF THE
LOUISIANA ENGINEERING SOCIETY

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

ARTHUR M. HILL, Editor.

Subscription, $2.00 per annum Single copy, 35 cents

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

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

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

DAVID W. STEWART

LOUISIANA ENGINEERING SOCIETY

Suite 422 St. Charles Hotel

OFFICERS FOR 1941

President, DAVID W. STEWART, 317 Baronne St.
1st Vice-Pres., LEO J. LASSALLE, University, La.
2nd Vice-Pres., C. GLENN CAPPEL, 833 Howard Ave.
Sect.-Treas., JOHN K. MAYER, P. O. Station 20.

DIRECTORS

ALVIN M. FROMHERZ, 226 Carondelet St.
KARL P. KAMMER, 317 Baronne St.
CHARLES M. KERR, 5831 S. Robertson St.
RICHARD B. KOHNKE, 932 Picheloup Place.
WILLIAM H. RHODES, 505 Canal Building.

BATON ROUGE SECTION OFFICERS FOR 1941

President, W. W. TENNANT
1st Vice Pres., N. E. LANT
2nd Vice Pres., F. F. PILLET
Sect.-Treas., CHAS. A. MEYER

STATE BOARD OF ENGINEERING EXAMINERS

J. T. BULLEN, Pres.
E. S. BRES
DONALD DERICKSON
B. H. GREHAN
B. W. PEGUES

DISTRICT CONTACT REPRESENTATIVES

3rd Dist. THOMAS J. JONES, New Iberia, La.
4th Dist. J. T. BULLEN, 4026 Curtis Lane, Shreveport, La.
5th Dist. S. E. HUEY, Ouachita Bank Bldg., Monroe, La.
6th Dist. C. A. MYERS, Dept. of Highways, Baton Rouge, La.
7th Dist. L. P. ELBERSON, Crowley, La.
8th Dist. D. E. FUELLHART, Natchitoches, La.

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

LOUISIANA ENGINEERING SOCIETY

STANDING COMMITTEES FOR 1941

Committees Sponsored by C. Glenn Cappel

Awards
F. F. Pillet, Chairman
Donald Derickson
B. W. Pegues
J. M. Robert
H. W. Waterfall
C. S. Williamson
J. C. Bendler
L. G. Ireland
John Klorer
A. E. Marks
J. A. McNiven
H. P. Newton
J. H. O'Neill
W. H. Rhodes
A. M. Shaw
C. Floyd

Finance
O. K. Oleson, Chairman
D. W. Godat
G. C. Kerr
I. K. Mayer
H. L. McLean
J. L. Fortier

Defense
E. S. Bres, Chairman
V. J. Bedell, Vice-Charman
Donald Derickson
A. M. Hill

Professional Advancement
J. M. Todd, Chairman
V. J. Bedell
F. N. Billingsley
H. Johnson
R. J. Kuhn
L. J. Lassalle
H. A. Levey
G. E. May
B. S. Nelson
C. B. Norris
John Riess
J. E. Morehiser

Committees Sponsored by Alvin M. Fromherz

Civic and Industrial Affairs
C. L. Nairne, Chairman
A. E. Abaunza
R. T. Burwell
C. C. Crawford
E. L. Cowan
C. B. Dicks
R. E. Cosa
A. J. Harris
P. F. Hoots
S. E. Huey
W. S. Leake
H. L. McLean
A. J. Naquin
J. L. Porter
G. A. Seaver
J. L. White
W. N. Tuller

Legislation
D. W. Godat, Chairman
S. V. Applewhite, Vice-Chairman
F. N. Billingsley
E. S. Bres
A. M. Fromherz
B. H. Grehan
W. B. Gregory
H. B. Henderlite
W. T. Hess
F. E. Johnson, Jr.
T. J. Jones
K. P. Kammer
L. J. Lassalle
G. E. May
J. A. McNiven
F. F. Pillet
W. H. Rhodes
F. M. Stone
C. S. Williamson
W. P. Wallace

Library
L. T. Frantz, Chairman
M. C. Abrahm
W. H. Scales
R. A. Steinmayer
R. M. Shaw

Committees Sponsored by Karl P. Kammer

Engineering Education
C. W. Ricker, Chairman
S. W. Elberson
L. T. Frantz
F. G. Frost
W. B. Gregory
A. M. Hill
W. H. Rhodes
F. M. Taylor
J. M. Todd
H. W. Waterfall
Wm. Whipple
Sidney Ellis, Jr.

Publicity
J. J. Bulliung, Chairman
B. H. Bell
H. W. Fletcher
J. A. Glover
O. K. Olsen
W. S. Rainville, Jr.
Frank Riess

Student and Junior Activity
L. J. Cucullu, Chairman
M. C. Abrahm
J. E. Harvey
G. A. Heft
W. S. Nelson
M. G. Zervigon
W. P. Wallace

Technical Papers
W. S. Rainville, Jr., Chairman
H. M. Blain, Jr.
J. M. Guillory
F. E. Johnson, Jr.
C. M. Kerr
G. C. Kerr
H. A. Levey
E. A. McLellan
E. L. Mire
R. A. Steinmayer
B. J. Haney

Committees Sponsored by Charles M. Kerr

House
R. L. Nall, Chairman
E. S. Bres
H. E. Crump
A. H. Guillot
W. T. Hogg
E. S. Lanphier
W. S. Nelson

Entertainment and Outings
B. H. Bell, Chairman
L. F. Alexander
J. J. Bulliung
R. J. Dreuding
A. L. Dunlap
H. W. Fletcher
R. P. Lockett
David Moodie
H. B. Myers
A. J. Naquin
O. K. Olsen
N. H. Ross
R. M. Seago
A. J. Fransen

Membership, Division "A"
A. L. Dunlap, Chairman
C. E. Abrahamson
F. R. Adams
V. J. Bedell
J. L. Bourgeois
J. T. Bullen
E. L. Cowan
M. J. Cramer
C. E. Dolhonde
L. P. Elberson
S. W. Elberson
O. H. Elverum
C. H. Fenstermaker
D. E. Fuellhart
J. B. Gates
A. E. Hotard
J. B. Howze
S. E. Huey
T. J. Jones
N. E. Lant
H. L. Lehmann
C. A. Myers
H. P. Newton
B. W. Pegues
B. B. Pierce
A. F. Rideout
P. T. Seashore
Harry Shutts
T. B. Smith
I. W. Sylvester
S. A. Theard
A. G. Jarreau

Publications, Division "A"
A. M. Hill, Chairman
J. C. Baehr
H. J. Molaison
J. M. Robert
H. S. Salzer
F. M. Taylor
G. F. Williamson

Committees Sponsored by Richard B. Kohnke

Membership, Division "B"
B. S. Nelson, Chairman
D. S. Elliott
C. A. Myers
J. H. O'Neill
H. I. Brown

Publications, Division "B"
N. H. Ross, Chairman
E. C. Coburn
H. W. Fletcher
J. T. Floyd, Jr.
J. D. Ford
W. H. Grant, Jr.
S. L. Hebrard
G. W. Hill
C. J. Kelly
G. C. Kerr
H. J. Lane
R. P. Lockett
N. L. Marks
L. C. H. McLean
W. P. Oster
E. J. McNamara

Employment
R. P. Bassich, Chairman
E. L. Fithian
G. A. Heft
E. A. McLellan
R. F. Muller
J. C. Bartley

Public Relations
A. T. Dusenbury, Chairman
L. F. Alexander
J. C. Baine, Jr.
B. H. Grehan
A. S. Hackett
G. R. Hammett
A. C. Hays
Noel P. Kammer
A. R. Keiler
N. E. Lant
H. P. Newton
D. H. L. Morris

The last name on each committee is the Junior member, who sits with the committee, but without vote.

PROCEEDINGS
OF THE
LOUISIANA ENGINEERING SOCIETY

VOL. XXVII. AUGUST, 1941 NO. 4

CONTENTS

EDITORIAL NOTES AND COMMENT

New Library Facilities. Even if you are not interested in looking up some information, you will be repaid by a trip through the new Howard-Tilton Memorial Library situated on the corner of Freret Street and Newcomb Boulevard. The construction and equipment represent the best modern library practice. The building is beautifully appointed and is air conditioned.

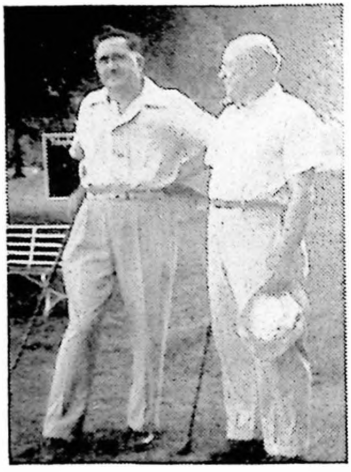
The general collection of science and engineering books is housed on the third floor, and the door is marked "Science and Engineering."

Access to this room is free to members of the Society for reading and consultation within the room.

By a payment of a five-dollar annual fee, borrowing privileges will be granted. If this arrangement is desired for a shorter period, the payment is 50 cents per month.

All of our members are welcome to make use of the library. The hours during the year, except from about the middle of August to the middle of September, are 7:45 a. m. until 10 p. m. For the vacation period mentioned above, hours are from 9 a. m. until 4 p. m.

'Twas a Grand Affair . . . . .



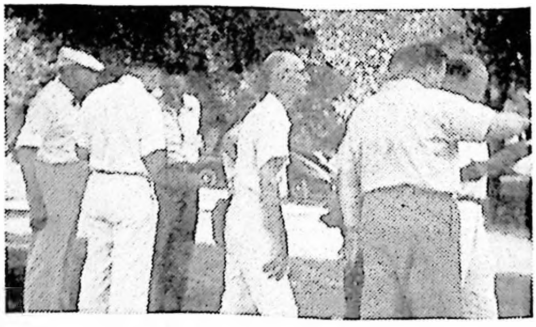
Golfers Steinmayer and Dusenbury.

Bossing 138,000 kilowatts at Market Street is one thing, and speaking at the dinner following the June Golf Tournament is another thing, but President Dave Stewart can do both.

And we repeat, 'twas a grand affair—an array of prizes from our many and generous friends, an array of talent in horse-shoe pitching and golf, ending in the evening with a dinner and an array of dancing talent by the entertainers.

The committee in charge of arrangements did a splendid job, and everything came off according to schedule.

We had hoped to have a number of Baton Rouge members, but change of dates on holidays prevented their attending. Two views of the day's events are shown. Mr. Ole K. Olsen's usual "barrel of fun" added to the enjoyment of those present. If you came, you'll come again; if you did not, plan to make it next year.



Ole K. Oleson (in cap) and playmates.

How Do You Do? Do you believe in "mental telepathy"? Or do you give the proper signal when you are making a turn or stopping, not expecting the driver behind you to "read your mind."

A careful survey of automobile accidents shows that the maximum occur during the early evening hours. Drivers who are reluctant to turn on their lights at the proper time are partly responsible. Perhaps it is "romantic" or "restful" to drive in the twilight with the lights out, but for safety's sake, turn on the lights early in the evening.

Do you suffer from "curb-itis*"? On a two-lane or four-lane highway do you drive down the center of the strip, or keep to the right?

It's these little things that will help save some of the 35,000 killed each year in automobile accidents. You, as an engineer and a professional man, should do your part, but—how do you do?

* A fear of driving closer than twelve feet to the curb or edge of roadway except when parking.

The mere existence of an engineering society raises the standards of the engineering profession.

New Members. Again in this issue is carried a list of new members. Look through the list, then consider "Isn't there someone I know who would make a desirable member?" Let's keep the membership on the up and up. The Membership Committee is doing a fine job, but they need the help of every individual.

Dennis, Edwin Lamar. State Member. 340 L. S. U. Ave., Baton Rouge, La. Age 40. Endorsed by D. W. Stewart, L. J. Lasalle, K. P. Kammer. 1924-25 Power Engr., Texas Co. 1925-26 Asst. Supt., Central Consuelo, San Pedro de Marcoris, Santo Domingo. 1927-38 Chief of Engr. Dept., Godchaux Sugars, Inc., New Orleans. 1938-41 Consulting Engr., New Orleans, and Chief Combustion Engr., Coppus Engr. Corp., Worcester, Mass. 1941 C. C. E., Coppus Engr. Corp. and Prof. of Chem. Engr., La. State Univ.

Dugan, John V., Jr. Affiliate Member. 1148 S. Peters St., New Orleans. Age 30. Endorsed by D. W. Stewart, K. P. Kammer, J. J. Bulliung. 1928 to date with Crane Co. 1932 to date has specialized in power plant piping design, especially sugar mill and oil refinery piping. 1934 to date entire time in industrial piping. At present sales engineer.

Flournoy, Algernon Francis. State Member. 903 Walnut St., Monroe, La. Age 43. Endorsed by Berny Oakland, A. M. Hill, H. A. Levey. B. S. in M. E. from Mass. Inst. of Tech. Electrical Contracting and Sales. Patent Examiner. At present in practice of Patent Law and Patent Engineering.

Galloway, Benjamin E. Member. 1204 Canal Bldg., Box 1070 New Orleans. Age 33. Endorsed by: B. Dornblatt, P. F., Hamilton, A. J. Negrotto. 1930-)) Instrumentman, La. Hwy. Comm. 1933 Field Engr., E. L. Bruce Co., Oak Grove, La., also C. W. A. Engr., West Carroll Parish. 1933-34 Instrumentman, La. Hwy. Comm. 1934-35 Locating and preparing plans for road and bridge projects, W. Carroll Parish. 1935 Planning Engr., F. E. R. A., Monroe, La. 1935-37 Planning & Const. Engr., W. P. A. 1937-38 Resident Engr., Oak Grove, La., Sewer Project. 1938-39 Asst. Area Engr., W. P. A., Baton Rouge. 1939-40 Area Engr. in charge of Const., Alexandria, La. 1940 to present Project Engr. State-wide Highway Const. Project, Hhqs. New Orleans.

Gamble, Cary Breckinridge. Member. 4235 S. Carrollton Ave., New Orleans. Age 38. Endorsed by G. C. Kerr, I. W. Mann, Jr., C. E. May. 1923 B. S. in E. E., Alabama Poly. Inst. 1924-26 Asst. Prof. Physics, Washington & Lee Univ. 1926-35 Frigidaire Corp. or Distributor as Sales Engr., Commercial Refrigeration, Air Conditioning. 1935-36 Crawford, Inc., New Orleans, Contractor for Air Conditioning. 1936 to date Consulting Engr. with Leo S. Weil & Walter B. Moses, Design of Air Conditioning Systems.

Gibson, James K. Member. 2026 St. Charles Ave., New Orleans. Age 29. Endorsed by K. P. Kammer, A. J. Naquin, W. S. Rainville, Jr. 1934 B. S. in E. E., Purdue Univ. 2 years Engr. Asst. to Director of Research, Cincinnati Street Railway,

Concinnati, Ohio. 1 yr. as Fellow, Bureau for Street Traffic Research, Yale Univ. 1 yr. as Research Asst. to Accident Prevention Engr., American Transit Assoc., New York City. At present Research Asst. in Research Dept., N. O. P. S. I.

Holloway, Glenn. State Affiliate. 220 Wieck Bldg., Baton Rouge. Age 53. Endorsed by L. J. Lassalle, E. C. Coburn, W. W. Tennant. 16 yrs. Building & Operating sawmills. 2 yrs. 1st Lt., 20th Engrs., France. 2 yrs. L. S. U. representative surveying European university industrial research and industrial extension service. Similar survey of Louisiana re L. S. U. industrial extension research service. 7 yrs. Pres. of Southern Engr. & Sales, sales agent for heavy machinery, developing and marketing new equipment.

Lundy, W. T. Member. 5355 St. Charles Ave., New Orleans. Age 56. Endorsed by J. M. Todd, J. F. Coleman, L. F. Alexander. 1907 Graduate of Univ. of Calif. 1907-12 Metallurgical Engr., Oriental Consolidated Mining Co., Chosen (Korea). 1912-16 Supt. Weedon Mining Co., Quebec, Canada. 1917-17 Engr., Texas Gulf Sulphur Co., Matagorda, Texas. 1919-23 Consulting Engr., San Francisco, Calif. 1923 to date Engr., Freeport Sulphur Co. Present position, Vice-Pres. & Gen. Mgr., Freeport Sulphur Co.; Vice-Pres. Cuban American Manganese Corp.

Parkinson, Taintor. State Member. College of Eng., L. S. U. Age 54. Endorsed by B. W. Pegues, H. W. Waterfall, F. J. Germano. 1909 A. B. from Dartmouth. 1909-10 Head Math. Dept., High School, Porthmouth, N. H. 1910-12 Grad. Fellow, N. Y. Univ. 1911 Pd. M., N. Y. Univ. 1912-13 Public School Principal, West Burnstable, Mass. 1913-23 same in Greenwich, Conn., except 1917-19 when in U. S. Signal Corps. 1924-30 Research Assoc. and then Assoc. Physicist in charge of investigation of radio wave phenomena with U. S. Bureau of Standards. in E. E. 1936 to date at L. S. U. teaching Electronics and Radio M. S. in E. E. in 1932. Instructor in E. E. 1934-36, Asst. Prof. 1930-34 graduate study in Physics & Engr., Univ. of Michigan, Communication.

Phillips, Charles J., Jr. Affiliate Member. 920 S. Telemachus St., New Orleans. Age 32. Endorsed by A. M. Fromherz, S. F. Jones, H. J. Patterson. 1927 Graduate of Warren Easton High School. 1927-30 completed course in mechanical Design & Drawing. 1927-32 Arch. Design with Dixie Bldg. Mat. Co. 1932-35 Supvis. Arch., Historical American Bldg. Survey. 1935-37 Engr. Dept. La. Hwy. Comm. 1937-38 Party Chief in Field, La. Hwy. Comm. 1938-39 Eng. Dept. of Geo. P. Rice. 1939-41 Engr. Dept. Housing Authority of New Orleans. Has 1941 Civil Service rating as Chief Engr. Draftsman.

Pyburn, Dewitt L. State Member. 364 Center Drive, Baton Rouge. Age 42. Endorsed by B. W. Pegues, N. E. Lant, F. B. Grevemberg. 1919-20 Res. Engr., Caddo Parish Hwy. Dept. 1920-21 Res. Engr., Ouachita Parish Hwy. Dept. 1921-22 Res. Engr., Caddo Parish Hwy. Dept. 1922-29 Asst. Parish Engr., Webster Parish. 1929-35 Res. Engr., Webster Parish. 1935-40 State Administrator, CCC Camps. 1940 Chrm., State Planning Comm. 1941 Director, Dept. of Public Works, B. R.

Schwartz, Morris C. State Member. 364 Center Drive, Baton Rouge, La. Age 33. Endorsed by L. J. Lasalle, F. F. Pillet, H. W. Waterfall. 1928 B. S. from N. Y. Univ. 1931 Ph. D. from same. 1931 Research Chemist, Gulf States Util. Co., Baton Rouge. 1932-39 Research Assoc., L. S. U. 1939 Research Assoc. in Water Tech., L. S. U. Eng. Exp. Station. 1941 Asst. Prof. Ch. Eng., L. S. U.

Ward, Kyle, Jr. Member. 937 Wilson Drive, New Orleans. Age 38. Endorsed by H. P. Newton, H. J. Molaison, C. S. Williamson. 1923 B. S. in Ch. E., U. of Texas, also B. A. 1926 M. S. in Chem., Geo. Wash. Univ. 1932 Ph. D. in Chem. Berlin. 8 yrs. Hercules Powder Co. 2 yrs. Chemical Foundation. 6 yrs. U. S. Dept. of Agriculture.

Waugh, Harry. State Member. 2707 Morning Glory Ave., Baton Rouge. Age 38. Endorsed by S. L. Hebrard, R. B. Richardson, C. A. Myers. 1½ yrs. Rodman & Instrumentman, Lincoln Parish Police Jury. 8 mos. on Construction with Alexandria Const. Co. 4 yrs. Instrumentman & Supt. Const. &

Main. with Claiborne Parish Police Jury. 12 yrs. Instrumentman, Res. Eng., Dist Engr., and at present Road Design Engr., Dept. of Hwys., Baton Rouge, La.

RE-INSTATEMENT

Chestnut, Roger E. Member. 413 S. Genois St., New Orleans. Age 52. Endorsed by J. A. McNiven, W. T. Hogg, H. E. Crump. 1915 Draftsman & Designer, U. S. Naval Station, New Orleans. 1919 with Chickasaw Ship Bldg. Co. 1920-22 with Longbeach Ship Bldg. Co., Cal. 1923-26 and 32-33 Designer with N. O. Dock Board. 1927-28 & 33-36 Des. Engr., Gulf Refining Co., Port Arthur. 1929 with Masonite Corp., Laurel, Miss. 1930-31 & 37 with Shell Pet. Co., Norco, La. 1937 to date with V. M. Friede, Naval Arch. & Engr., New Orleans.

Hunt, Dick A. State Member. 25 Mary St., Alexandria, La. Age 40. Endorsed by W. S. Nelson, I. W. Sylvester, J. L. Porter. 21 yrs. active practice, including 6 yrs. railway Civil Engr. in responsible capacity, 6 yrs. Hwy work, 1½ yrs. Municipal Engr. At present in charge of Estimating Dept., W. Horace Williams Co., Contractors at Camp Claiborne, Bringhurst, La.

PAPERS AND DISCUSSIONS

SUGGESTED METHODS FOR PREVENTING THE INFLUX OF THE GULF OF MEXICO FROM CONTAMINATING THE NEW ORLEANS WATER SUPPLY

BEN J. HANEY, JR.*

Presented before the Society on June 9, 1941.

This paper was compiled largely from the information obtained from the 1936 salt influx report by Mr. A. B. Wood, General Supt. of the Sewerage and Water Board, the Chemical Engineers of the Sewerage and Water Board, and 1939 reports of Mr. John Klorer of the Sewerage and Water Board.

For the 1940 invasion I am largely indebted to the U. S. Engineers of the Second New Orleans District for giving me access to their field notes.

Few realize that a low flowage phenomenon of the Mississippi River threatens New Orleans with a water supply that is steadily becoming less palatable.

When the discharge of the river drops below 200,000 cfs. at Angola, La., for a considerable length of time, its velocity is insufficient to produce the force and agitation necessary to retard the influx of salt water from the Gulf of Mexico, which is 2.16% greater in density than the fresh water.

Unless violently disturbed, salt water and fresh water will not mix despite perfect miscibility.

The mixing of salt water with fresh water was presented as a laboratory experiment by Thompson. His apparatus consisted of a Meyer tube, which is in effect a U-tube with a conical funnel on one leg provided with a stop cock, the other leg is a straight balancing tube and the bottom connection is a horizontal tube having a series of spherical bulbs. In starting, the tube was half filled with fresh water and then salt water (colored to facilitate observation) was admitted. The salt water would flow and overflow through

* Member of the Society and Assistant Engineer with the Sewerage and Water Board, New Orleans, La.

the fresh water medium until it had displaced the fresh water at the bottom of the tube. A sharp line of demarcation—an interfacial plane—existed between the two layers. There was only a slight commingling of the fresh water with the salt water..

The Gulf Stream is an example of waters of different temperatures not mixing.

Another example of this is in a swimming pool filled with two sources of water at different temperatures (tap and well water). There is a distinct thermal stratification that is noticed by all. A temperature drop of from 80° to 70° increases the density of the water .138%.

The most interesting example of the mixing action between the salt and fresh water was made known in a sample of Gulf water taken five miles out from the mouth of the Southwest Pass in 1936. This sample contained 10,680 ppm. chlorides. Gulf water contains about 17,000 ppm. chlorides and ordinary river water contains less than 50 ppm. The choloride content of this sample revealed that approximately 40% of the sample was river water. This indicated, beyond doubt, that the river water of lesser density has but a slight tendency to mix with the Gulf water when there is little agitation between the two waters.

In mentioning the chloride content of the two waters, (river and Gulf waters), it may be well to include the taste threshold for the chloride. This threshold varies according to the individual and ranges between 175-250 ppm. Industrial complaints from ice houses, beverage companies, florists, etc., begin between 100-150 ppm chlorides.

Prior to 1930 we were not troubled with the saline influx from the Gulf of Mexico. During 1930 the chloride content of the surface water of the river at Carrollton amounted to 196 ppm. Carrollton is the upper extremity of the city of New Orleans where the intake for the supply of this city is located. A recurrence of this condition did not appear before 1934, when the chlorides were 86 ppm. In 1935 were 70 ppm. and 1936 381 ppm.

During the year 1936 when the chlorides reached 381 ppm., the chemical department took numerous samples of the

river water, both above and below the Carrollton intake. These samples were taken at various depths and as far north as Baton Rouge to determine what percentage of the chloride content of the water could be attributed to the infiltration of water from the Gulf of Mexico.

During the salt period of 1937, Mr. Wood assembled a survey party to make a complete study of this saline encroachment.

The device for taking samples of river water at various depths was designed by Mr. C. J. Powell, Chief Chemist of the Sewerage and Water Board. This device consists of a cylinder and piston on an extended brass stem. The cylinder is clamped in an open position and lowered in the river by means of a winch to the desired depth. When this depth is attained, a brass messenger is released down the supporting cable and snaps the trigger immediately upon making contact. The cylinder falls and entraps a plug of the water that is to be sampled. A pet cock at the base of the cylinder releases the sample after it has been brought to the surface.

FIGURE 1: This is a graphical plot of the salt survey taken October 7th-9th, 1937. The ordinate of this longitudinal cross section of the river is the depth of the river in feet. The abscissa is the sampling location in miles below Cairo, Ill.

The horizontal scale is 4 miles to the square and the vertical scale is only 10 feet to the square. Because of this great reduction the bed of the river appears to abound in sharp peaks and hollows, in reality the most severe condition represented here is a pit four miles long and 90 feet deep.

This comparison can best be made with reference to Figure 2 as that is the true thalweg of the river.

At the time that this survey was taken the salt water had not reached the Carrollton Intake of the Purification Plant at New Orleans.

Samples of the river water were taken every 10 feet of depth at the Navigation Canal 978 miles below Cairo and 12 miles below the Carrollton Intake. Surface samples at this point revealed a chloride content of 54 ppm. and a 60 ft. sam-

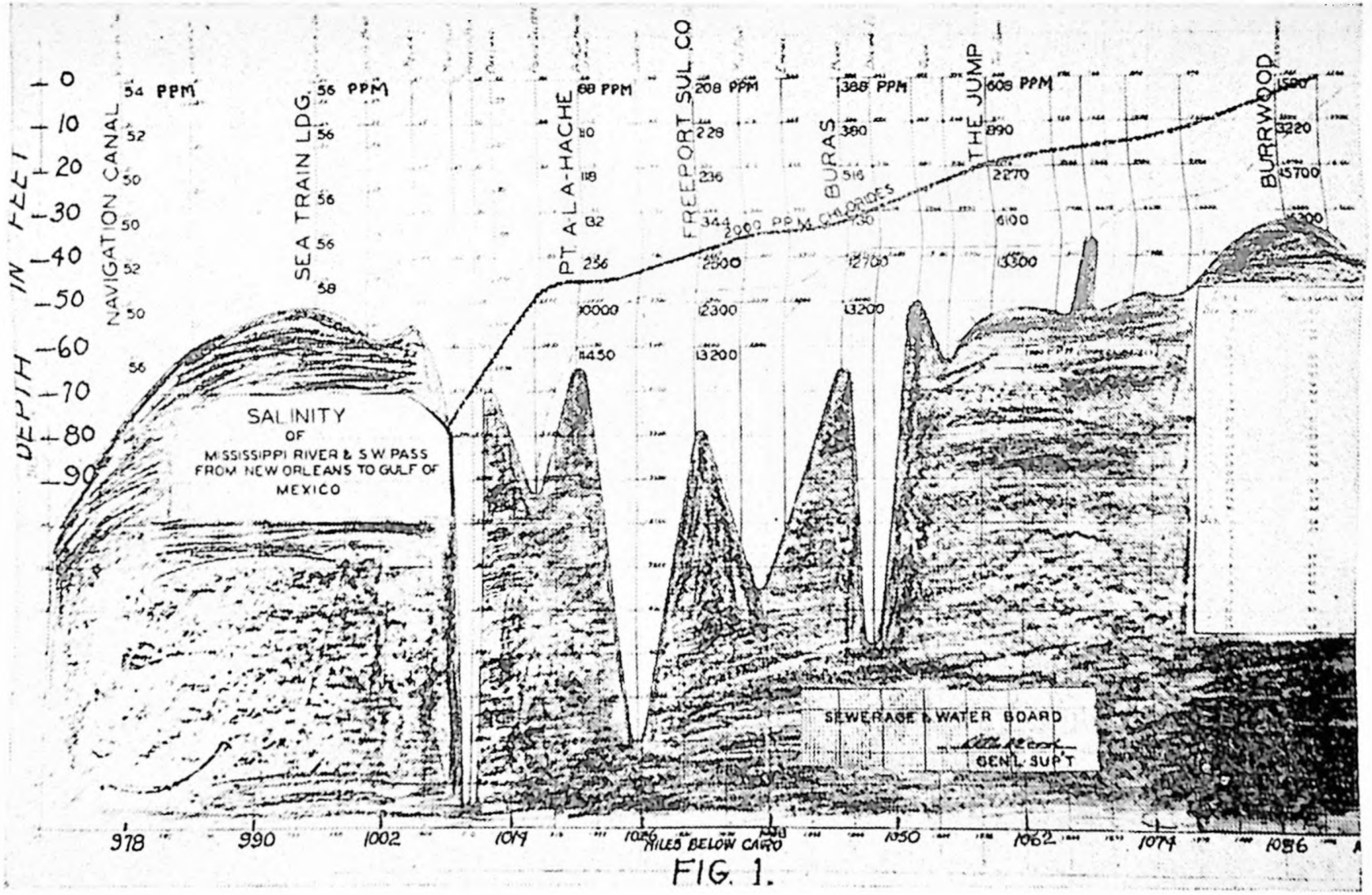

DEPTH IN FEET
0
10
20
30
40
50
60
70
80
90
NAVIGATION CANAL
54 PPM
SEA TRAIN LDG.
56 PPM
PT. A-LA-HACHE
68 PPM
FREEPORT SUL. CO
208 PPM
BURAS
388 PPM
THE JUMP
608 PPM
BURRWOOD
2000 PPM CHLORIDES
SALINITY
OF
MISSISSIPPI RIVER & S.W. PASS
FROM NEW ORLEANS TO GULF OF
MEXICO
SEWERAGE & WATER BOARD
GEN'L. SUP'T
978
990
1002
1014
1026
1038
1050
1062
1074
1086
MILES BELOW CARO

FIG. 1.

ple had a chloride content of 56 ppm. This was an indication that the salt had not as yet reached the Navigation Canal.

The salt water was discovered at Monticello, 44 miles below New Orleans. The surface water had a chloride content of 72 ppm. and at a depth of 80 feet the chlorides were 2340 ppm.

In this figure the plane of separation between the fresh water and the intruding salt water flowing up-stream from the Gulf of Mexico is assumed to be 2000 ppm. chloride.

This interfacial plane, or plane of separation, shown hereon is at a depth of 75 ft. below the surface of the river at Monticello and gradually rises to within 3 feet of the surface at Burrwood, a distance of 75 miles.

This mass of invading salt water, between the plane of separation and the river bed, is what is referred to throughout this discussion as the saline wedge.

On October 7, 1940, with a flow in the river of 140,000 cfs. the invasion of the saline wedge reached as far as 28 miles south of Carrollton. On October 14th, one week later, it advanced to 7 miles south of Carrollton, a distance of 21 miles in 7 days the flow being 122,000 cfs.

It is interesting to note how this salt water is stopped momentarily by a ledge in the thalweg. These ledges and hollows in the thalweg form high salt water reservoirs. They delay, but they do not stop this influx. The salt water overflows from one reservoir and fills up another.

On October 21st, a lapse of another week, with a discharge of 103,000 cfs. the wedge advanced to a point 12 miles north of Carrollton, a distance of 19 miles in 7 days.

The following week, October 28th, this salt was not able to advance farther up the river, due to the peak in the thalweg near Kenner, 18 miles above New Orleans. It was steadily climbing to the top of this peak and managed to spill over on November 7th, the discharge of the river increasing slightly from 103,000 cfs. to 118,000 cfs.

After November 7th the discharge of the river steadily increased and the wedge began to disintegrate.

On November 14th the discharge suddenly increased from 118,000 cfs. to 142,000 cfs. and this dissolved the wedge practically completely north of the ledge at Kenner and it sliced about 20 feet off of the wedge on the opposite side of the ledge.

One week later with the discharge of the river practically the same, the depth of the wedge was lowered another 10 feet. December 3rd the wedge was definitely on its way out, the only salt remaining was the salt in the hollows.

It is interesting to note that the salt water upon retreating does not appear to be pushed back but it is diluted with the fresh water and the wedge appears to have been sliced off.

During 1940 the wedge was potent enough to extend 18 miles north of Carrollton. We have every reason to believe that—had the discharge remained around 118,000 cfs. or had fallen below this amount—the invasion would have continued upstream.

The tide cycle extends as far as 300 miles up the river and is instrumental in aiding the migratory action of the wedge.

At Angola, La., 325 miles above the Gulf of Mexico, the discharge is not affected by the tide as the cycle diminishes before reaching this location.

During times of low flow the 24-hour discharge at Angola is fairly uniform, but due to the tidal action at New Orleans the discharge at this location is quite variable. When the discharge at Angola is 100,000 c.f.s. and remains constant over 24 hours, the discharge at New Orleans may vary from 70,000 to 130,000 c.f.s. A rising tide increases the reservoir capacity of the river and lessens its velocity, a falling tide acts in a reverse manner.

A rising tide increases the salt water head at the Gulf of Mexico and decreases the velocity of the river discharge. These two conditions are most favorable for an advanging wedge. As the tide falls, the fresh water velocity increases and tends to dilute the interface of the wedge and carry some of the salt water to the surface. During times of low flows, the salt advances at a rate far surpassing that at which

it is dissolved. The salt water wedge does not fluctuate in and out with the tide because once it begins to invade the fresh water it continues to do so until the discharge becomes great enough to carry the influx back into the Gulf.

With no fresh water flow in the river the salt water will advance 360 miles up the river because at this point the average elevation of the river thalweg is at mean Gulf level. This is 235 miles up the river from New Orleans. The actual advance of the wedge is soldom more than 20 miles above New Orleans.

In 1939 we had the longest low water period on record—a total of 148 days. This is the number of days that the Angola Gauge Reading was below 5.

In 1936 the low water period was 62 days, and in 1930 it was 82 days.

The surface chlorides at Carrollton for 1930 were 196; for 1936 381, and for 1939 225.

1936 had a shorter period of low discharge than both 1930 and 1939, still the surface samples contained more chlorides.

This was largely due to the high chloride content of the Arkansas River. The chloride content averaged 817 ppm. and its discharge ranged from 8,000 to 18,000 cfs.

At a time when the Arkansas River had a chloride content of 1130 p.p.m., the Mississippi River was only discharging 110,000 cfs. This alone increased the chlorides in the Mississippi 98 p.p.m.

Prior to 1900 there is no record of the amount of chlorides in the river, but we do know that salt water advanced to New Orleans. Reports were received that fishermen caught salt water fish such as red fish and pompano within the city limits.

From 1900 to 1930 the reports on the chlorides in the river are scattered.

A few days before we know that the salt is to advance up to our intake a number of reservoirs are filled and used to dilute the river water when the chlorides become very high. Two reservoirs are filled to furnish the boiler feed water during this salt period.

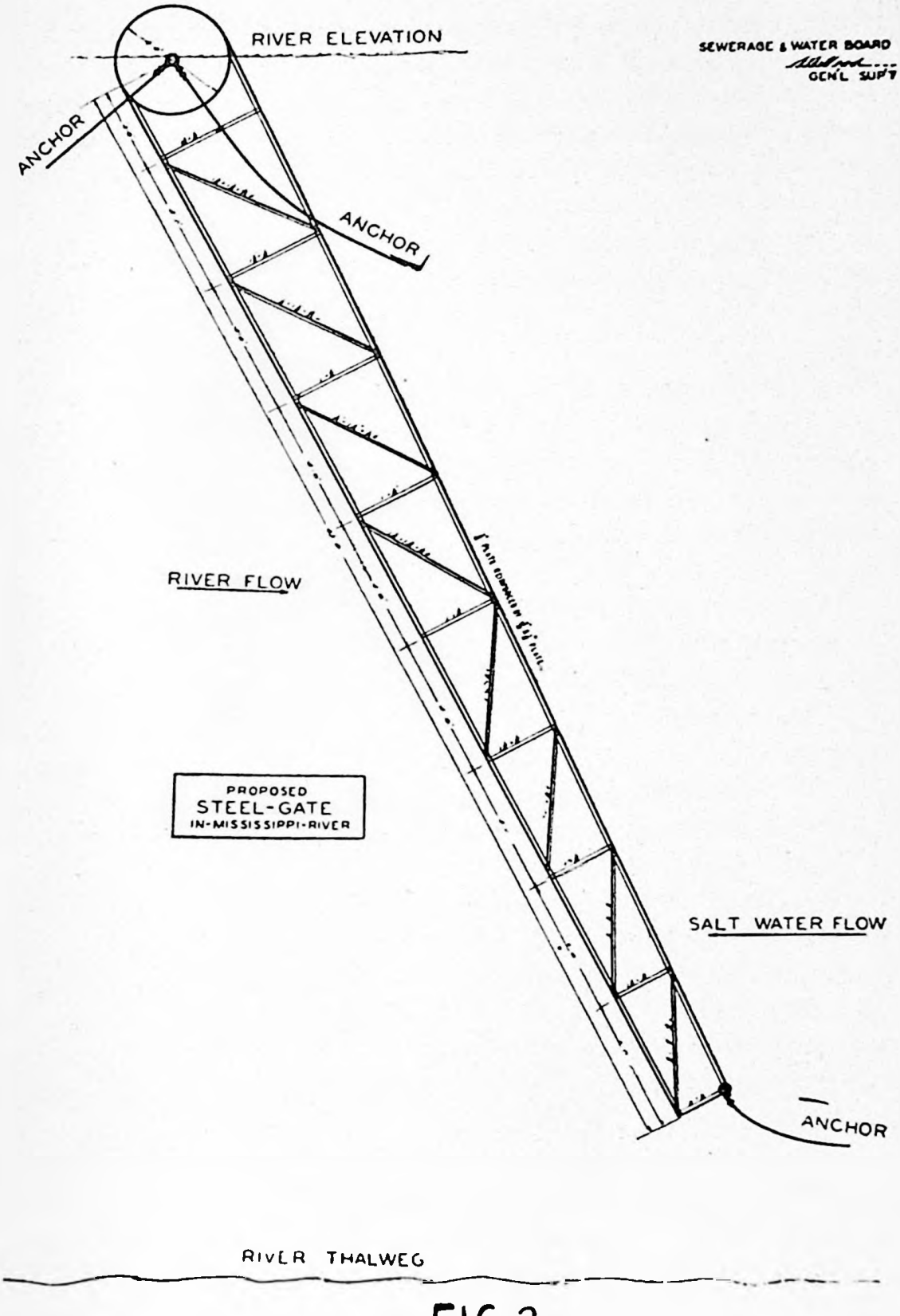

RIVER ELEVATION
SEWERAGE & WATER BOARD
GEN'L SUP'T
ANCHOR
ANCHOR
RIVER FLOW
PROPOSED
STEEL-GATE
IN-MISSISSIPPI-RIVER
SALT WATER FLOW
ANCHOR
RIVER THALWEG

FIG 2

An additional 24-hour crew shift is used during this time to operate a mud pump stationed on a barge. This pump is kept constantly in operation, adding silt to the water in order to absorb some of the taste produced by the algae. Carbon is added to the filters and the copper sulphate treatment is added to the water.

FIGURE 2: This is the gate that Mr. Wood proposed should be put in the Mississippi River to retard the salt invasion. The idea of the gate is not to stop the salt water completely.

This structure is built up of steel members. Its face being a reinforced steel plate ⅛'' thick. The structure is supported by means of a floating drum 4 feet in diameter. In still water the drum is slightly more than half submerged. The depth of the gate depends upon the contour of the river bed.

The discussion to follow is based upon a gate 43 feet deep from the center of the drum to the tip. It is built in sections of 40 feet and weighs 465#-ft.

This structure is called a gate because it is free to open and close.

It is anchored both up and down the river at the drum and it is anchored only in one direction at the bottom of the gate and that is down the river.

Anchored in this manner the gate is free to open in the direction of the river flow but closes when the density of the salt water becomes greater than the forces of the fresh water. The gate will not open in the direction of the salt flow, as it is anchored at both top and bottom.

It was proposed to leave a 500 ft. channel unobstructed in the center for navigation.

The proposed location of the gate is slightly more than a mile above the mouth of the Mississippi.

This site was proposed because the contour of the river along this section is uniform and averages about 45 ft. in depth.

The span of the river from center line to center line of the levee is approximately 3500 ft. It is proposed to anchor the

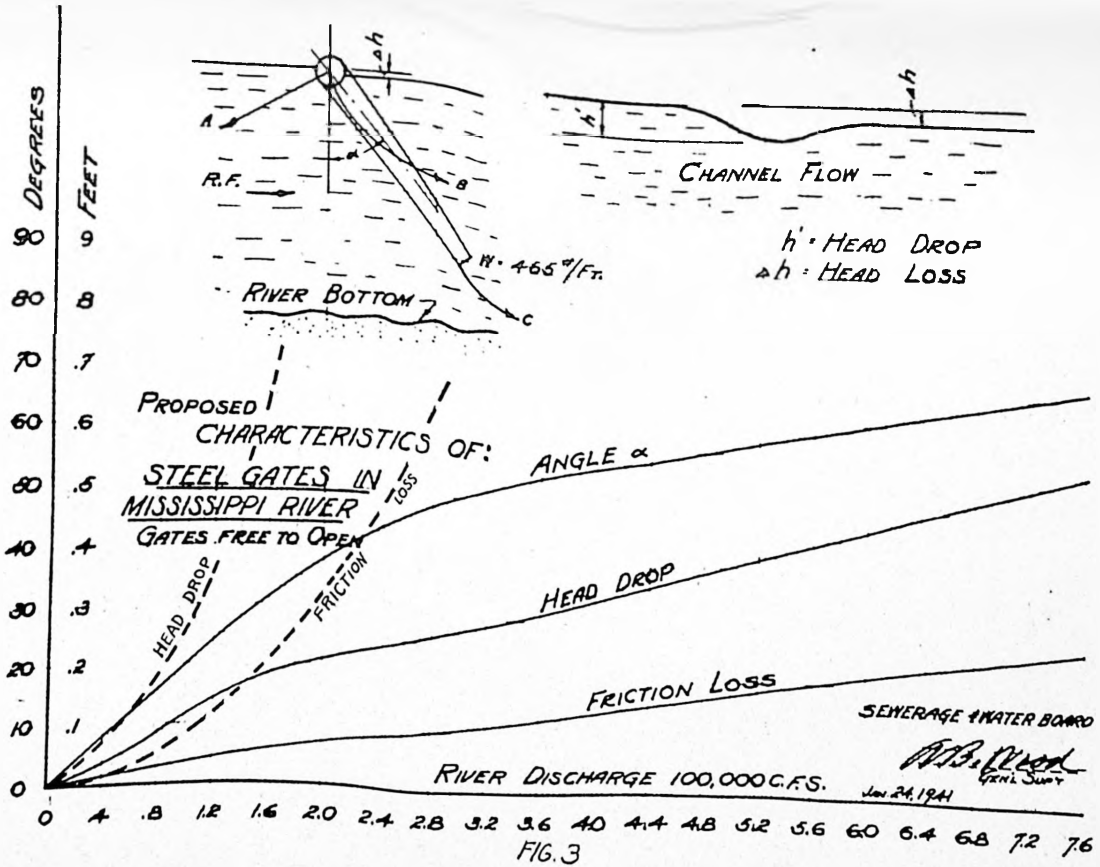

DEGREES
FEET
90
80
70
60
50
40
30
20
10
0
9
8
.7
.6
.5
.4
.3
.2
.1
0
.4
.8
1.2
1.6
2.0
2.4
2.8
3.2
3.6
4.0
4.4
4.8
5.2
5.6
6.0
6.4
6.8
7.2
7.6
Δh
A
B
C
R.F.
α
W. 465 #/Ft.
RIVER BOTTOM
CHANNEL FLOW
h' = HEAD DROP
Δh = HEAD LOSS
PROPOSED
CHARACTERISTICS OF:
STEEL GATES IN
MISSISSIPPI RIVER
GATES FREE TO OPEN
HEAD DROP
FRICTION
LOSS
ANGLE α
HEAD DROP
FRICTION LOSS
RIVER DISCHARGE 100,000 C.F.S.
SEWERAGE & WATER BOARD
Jan 24, 1941

FIG. 3

gates about 100 ft. out, the anchors being placed between sections.

FIGURE 3: This curve sheet brings about the characteristics of the gate before the salt wedge reaches it. (full lines).

With a discharge of 250,000 cfs. the head drop through the channel is only ¼ of a ft. and the greater part of this drop is regained. The friction loss being less than 1/10 of a ft.

When the discharge of the river reaches a stage where the gates speed up the velocity and becomes a navigation hazard, they may be released from their anchors floated up the river and set aside for the following year.

The dotted lines (Fig. 3) show head drop and friction loss vs. river discharge when the gates are in a vertical position.

With a discharge of 200,000 cfs. and the gates free to open the head drop is .38 ft.

With the gates in the vertical position and the same discharge the drop is 1.05 ft.

When the gates are in this position it is an indication that the salt water is flowing under the gate and all of the fresh water goes out through the channel.

A river discharge of 125,000 cfs. produces a friction loss of .15 ft.

The head of the water on the upper side of the gate is .15' higher than the water on the lower side.

This fresh water head of only .15' is not sufficient to keep the salt water from flowing under the gate but it will hold back 20' of salt water with a chloride content of 5000 ppm. greater than that on the opposite side.

If we could cut down on the width of the channel, the head loss would be greater and would be capable of holding back a greater amount of salt water.

Another advantage of the gate is that it will increase the density of the water flowing out of the river by increasing its salt content.

With the gates free to open the channel velocity does not reach a critical stage. Since there is no discharge data on the river in this vicinity, (one mile above the mouth of the

Mississippi), its velocity was obtained by assuming a uniform cross section of an average depth of 45 ft.

If we assume the river to be discharging at the rate of 125,000 cfs. the channel velocity, with the gates in the vertical position, becomes 4.5 ft./sec.

This velocity corresponds to a river discharge 700,000 cfs., which is three times as great as that required to sweep out the wedge.

A velocity of 4.5'/sec. through the channel will produce a great deal of agitation. This stirring action will speed up the diffusion of the salt and increase the salinity of the water entering the Gulf.

For example, if the river at Angola is discharging 125,000 cfs. that amount of water must enter the Gulf.

If with the gates in operation it enters with a chloride content of 6,000 p.p.m. instead of 5000 p.p.m. the effective velocity of the river is increased and a river discharge of 125,000 cfs. is as effective as a discharge of 150,000 cfs.

Increasing the chloride content of the water increases its density. If the density of the water flowing out of the river is increased it has a greater force tending to hold back the wedge.

In summarizing the advantages of the gate, we have shown where a discharge of 125,000 c.f.s. will build up sufficient fresh water at the gate to retard 20 feet of salt water with a chloride content of 5000 p.p.m. greater than the water on the opposite side.

It will increase the channel velosity to the equivalent of a river flow of 700,000 c.f.s. The agitation produced by the increased flow will increase the chloride content of the water enterin gthe Gulf and thereby increases the effectiveness of the river discharge. This has the same effect as increasing the discharge of the river.

New Orleans is 125 miles from the Gulf of Mexico and the salt water has not extended more than 25 miles above New Orleans.

If the gates can cut down the travel of this wedge 17%, New Orleans will not be troubled with salt influx from the Gulf.

In view of the above facts we have every reason to believe that the gates will be more effective than a 17% retardation.

The actual value can only be determined experimentally.

The estimated cost for construction and installing the gates is $800,000.00.

This would be an expensive experiment but it could be carried out on a smaller scale.

Aside from the steel gates, other methods have been suggested that may temporarily remedy the situation or permanently solve the problem.

In 1900 the Chicago Drainage Canal was constructed to divert from Lake Michigan to the Illinois River and thence to the Mississippi River a flow of 10,000 cfs. This was added to the low flow of the river until 1930. By action of the Supreme Court, in compliance with the St. Lawrence Waterway Treaty, this flow was reduced to 1500 cfs.

It was suggested that we attempt to get back this 8500 cfs. which would increase the flow of the Mississippi River about 10% during low stage.

Another proposal was the construction of a reservoir in the city limits to store the fresh water for the duration of the low discharge period.

To store a 30-day supply the reservoir would have to be one mile square and 10 feet deep. The salt period has recently extended over a period of 140 days.

In water that is left to stand, the microscopic organisms, other than bacteria, multiply rapidly causing very disagreeable tastes and odors.

Constructing an auxiliary pumping station far enough up the river to draw a supply beyond the limit of the salt water alone would require the expenditure of several millions of dollars.

There is an increased diversion of the water from the Mississippi River to the Atchafalaya by way of Old River. In 1936 this diversion amounted to 15% of the river flow and in 1939 this diversion increased to 18% of the discharge during the low flow period or 20,000 cfs.

Placing a needle dam across Old River was suggested to limit its flow into the Atchafalaya River. This would result in an influx of salt water up the Atchafalaya and complaints from the residents and industries in that region.

Another suggestion is to consider a source other than the Mississippi River from which to draw our water supply.

Water from the Tchefuncta River would have to be cradled some 35 miles across Lake Pontchartrain or 60 miles around the lake.

Artesian well water of sufficient quality and quantity would have to be piped over some 40 or 50 miles. The expense of this long pipe line would be far greater than placing an auxiliary intake up the river.

The construction of sills below New Orleans, similar to the natural peak in the thalweg at Kenner, is being given considerable thought.

A sill below New Orleans will convert the lower Mississippi into a large salt water reservoir and this water will not reach New Orleans until the reservoir is allowed to overflow. If the period of low flow is of a short duration, this reservoir will not be filled to capacity and there will be no increase in the salinity at New Orleans. If the salt water were allowed to flow over this sill, as it would have in 1940, it would lose its effectiveness and we will be troubled with the salt influx.

Placing a gate in the river, extending the intake some 25 miles upstream or constructing a sill in the river below New Orleans are temporary relief measures and will not solve this problem of salt water infiltration unless we are assured of a larger discharge down the river during a period of low flow.

The only thing that prevents the salt water from flowing some 350 miles up from the mouth of the Southwest Pass is the flow of water downstream. If this flow is lessened or the duration of low flow lengthened, the salt water will have a greater tendency to flow upstream.

The Fort Peck Dam in the Missouri River increases the flow of the Mississippi River approximately 24,000 cfs. during the period of low discharge of the Mississippi River. The T. V. A. projects in the Ohio River add another 10,000 cfs. to the Mississippi at this time.

Dams in the other tributaries of the Mississippi River as the Arkabuthe Dam in the State of Mississippi, the Sardis Dam in the Tallahatchie River in Mississippi and the Denison Dam in the Red River in Texas promise no relief to the Mississippi River during its crucial stage.

If we can be assured of the 8500 cfs. from the Chicago Diversion and the 20,000 cfs. that goes through Old River to the Atchafalaya we may be sure that sills in the river will be a solution to this problem of salt invasion.

We cannot at the present time rely on any solution that will involve great quantities of steel.

It is discouraging to know that, while the Sewerage and Water Board and other interests are doing all in their power to arrive at a solution for remedying the influx of salt water from the Gulf of Mexico, we find that some oil companies in the vicinity of Baton Rouge are applying for a permit before the Louisiana Stream Control Committee to discharge the brine from their oil wells into the Mississippi River.

This oil field brine, unlike that of the Gulf of Mexico, can be kept out of the river and we hope that the Louisiana Stream Control Commission will take the necessary steps to see that it is.

MINUTES OF THE MEETINGS AND BUSINESS OF THE SOCIETY

Minutes of the Meeting of the Board, June 2, 1941.

The meeting was called to order by President Stewart with the following present: Cappel, Fromherz, Kammer, Rhodes and Mayer.

The minutes of the last meeting were read and approved.

It was decided that the list of engineers submitted by the Committee on Professional Advancement at the last meeting of the Board be returned to the Committee with the request that a new list be submitted; the new list to include engineers from the fields of chemical, civil, electrical and mechanical engineering instead of from a single field as in the first list submitted.

President Stewart announced that 23 letters had been written opposing the proposed St. Lawrence Waterway Undertaking and that a number of encouraging replies had been received.

Mr. Cappel proposed the organization of a committee whose services would be available upon request for review and advice on engineering defense problems peculiar to this section. The details of the proposal are to be submitted in writing.

In connection with the national defense program it was decided that President Stewart write Mr. A. B. Paterson, District Coordinator, offering him the services of the Society in any capacity, in which they might be utilized.

Mr. Fromherz stated that due to recent developments in the defense program the time is now inopportune for the presentation of a paper on lengthening and liberalizing engineering courses. The Board concurred in this opinion and decided to drop this as a subject for a fall meeting.

A request of the Golf Committee for an appropriation of $80.00 to cover the anticipated deficit on the Golf Tournament and Dinner was approved.

Mr. Fromherz stated that a report of the Library Committee would be presented at the next Board Meeting.

A proposal for the formation of a Junior Engineering Group was read and approved by the Board. Mr. Cuculla, Chairman of the Advisory Committee which drew up the proposal, is to present the matter at the next Society meeting.

A letter from the United Service Organization was read. It was decided that President Stewart write the organization endorsing its program.

The outline of a paper, submitted by Mr. Ben J. Haney, Jr., was approved for presentation at the next meeting of the Society.

Permission was granted for the Secretary-Treasurer to revise the book-keeping system of the Society.

The following applications for membership were ordered placed on a letter ballot:

For Member: R. E. Chesnut, E. L. Dennis, A. F. Flournoy, C. B. Gamble, J. K. Gibson, D. A. Hunt, W. T. Lundy, T. Parkinson, D. L. Pyburn, M. C. Schwartz, K. Ward, Jr., and H. Waugh.

For Affiliate Member: J. V. Dugan, Jr., G. H. Holloway, C. J. Phillips, Jr.

Upon the request of Mr. R. J. Daigle it was decided to submit his application to Membership Committee "B" for reconsideration of grade.

The selection of Mr. R. T. Basnett, Senior in Electrical Engineering at Tulane University, as recipient of the Junior Membership Award, was approved.

In response to a request by Chairman Hill of Publicity Committee "A" as to the sense of the Board toward carrying the words "LASEC NEWS" on the front cover of the Proceedings, it was decided that the present cover be maintained.

There being no further business, the meeting adjourned.

J. K. MAYER, Secretary-Treasurer.

Minutes of the Meeting of the Society, June 9, 1941.

The meeting was called to order by President Stewart with approximately 90 members and guests present.

The minutes of the previous meeting were read and accepted.

President Stewart reported briefly on Society and Committee activities.

Chairman L. T. Frantz reported for the Library Committee and Chairman W. S. Rainville, Jr., for the Technical Papers Committee.

Chairman L. J. Cucullu of the Student and Junior Activities Committee introduced a proposal for the formation of a Junior Engineering Group to be sponsored by the Society and the local sections of the founder societies. The proposal was discussed from the floor by several members. Copies of the proposal are to be sent to the membership and a vote taken on the endorsement of the proposal at the next Society meeting.

President Stewart introduced the speaker of the evening, Mr. Ben J. Haney, Jr., Assistant Engineer with the Sewerage and Water Board, who presented a paper on "Suggested Methods for Preventing the Influx of the Gulf of Mexico from Contaminating the New Orleans Water Supply." Mr. Haney answered several questions at the conclusion of the paper.

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

J. K. MAYER, Secretary-Treasurer.

Upon the request of Mr. R. J. Daigle it was decided to submit his application to Membership Committee "B" for reconsideration of grade.

The selection of Mr. R. T. Basnett, Senior in Electrical Engineering at Tulane University, as recipient of the Junior Membership Award, was approved.

In response to a request by Chairman Hill of Publicity Committee "A" as to the sense of the Board toward carrying the words "LASEC NEWS" on the front cover of the Proceedings, it was decided that the present cover be maintained.

There being no further business, the meeting adjourned.

J. K. MAYER, Secretary-Treasurer.

Minutes of the Meeting of the Society, June 9, 1941.

The meeting was called to order by President Stewart with approximately 90 members and guests present.

The minutes of the previous meeting were read and accepted.

President Stewart reported briefly on Society and Committee activities.

Chairman L. T. Frantz reported for the Library Committee and Chairman W. S. Rainville, Jr., for the Technical Papers Committee.

Chairman L. J. Cucullu of the Student and Junior Activities Committee introduced a proposal for the formation of a Junior Engineering Group to be sponsored by the Society and the local sections of the founder societies. The proposal was discussed from the floor by several members. Copies of the proposal are to be sent to the membership and a vote taken on the endorsement of the proposal at the next Society meeting.

President Stewart introduced the speaker of the evening, Mr. Ben J. Haney, Jr., Assistant Engineer with the Sewerage and Water Board, who presented a paper on "Suggested Methods for Preventing the Influx of the Gulf of Mexico from Contaminating the New Orleans Water Supply." Mr. Haney answered several questions at the conclusion of the paper.

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

J. K. MAYER, Secretary-Treasurer.

PROCEEDINGS
OF THE
LOUISIANA ENGINEERING SOCIETY

AUGUST, 1941

"PATRONIZE OUR ADVERTISERS"

INDEX TO ADVERTISEMENTS

LASEC NEWS

SECTION OFFICERS

President,
J. A. McNIVEN
1st Vice-President,
F. N. BILLINGSLEY
2nd Vice-President,
V. J. BEDELL
Secretary-Treasurer,
D. W. GODAT
314 Terminal Station Bldg.

LOUISIANA SECTION
AMERICAN SOCIETY OF CIVIL ENGINEERS
FOUNDED 1852
1914

NEW ORLEANS, LA.

PUBLICITY COMMITTEE

J. M. LeDOUX, Chm.
CHARLES M. KERR
GEORGE JANVIER, JR.
JACOB T. BULLEN

LASEC NEWS
5700 Garfield St.

Vol. III, No. 4 | Published Bi-Monthly | August, 1941

AS WE SEE IT

A long time ago, Plutarch observed that "Rest is the sweet sauce of labor." So, with the thought in mind of tasting once again of that "sweet sauce," we got out the trusty old road map and scanned it for likely ways to distant places.

Looking north, we saw Chicago and the Great Lakes. These offered strong appeal, but somehow we felt the need for something wilder, something primeval — prairies, caverns, canyons and the like. A trip to the Pacific coast held all the answers, but—in two weeks? It just couldn't be done. Monterey and Mexico City, also were too far.

Deciding, then, to compromise on a trip to the mountains, and to forego the caverns, canyons, etc., we turned to the opposite side of the map, where we might read of the principal points of interest en route to North Carolina. The shipyards near Mobile, the steel mills near Birmingham, the T. V. A. and Norris Dam, seemed to head the list. Just more concrete, cranes and poor engineers sweltering in the sun. No. We wouldn't be able to take it. No, sir, no postman's holiday. Probably the best thing to do after all, would be to stay home and putter around the house. The back fence is in bad shape and a lot of other things need fixing. And if the office phones every other day about this or that—well, Homer held to the belief that "too much rest itself becomes a pain"—and Homer was an honorable man.

NEWS ITEMS

A. S. C. E.

1 9 4 2

SPRING MEETING

TO BE HELD

IN

NEW ORLEANS

The Board of Directors announces that the National Society will hold the 1942 Spring Meeting in New Orleans.

Lt. Col. V. J. Bedell has been appointed General Chairman, and is now formulating the personnel of committees and laying the groundwork for this important event.

The date of the meeting and a general outline of the program is expected to be announced in the near future. Meanwhile, remember!

1 9 4 2

SPRING MEETING

NEW ORLEANS

It is seldom that engineers have the opportunity to vividly oserve the disintegration of a great bridge. Such an opportunity was afforded to the members of the Louisiana Section and to their guests, the Army and Navy engineering personnel in New Orleans, at the regular meeting of the Section at the St. Charles Hotel, July 10th.

The Section was fortunate in being able to secure from the Society, technicolor motion pictures showing the behavior of the Tacoma Narrows Bridge through the many phases preceding its collapse, and also the actual failure and plunge of the main span into the waters of Pudget Sound.

The value of the presentation was greatly enhanced by Prof. Donald Derickson of Tulane University, who introduced descriptive data relating to the structure and cited relative facts concerning several of the larger suspension bridges in the United States.

The thanks of the Section were extended to Prof. Derickson for his very interesting contribution.

Pursuant to instructions from the Board of Directors, the Secretary has addressed a letter to each member of the Section, recommending Mr. J. T. L. McNew, of College Station, Tex.,

for National Director from Zone IV, District 15, for the two-year period 1942-1944. The term of the incumbent Director, Col. Edward S. Bres, of the Louisiana Section, expires during the current year.

Possessing pre-eminent qualifications for the Directorship, Mr. McNew is Head of the Civil Engineering Department of the Agricultural and Mechanical College of Texas, and is presently serving the Society as Chairman of Local Sections.

In order to obtain better coverage of Personals and News Items, and also to extend the field of publicity activities to the northern end of the state, the Board, upon recommendation of President McNiven, has appointed Mr. J. T. Bullen, of Shreveport, to be a member of the Publicity Committee.

The Board of Directors has received and accepted the resignation of Lt. Col. V. J. Bedell from the Committee on Civilian Protection in Wartime. Lt. Col. Bedell's resignation was due to his having been called to active duty with the U. S. Engineers.

The President, acting under authorization from the Board, has announced the appointment of A. T. Dusenbury to succeed the retiring chairman.

PERSONALS

We are pleased to note that JOHN F. COLEMAN and associates have been awarded the engineering contract for expansion of U. S. properties at Charleston, S. C.

FRANK C. CAREY of the U. S. Engineer's Office at New Orleans, has replaced Major C. K. Harding, who was recently transferred.

COL. MARCEL GARSAUD is back from Washington, where he appeared before a congressional hearing on the proposed St. Lawrence Seaway.

WALTER SCALES, who was recently elected a national director of the American Association of Engineers, has just returned from a trip covering thirty odd states.

Promoted and called to active duty, LT. COL. V. J. BEDELL has been assigned to the New Orleans Port of Embarkation.

Also now in the service is LT. COMDR. THOMAS BRUNS, in charge of naval construction at Burwood, La.

KING WOOLF too, spends much time at Burwood, directing construction as the contractor's representative.

J. D. LOCKWOOD has been appointed representative of the J. F. Coleman Engineering Co. in Charleston, S. C., in charge of the reconstruction of the Charleston Q. M. project.

JOHN KLORER is in Washington, D. C., following his appointment as Supervising Engineer, Reconstruction Finance Corporation.

F. N. BILLINGSLEY recently conducted several high ranking naval officials on a tour of inspection of the new Louisiana Shipyards on the Industrial Canal at New Orleans.

From Washington comes word of the appointment of ALLEN NEGROTTO as State Director of the Public Work Reserve, an agency established to prepare projects to absorb the economic shock when the war ends.

MEMBERSHIP CHANGES

ADDITIONS TO MEMBERSHIP

Associate:

RALPH EDWARD LIND, New Orleans, La.

ARCHIBALD DONALD STRANGE-BOSTON, New Orleans, La.

MEMBERSHIP TRANSFERS

From Associate to Member:

GLEN NELSON COX, University, La.

From Junior to Associate:

JOHN IRVING McCAIN, JR., New Orleans, La.

ROY THOMAS SESSUMS, Ruston, La.

APPLICATIONS FOR TRANSFER

From Associate to Member:

CLIFFORD HOEY STEM, New Orleans, La.

From Junior to Associate:

EDWIN EMMONS GIBBONS, New Orleans, La.

JOHN STONE GENTILICH, New Orleans, La.

APPLICATIONS FOR MEMBERSHIP

For Member:

RAYMOND THOMAS REILLY, Camp Polk, La.

For Associate:

THOMAS FRANCIS DONLON, Baton Rouge, La.

DICK ALWYN HUNT, Alexandria, La.

DID YOU KNOW THAT:—

On December 24, 1873, a through route by rail, operating on two different gauges, was opened to traffic between New Orleans and Chicago. That part of the run between New Orleans and Cairo, over the Jackson and Mississippi Central Railroad, was over a 5-foot gauge. From Cairo north, the Illinois Central Railroad had been built to a 4-foot 8½-inch gauge. There was a three-mile ferry near Cairo, separating the Illinois Central Railroad from the lines going south.

Sleeping cars and through freights made the entire trip without unloading. Arriving at the ferry, the train boarded the transfer boat, and while en route to the opposite terminus, the cars were jacked up, their trucks rolled out and others of proper gauge substituted for the balance of the trip.

THE PROCEEDINGS
OF THE
LOUISIANA ENGINEERING SOCIETY

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

ARTHUR M. HILL, Editor.

Subscription, $2.00 per annum Single copy, 35 cents

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

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

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

DAVID W. STEWART
President

LOUISIANA ENGINEERING SOCIETY

Suite 422 St. Charles Hotel

OFFICERS FOR 1941

President, DAVID W. STEWART, 317 Baronne St.
1st Vice-Pres., LEO J. LASSALLE, University, La.
2nd Vice-Pres., C. GLENN CAPPEL, 833 Howard Ave.
Sect.-Treas., JOHN K. MAYER, P. O. Station 20.

DIRECTORS

ALVIN M. FROMHERZ, 226 Carondelet St.
KARL P. KAMMER, 317 Baronne St.
CHARLES M. KERR, 5831 S. Robertson St.
RICHARD B. KOHNKE, 932 Picheloup Place.
WILLIAM H. RHODES, 505 Canal Building.

BATON ROUGE SECTION OFFICERS FOR 1941

President, W. W. TENNANT
1st Vice Pres., N. E. LANT
2nd Vice Pres., F. F. PILLET
Sect.-Treas., EARL C. COBURN

STATE BOARD OF ENGINEERING EXAMINERS

J. T. BULLEN, Pres.
E. S. BRES
DONALD DERICKSON
B. H. GREHAN
B. W. PEGUES

DISTRICT CONTACT REPRESENTATIVES

3rd Dist. THOMAS J. JONES, New Iberia, La.
4th Dist. J. T. BULLEN, 4026 Curtis Lane, Shreveport, La.
5th Dist. S. E. HUEY, Ouachita Bank Bldg., Monroe, La.
6th Dist. C. A. MYERS, Dept. of Highways, Baton Rouge, La.
7th Dist. L. P. ELBERSON, Crowley, La.
8th Dist. D. E. FUELLHART, Natchitoches, La.

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

LOUISIANA ENGINEERING SOCIETY

STANDING COMMITTEES FOR 1941

Committees Sponsored by C. Glenn Cappel

Awards
F. F. Pillet, Chairman
Donald Derickson
B. W. Pegues
J. M. Robert
H. W. Waterfall
C. S. Williamson
J. C. Bendler
L. G. Ireland
John Klorer
A. E. Marks
J. A. McNiven
H. P. Newton
J. H. O'Neill
W. H. Rhodes
A. M. Shaw
C. Floyd

Finance
O. K. Oleson, Chairman
D. W. Godat
G. C. Kerr
J. K. Mayer
H. L. McLean
J. L. Fortier

Defense
E. S. Bres, Chairman
V. J. Bedell, Vice-Charman
Donald Derickson
A. M. Hill

Professional Advancement
J. M. Todd, Chairman
V. J. Bedell
F. N. Billingsley
H. Johnson
R. J. Kuhn
L. J. Lassalle
H. A. Levey
G. E. May
B. S. Nelson
C. B. Norris
John Riess
J. E. Morehiser

Committees Sponsored by Alvin M. Fromherz

Civic and Industrial Affairs
C. L. Nairne, Chairman
A. E. Abaunza
R. T. Burwell
C. C. Crawford
E. L. Cowan
C. B. Dicks
R. E. Gosa
A. J. Harris
P. F. Hoots
S. E. Huey
W. S. Leake
H. L. McLean
A. J. Naquin
J. L. Porter
G. A. Seaver
J. L. White
W. N. Tuller
F. N. Billingsley
E. S. Bres
A. M. Fromherz
B. H. Grehan
W. B. Gregory
H. B. Henderlite
W. T. Hess
F. E. Johnson, Jr.
T. J. Jones
K. P. Kammer
L. J. Lassalle
G. E. May
J. A. McNiven
F. F. Pillet
W. H. Rhodes
F. M. Stone
C. S. Williamson
W. P. Wallace

Legislation
D. W. Godat, Chairman
S. V. Applewhite, Vice-Chairman

Library
L. T. Frantz, Chairman
M. C. Abrahm
W. H. Scales
R. A. Steinmayer
R. M. Shaw

Committees Sponsored by Karl P. Kammer

Engineering Education
C. W. Ricker, Chairman
S. W. Elberson
L. T. Frantz
F. G. Frost
W. B. Gregory
A. M. Hill
W. H. Rhodes
F. M. Taylor
J. M. Todd
H. W. Waterfall
Wm. Whipple
Sidney Ellis, Jr.
B. H. Bell
H. W. Fletcher
J. A. Glover
O. K. Olsen
W. S. Rainville, Jr.
Frank Riess

Publicity
J. J. Bulliung, Chairman

Student and Junior Activity
L. J. Cucullu, Chairman
M. C. Abrahm
J. E. Harvey
G. A. Heft
W. S. Nelson
M. G. Zervigon
W. P. Wallace

Technical Papers
W. S. Rainville, Jr., Chairman
H. M. Blain, Jr.
J. M. Guillory
F. E. Johnson, Jr.
C. M. Kerr
G. C. Kerr
H. A. Levey
E. A. McLellan
E. L. Mire
R. A. Steinmayer
B. J. Haney

Committees Sponsored by Charles M. Kerr

House
R. L. Nall, Chairman
E. S. Bres
H. E. Crump
A. H. Guillot
W. T. Hogg
E. S. Lanphier
W. S. Nelson
M. J. Cramer
C. E. Dolhonde
L. P. Elberson
S. W. Elberson
O. H. Elverum
C. H. Fenstermaker
D. E. Fuellhart
J. B. Gates
A. E. Hotard
J. B. Howze
S. E. Huey
T. J. Jones
N. E. Lant
H. L. Lehmann
C. A. Myers
H. P. Newton
B. W. Pegues
B. B. Pierce
A. F. Rideout
P. T. Seashore
Harry Shutts
T. B. Smith
I. W. Sylvester
S. A. Theard
A. G. Jarreau

Entertainment and Outings
B. H. Bell, Chairman
L. F. Alexander
J. J. Bulliung
R. J. Dreuding
A. L. Dunlap
H. W. Fletcher
R. P. Lockett
David Moodie
H. B. Myers
A. J. Naquin
O. K. Olsen
N. H. Ross
R. M. Seago
A. J. Fransen

Membership, Division "A"
A. L. Dunlap, Chairman
C. E. Abrahamson
F. R. Adams
V. J. Bedell
J. L. Bourgeois
J. T. Bullen
E. L. Cowan

Publications, Division "A"
A. M. Hill, Chairman
J. C. Baehr
H. J. Molaison
J. M. Robert
H. S. Salzer
F. M. Taylor
G. F. Williamson

Committees Sponsored by Richard B. Kohnke

Membership, Division "B"
B. S. Nelson, Chairman
D. S. Elliott
C. A. Myers
J. H. O'Neill
H. I. Brown

Publications, Division "B"
N. H. Ross, Chairman
E. C. Coburn
H. W. Fletcher
J. T. Floyd, Jr.
I. D. Ford
W. H. Grant, Jr.
S. L. Hebrard
G. W. Hill
C. J. Kelly
G. C. Kerr
H. J. Lane
R. P. Lockett
N. L. Marks
L. C. H. McLean
W. P. Oster
E. J. McNamara

Employment
R. P. Bassich, Chairman
E. L. Fithian
G. A. Heft
E. A. McLellan
R. F. Muller
J. C. Bartley

Public Relations
A. T. Dusenbury, Chairman
L. F. Alexander
J. C. Baine, Jr.
B. H. Grehan
A. S. Hackett
G. R. Hammett
A. C. Hays
Noel P. Kammer
A. R. Keiler
N. E. Lant
H. P. Newton
D. H. L. Morris

The last name on each committee is the Junior member, who sits with the committee, but without vote.

PROCEEDINGS
OF THE
LOUISIANA ENGINEERING SOCIETY

VOL. XXVII. OCTOBER, 1941 NO. 5

CONTENTS

EDITORIAL NOTES AND COMMENT

The Engineer and National Defense. Much has been written on this subject; Colonel Bres in this issue gives an interesting and clear-cut picture of the engineer's activities. Statistics are given, but tie in with an interesting narrative. It is an article which every member should read, since it outlines with impressive clarity the organization of a "mechanized" army and the indispensable part played by the engineer in *constructive* as well as *destructive* warfare.

New Baton Rouge Secretary. Mr. Earl C. Coburn was recently elected as Secretary-Treasurer of the Baton Rouge Section. He replaces Mr. Charles A. Meyer who was the first Secretary-Treasurer of the Section. Mr. Meyer was of great assistance in doing much organization work in connection with the formation of the Section, and obtained

a number of new members. Mr. Meyer was transferred from Baton Rouge.

Mr. Coburn is a genial personality, well known to all Baton Rouge members, and to many outside of that city. He too assisted in establishing the section, and has been active in its affairs and contributed to its growth. We wish him success in his new office.

New Book Arrivals. In the June issue of the "Proceedings" an invitation was extended to members of the Society to make use of the facilities of the Howard-Tilton Library at Newcomb Boulevard and Freret Street. Recent engineering additions are listed.

Opportunity in the Navy. Following is a letter recently received and explaining the opportunities in the Navy:

> The Navy desires to enroll in this Naval District as soon as possible a large number of qualified college graduates in various professional classifications to serve during the current National Emergency as commissioned Officers in the General and Special service branches of the U. S. Naval Reserve.
>
> Appointments are made at ages between a minimum of 23 and a maximum of 50. The rank for which an applicant may qualify will depend upon his age, educational record, practical and professional experience and attainments in civil life. A circular giving complete details regarding the various classifications is enclosed herewith for the information of those members of your association who would be interested. The pay and allowance of officers in the Navy are the same as corresponding ranks in the Army; Ensign to Lieutenant Commander covering the same ranks as Second Lieutenant to Major.
>
> I will greatly appreciate it if you will bring this information to the attention of well-qualified men among your membership, men whom you earnestly consider well adapted to assignments as commissioned officers. Those who desire to apply for commissions should address a letter to the Director of Naval Reserves, Eighth Naval District,

Federal Office Building, New Orleans, Louisiana, giving in detail the facts concerning their schooling, degree or degrees awarded, professional experience, age, place of birth, and a brief resume of civil occupation and attainments.

This program of officer procurement is a most important part of National Defense, and you can assist greatly by disseminating this information as quickly as possible to interested and qualified persons. It is especially requested that this information be included in the next issue of your bulletin.

Your splendid cooperation in the past is greatly appreciated and I will be grateful for your valued assistance in this important expanded procurement program.

Sincerely yours,

T. A. THOMSON, JR.
Captain, U. S. Navy
Acting Commandant

Gas Manufacture in New Orleans. Mr. Hugh M. Blain, Jr., who is Superintendent of Gas Production at New Orleans Public Service, Inc., has an interesting article in this issue on gas manufacture. It is a brief of his extremely interesting address given before the Society at the August meeting.

PAPERS AND DISCUSSIONS

PERTINENT FEATURES OF THE PRESENT WORLD WAR AND THE RESPONSIBILITY OF ENGINEERS IN OUR NATIONAL DEFENSE PROGRAM

Address by COLONEL EDWARD S. BRES,*
Director, American Society of Civil Engineers

Delivered to the Alabama Section, American Society of Civil Engineers, Birmingham, Alabama, November 29, 1940.

Our Country, today, is face to face with a great National Emergency—a serious social, political and economic crisis. To meet and overcome this crisis a vast program of National Preparedness for Defense has been instituted. Traditionally it has been the policy of our National Government, after a crisis has passed, to ignore all considerations of the necessity for preparedness to meet emergencies which might manifest themselves in the future. In the fact of this policy to ignore the future, when an emergency such as the present one appears, our task for preparedness assumes the proportions of an overload burden. I submit that this task and burden falls primarily on the engineers. Frankly, it might be said that not only were there no designs on our drawing board of preparedness, but we were without the drawing board itself.

The vast expanses of seas separating our shores from all nations which might conceivably become aggressive have, in small part perhaps, been the reason or excuse for the so-called logic underlying our traditional policy of neglecting preparedness for the future. Now, however, the tremendous developments in the speeds of all modes of travel and transportation have narrowed these sea barriers to a dangerous

*Member of the Louisiana Engineering Society and Director of the American Society of Civil Engineers.

width and in consequence we are deprived of the security of distance.

The burden of defense rests on the engineering profession, both in the building of the plant for preparedness and in the operations of this plant.

Parenthetically the remark of General Hindenburg is recalled. He said that when the United States entered the War in 1917 its industrial establishment took up patriotism and it knew just how to make it function effectively. And American industry is American engineering.

After the fall of successive countries in face of the speed and perfection of modern mechanical armies of aggressors, the Army and Navy Munitions Board recognized the essentials of the technical burdens and in consequence called on the engineering profession for a conference in Washington with the object in view of preparing a plan for the organization of all American Industries.

The organization of the Construction Advisory Committee to the Army and Navy Munitions Board resulted and Colonel John P. Hogan, President, of our Society was nominated Chairman. Other technical organizations included in the conference were the American Engineering Council, the Construction League of the United States and the Associated General Contractors. The first work of the Committee which grew out of the conference was taking a complete census of engineers, architects and contractors. Over 100,000 questionnaires were mailed and from the answers received a card index, carefully classified, was prepared and furnished to the Army and Navy Munitions Board. The selection and placement of a vast number of engineers, architects and contractors on the essential tasks of preparedness resulted from this card index. This index continues to be an active element of use by the Army and Navy.

In this paper all engineering and technical professions are given inclusive consideration, so that no differentiation of Civil, Electrical or Mechanical Engineers and architects is attempted. Nor has an attempt been made to establish

the ratio that each separate technical profession must bear to the whole technological burden imposed. At the present time 40,000 engineers of various classifications are at work on the country's mobilization for National Defense. It might be suggested that preparation for defense most certainly extends into preparation for ultimate offense. Else how could an aggressor be conquered and his activities in the future controlled?

It follows, then, that after the factory has been enlarged, the innumerable machine tools made, the machines of war constructed and their production output maintained the engineer's task of manning, maintaining and operating these machines proceeds right on. In preparation for National Defense it is estimated that 80% of the personnel engaged is either engineers or others whose every effort is planned, guided and controlled by enginers. The magnitude of the purely civilian effort of technologists is thus realized.

The defense of the Nation, from an engineer viewpoint, divides itself into three general headings:

(a) Engineer Troops.

(b) Construction facilities such as barracks, hospitals, warehouses, transportation routes, water and rail terminals, and construction of fortifications.

(c) Supply covering procurement storage and issue of war materials, supplies and equipment.

Should we mobilize an Army of 4,000,000 men the purely engineering ratio of this vast force, both officers and enlisted men, will approximate 10%, or 400,000 of total number. In the German Army, which secures its Engineer Officers from practicing civilian engineers, this ratio is 14%. Additionally, a great number of engineers, not definitely classified as such, is an essential requisite of the army.

A brief tabulation of the branches of the services involving and performing engineering work is as follows:

In the Artillery for computation of firing data, map interpretation, erection of field fortifications and emergency purely technical service.

In the Quartermaster Corps for construction, logistics and lines of communications.

In the Signal Corps for procurement and operation of telephone, telegraph and radio equipment.

In the Chemical Warfare Services for duties as its name implies.

In the Ordnance Corps for design and manufacture of tanks; of cannon and small arms with their ammunition.

Finally, in the Motor Transport Corps, Parks, Depots, Shops, Service of Supply, and Air Corps in procurement of air craft and in connection with which nearly every element, except of actual flying and combat is done by engineers.

Technological requirements in the Navy are as vast as are those that have been enumerated for the Army. Planning, preparing, manufacturing and operating, both on land and sea of Naval equipment, are jobs for the engineers. Indeed the Navy Department has separately constituted the Civil Engineer Corps and the Construction Corps.

Before undertaking a review and description of the strictly military phases of the engineer's efforts in the direction of National Defense it may be of interest to amplify reference previously made to the purely civilian aspects of our job.

To meet future needs of both industry and Government in carrying out the National Defense Program Congress has appropriated $9,000,000 to provide for and to cooperate with qualified Technical Schools for courses of intensive training for 30,000 students with technical backgrounds. Classes will be held both at the engineering schools and in or near industrial plants. The first courses to be established will be designed to forestall potential shortages or inspectors of materials, chemicals, explosives, instruments and power units; designers of machinery, equipment, tools and dies, and aircraft power plants, structures, and instruments; production engineers and supervisors; physical metallurgists; marine engineers and naval architects.

Extensive mechanization and the resulting complication of the industrial burden has been greatly magnified, not

only as a technical problem in itself, but as a consequence of so-called social legislation, restrictions and limitations on work, laws and wages and classification of workmen. The diminutions of industrial production which followed in the wake of the 1929 Depression and the movement of workmen away from this class of employment has had the effect of creating a serious shortage of skilled artisans. Plans and specifications prepared by engineers are not alone sufficient. The necessity for training of skilled artisans to do actual construction is a task for the engineers. We are needed to train welders, carpenters, masons, pipe fitters, steel workers, machine operators, pattern makers, forgers, transmission linemen and a thousand and one other craftsmen.

Engineers are responsible for the extension of existing and erection of additional plants for the manufacture of:

Air Craft—on a 20-hour basis.

Anti Air-Craft guns and ammunition.

Other ammunition and explosives for small arms, light and heavy artillery, demolitions and etc., ad infinitum. America is without Allies to supply our deficiencies during the waiting period of preparation. (It is stated that in the defense of London, in every minute during an air raid there is fired ammunition to the value of $100,000. And it is further stated that the American production facility is rated at about 1/50th of the expected essential requirements of smokeless powder and that six months will be required to erect plants and bring production to needed minimum capacity.)

In the invasion of Poland, lasting less than 30 days and participated in by comparatively few divisions, Germany's fuel expense, alone, was 40 million dollars.

During the last World War, in one barrage laid down, the artillery fire of 3,000 guns lasting one day cost 300 million dollars.

We must erect plants to build tanks and anti-tank defense.

The Engineer must plan and produce:

Housing facilities—camps and cantonements.
Roads and bridges.
Sanitary Systems.
Power plants for lights, heat and communication.
Hospital and equipment.
Extensive Navy Bases.
Submarine Bases.
Aviation Fields for both land and naval forces.
Dry Dock and ship building plants.
Air Raid Shelters.
National Military Highways.

Construction in Possessions and seacoast defenses. The largest present item being the Panama Canal Locks for which civilian forces are being rapidly augmented.

(We are now in need of 16" gun carriages. Available industries can produce only two carriages for these guns in one year. The construction of a special plant to build these gun carriages is now contemplated. This plant will be 400 by 800 feet. It will take one year to build and equip, at a cost of several million dollars. Its capacity working continuously will be 4 gun carriages in one year. I bring this to your attention as illustrative of the time and cost of preparation. In the design of this and other plants provision has been made for industrial use of the plant when the speeding up of our defense needs has been caught up with or completed.)

The task of building factories for the production of uniforms and clothing is ours. These and a myriad others, obvious in their necessity, fall to our lot.

(A newly organized Committee is now set up to examine inventions useful in National Defense. The Chairman of this Committee is in charge of research for one of our largest Corporation. It is proposed to build up a Staff of 50 trained engineers.)

In order to gauge American capacity for Preparedness production, it may be of interest to compare the 1940 Construction Program with that of other years. For example, construction expenditures have reached a high of 11 billions of dollars and a low of 5 billions. It would appear, then, that the 13 million dollar National Defense Construction Program ought to be fulfilled without undue delay.

The distribution of the expenditure of 13 million is planned to be about as follows:

About 2 billions in direct construction by Government Agencies.

From ½ to 1 billion in the enlargement of existing plants and factories.

About ½ billion to erect temporary housing and related services for the Army and Navy.

About ¼ billion for permanent and semi-permanent housing and service for Army and Navy Bases for housing of personnel at new munitions plants and ship yards. The distribution of these activities appear to extend inland as much as 250 miles from our National boundaries.

If there are bottle-necks and obstructions in production of all these essential elements, their dilation is our job, the engineer's job. Preparation of plans for all of this, it is estimated, will require 20,000 men; years of the time of skilled technicians. With this tremendous burden confronting us it appears that complete National Preparedness will be accomplished by Spring of 1942. However, with Industry assuming patriotism it may be hoped that the job will be practically completed by late Summer of 1941. It is an engineer's job to do. We must compute every stress and strain; design every structure to withstand every transmitted effort applied to it.

In the foregoing, the thesis that the Civilian Engineer is the most essential element in National Preparedness has been outlined and it is hoped, in some measures, proved.

Turning to the purely military functions of engineers a brief description of our prospective Army and the engineer's part in its training and operation is of interest. The man-power strength of the Army will be 1,400,000 officers and enlisted men. It will be composed of Regular Army and National Guard troops brought to the required strength through voluntary enlistments and calling to duty some 50,000 Reserve Officers and the Selective Service Personnel.

The organization of the Army is constituted of three classes of Divisions: Armored, Triangular and Square.

The Armored Division, which on the march requires road space of about 80 miles, is entirely motorized and is used as a penetrating or shock unit to break through on enemy front. In combat this unit is followed by the Triangular Division which is semi-motorized and/or the Square Division, as the case may be, which stabilize more permanently the positions and territory to be held. There is no fixed order of this formation. It varies with conditions.

The Triangular Division is itself highly mobile. It contains approximately the same fire power as the Square Division and with all other units, although, in smaller number. It is capable of delivering a swift blow at any distance up to 150 miles within a 24-hour period and of bringing to bear the maximum fire power in delivering the attack. Similar to the Armored Division its strength is about 11,000.

The Square Division numbers approximately 20,000 and with some minor changes is essentially the same Division developed following the last World War. The present Divisions of the National Guard are Square.

The force of 1,400,000 men now being mobilized will provide for and be formed into:

Regular Army:	9 Triangular Divisions; 2 Cavalry Divisions and 2 or more Armored Divisions.
National Guard:	18 Square Divisions.
GRQ	Army and Corps installations.

Of the whole number of troops 140,000 will be engineers of which 7,000 will be officers.

Increased motorization and mobility call for increased activity of man power personnel. It calls for and places the burden of young active men. A premium is placed on agility and speed. Interesting, is the fixed policy of the British Army that no Colonel in the highly mobilized units shall be more than 35 years of age. It is proposed to reduce this age to 30 years as a fixed policy.

The increase in size of the Triangular Division to about 15,000 and its adoption to supercede the Square Division has been studied in the recent maneuvers and throughout the year. Divisions of similar organization have been adopted by France, Germany and other countries. Engineer Troops perform a vitally important role in its strategical and tactical employment. The Division is organized to move swiftly and respond quickly to orders, features applicable to both itself and integral units. It is also readily susceptible to quick enlargement. As the name implies its integral Combat Units are organized in series of three. Three Combat Arms: Infantry, Artillery and Engineers. Three regiments of Infantry of three batallion each. One regiment of 105mm Artillery of three battalions of three batteries each. One battalion of Engineers of three combat companies. One battalion of 155mm Artillery of three batteries, etc.

Within two hours time after receiving orders our own Divisions while in experimental stage could break camp and actually be on the march. All transportation is motor, but not sufficient in amount to move all units simultaneously. Units are shuttled or trucks secured from other units. There are reasons for this. For instance, infantry are foot troops and should not be led to believe that they can only arrive at a destination by truck. The spychology of de luxe warfare and of believing that it is impossible to move forward until trucks arrive must be discouraged. In addition to saving from fatigue and making possible more efficient work this mechanization saves time in movement and oper-

ations are permitted on more distant fronts and areas; in covering flanks and retreat, and in demolition work.

For combat operation the Division is divided into three Combat Teams, each complete within itself, composed of one regiment of Infantry, one battalion of 105mm howitzers and generally one company of engineers associated. Auxiliary Units mainly Air forces are attached for special situations. The mobility of a Combat Team is readily apparent.

Further streamlining of the Division is the elimination of Brigade Headquarters. Although the Staff includes two Brigadier Generals, Infantry and Artillery, they function only in an advisory capacity to the Division Commander who deals directly with the Combat Teams. This unit independence of the Combat Teams increases their importance and value. Additional Combat Teams, as complete units, can be secured from the Reserve of the Corps and Army and readily fitted in to enlarge Divisions operations.

The Engineer Battalion consists of 19 officers and 616 enlisted men organized as three lettered Companies of 4 officers and 176 men and a Headquarters Company. It is commanded by a Colonel who is Division Engineer and the Technical Advisor of the Commanding General. As a Division Staff Officer and advisor he is placed on a parity with the higher ranking officers of other branches. His Staff includes only a Major and three Captains. The troops personnel is highly trained and on duties other than assault, used principally in supervising work for which the working details are supplied by other branches.

The Engineer Battalion is responsible primarily for:

(a) Engineer reconnaissance.
(b) Aids to forward movement of Division troops.
(c) Measures to hinder enemy movement.

Aiding the forward movement of the Division involves:

Constructing, repairing and maintaining trails, roads and bridges.

Recommending traffic control methods.

Sign posts and routes.

Removing obstacles, including road blocks and mines.

Constructing advance landing fields.

Procuring and issuing maps.

Camouflage.

Measures to hinder the movement of the enemy involve:

Providing tools and materials to our troos for field fortification work.

Constructing special fortification works.

Laying out defensive positions.

Demolitions.

Constructing obstacles and road blocks.

Supplying anti-tank mines and laying mine fields.

Other functions are water supply and employment in emergencies as riflemen.

The battalion is provided with much power equipment which includes air compressors, air and gasoline driven power hammers, power saws, powered earth augers, nine demolition sets, 4 water purification units of combined capacity of 3600 GPH, oxyacetylene torches, 3/8 cubic yard shovel with pile driver attachment, road grader, a truck crane, outboard motors, electric lighting set and ten assault boats for stream crossings, etc. Additional power and other equipment is with the special battalions, Corps and Army troops.

A newly organized Aviation Engineer Regiment will serve with the GHY Air force.

Engineer troops of Corps and Army are General Service Regiments and Battalions both for work and special duty, such as, pontoon, map reproduction, water, topographical and other units. The heavier and more permanent construction of roads, bridges, camps, utilities and every feature which is included in our civilian communities of today are the responsibilities of these troops.

The varied duties imposed on engineer officers make it requisite that they have a general knowledge of all arms,

especially infantry. In all of our Wars they have proved outstanding and are found assigned to important staff positions and promoted to command Divisions.

Engineers have always been a necessary branch of all armies. This extends back over 6,500 years when the Royal Carpenter at the Court of Memphis was comparable to the Chief of Engineers of our Army today. From this early time until the latter part of the Eighteenth Century we find only the Military Engineer. When not engaged on military duties he was building up the country with highways, drainage and other public improvements and architectural development. The types of engineering and the magnitude of the projects in many instances compared with the present day. In 8,000 B. C. we find in Wangen, Switzerland, a village approximately 4 acres in area, 100,000 piles driven for housing foundations and to elevate homes for most protection against beast and enemy invaders.

The great pyramid of Cheeps erected 4,200 B. C. required seven million tons of granite, many pieces weighing 40 to 80 tons. The granite was transported over 500 miles and 100,000 men worked thirty years, one billion man/days in an eleven acre area.

Without tracing in detail through centuries the interrelated civilian work of the Military Engineer we can mention the building of the forerunner of the Suez Canal, by the Egyptians 4,000 years ago at the sacrifice of 120,000 lives; the feats of Ghenghis Khan; who because of his engineers was enabled to expedite the movement of his Mongul hordes from one to two thousand miles and the initiative of Archimedes in his invention of the catapult to hurl 2,000 ton missles and intensifying the sun's rays through concaved mirors to set afire the Roman fleets; and Leonardi DeVinci, known as the first engineer of modern times, who 400 years ago used horse drawn tanks in battle.

Late in the 17th Century, Vauban gave to the world the engineering principles for field fortifications and in 1690 founded in the French Army the Corps des Genie. In 1947,

the noted Ecole des Ponts et Chausses was constituted by royal decree and engineering training of civilians along the lines of our present schools was begun.

Beginning about 1750, because of the economic development in the older nations and their colonies, the civilian engineering work gradually increased in importance and volume to the extent of being definitely differentiated from the purely military engineering work. This gap has continued to widen.

In 1776 General Washington, himself an engineer, prevailed on the Continental Congress to authorize a Corps of Engineers. Its establishment was made possible because of the assistance of French and Polish Military Engineer Officers. Until the founding of Rensselaer Polytechnic Institute in 1824 our U. S. Military Academy was the only engineering school in the United States. Incidentally, until 1866 West Point was entirely administered by the Corps of Engineers.

The technical training of military and civilian engineers is essentially the same. Perhaps military engineering covering all branches of civil engineering is more comprehensive. In the prosecution of peace time public works, economy and efficiency performance are alike. In War, however, time is the essence and objectives are accomplished in the shortest period of time without regard for expense. Plans must be highly flexible to permit changes and work simple in conception, design and execution. Construction to meet bare requirements accomplished with greatest possible economy of material.

(The service together of regular army and civilian military engineer officers has proved equally beneficial. We, as civilians, acquire certain methods of any usuage and we in turn give to the army the results of our varied experience in all walks of life. As one example, in the last War by existing army methods a maximum of 1200 maps could be lithographed in a day. 350,000 maps were necessary for

the St. Mihiel offensive to be started in 30 days. Application of the methods of an officer from civilian life increased this number ten fold to 1200 maps per hour and the required 350,000 maps in eight colors were reproduced in time.)

In the theater of operations, many times, roads and bridges must be constructed for only a few hours use, but they must be completed for a fixed hour. One failure of delay may cause the loss of an offensive which has required weeks of planning and preparation. Such occurances happen in training maneuvers.

Many persons do not fully comprehend the importance of maneuvers. Their value in addition to the tactical experience is in the training received in tenting, or housing, feeding, transporting and keeping in good physical condition a group of 50 to 100 thousand men. We train officers and troops in mobility. This is quite a problem when it is realized that the area used for this training are outlying, sparsely settled, cut over sections in which only a few scattered villages are located. Imagine walking into the average country store to purchase food for a thousand men or of stopping at a filling station for a hundred thousand gallons of gasoline. Wood for the cook stoves, feed for animals, fresh meat and vegetables in large quantities and the procurement and distribution of these commodities are some of the matters which must be planned weeks ahead.

Many have accepted the viewpoint that battles are decided by the actual fighting of troops at the front. Although this is true in a sense, experience has shown that in the theater of operations for every man at the front two or more men in the service of supply are required to keep him going. Little thought is given to the fact that if the troops were not in the designated positions properly equipped and supplied they would not be able to function at all. If we turn to Ghenghis Khan nearly 7,000 years ago we find his success was brought about because of training, mability, preparedness and was due to the presence of a greater

number of men well supplied and equipped at critical points. The same observation can be recorded in the success of Confederate Generals of Cavalry. The transporting, equipping and supplying of troops is possibly of more importance than actual combat. If all of the details are expeditiously and efficiently arranged we find that in combat success will go to the troops thus well prepared, rather than to troops who may fight a little better individually, but who are deficient in organization for War. We have very valuable examples of this condition today. Incidently, we have available, literally millions of men willing and anxious to defend our country, but they would be placed in a most difficult situation if forced into War at any time without proper supplies and equipment.

On the Engineer is placed the responsibility for production, transportation and distribution of equipment and supplies. Factories are necessary to manufacture and produce. Railroads, truck lines and waterways are necessary for transportation, trucks for the final distribution. All of these functions are dependent on the work of the Engineer as he will also be depended on in the future to carry out the rehabilitation of the devastated countries.

Historically, the status of our Engineer troops at the outset of our various wars is interesting. We find none as such in the Continental Army. In the Mexican War there were a few who were Staff Officers. In the Civil War but one Company. In the Spanish War there were but two companies. In 1917 there were 250 officers and 2,200 enlisted men. Today we have readily available approximately National Guard and 8,000 of the Reserve Corps. The enlisted strength of the Regular Army is 12,200 and the National Guard a few thousand. The immediate major expansion illustrates the burden placed on the civilian engineer.

From the recent World War, our first mechanized war, much is being learned, especially, with regard to organization, tactics and the use of troops and equipment.

Wars today are won because of a determined offensive. The success of a mobile offense has been evidenced against the standstill defensive. Defense must be equally as mobile as offensive. Vigor, audacity, initiative, speed and modern weapons are capitalized.

Mechanization has increased and because of it proportionate decrease in actual required combat man power. This development has increased the destructive ability of man power and far outstripped constructive or replacement ability of the same man power. Fewer men are required to destroy but the same man power of former wars is required to reconstruct highways, bridges and other structures. In destruction engineers have become 20 times more efficient than in construction. This mobile warfare imposes the maximum strain on the engineers especially in the forward formation. Possibly, only in water supply does this not apply. There is an ever increasing margin between what the engineers can do and what they are called on to do.

The German War machine, which at this time has shown, on land, so much success, was started in 1934 and seen at its height this year. Its slogan is "Audacity and Swiftness." Some reasons given for its success have been the willingness to receive and experiment with ideas, the coordination between branches; the suppression of branch rivalry and the ready substitution of weapons between branches to perfect efficiency.

Troops are trained for open warfare. Unit commanders are given more authority and urged to develop initiative. The use of this policy by other countries would have precluded a recent experience of much tactical cost and permitted the detonating of bridges prepared for demolition but remaining intact awaiting final instructions from higher authorities. Surprise and originality of method have superceded the set habits for which it was famous in the past.

The spirit of confidence and success pervades personnel and "attack" is the tactical doctrine.

Leaders are always well forward "to feel the situation" and to make immediate decisions. Rapidity of action is increased by issuing combat orders verbally and in simple form. Quick action, though faulty at times, is recognized as being better than hesitation and loss of initiative.

Engineers more than ever before form a vital part of the Combat Teams. During the last War the majority of engineer work hours was spent on road maintenance and although still vitally important this work with minimum engineer supervision has been taken over by the Labor Service Battalion composed of boys about 18 years of age, and the Organization Todt composed of conscripted skilled and semi-skilled labor. This releases the trained engineer troops for combat duty. The Labor Service Battalion secures ist personnel from the army conscripts, the six month period prior to call for army service being spent in the Battalion. This period of training may be one of the reasons why the troops are in such fine physical condition. Nearly three million boys have served in the Battalion which is semi-military and comparable to our CCC and which was started two years after the CCC.

The Combat engineer troops are incessantly trained over a period of two years, going over and over every last detail of engineer duties.

Because of the great variety of duties required Combat Engineers are referred to as Pioneer Troops. The fact of being in the forefront of fighting is attested by reports and the citing and decorations awarded the officers.

Improving and making possible the routes of advance has been the primary function of the engineer, this has applied, especially, to stream crossings, reducing fortifications and overcoming all obstacles. Stream crossings which were formerly effected under cover of darkness are now bridged in daylight. Fast motor boats are used for initial crossing and bridges built under fire. Losses of the engineers are very heavy. Engineers must be imbued with initiative, foresight and ability to work at top speeds. At

the front power tools whenever practicable replace hand methods.

When the going becomes difficult there is a cry to get the engineers to the front. European nations have planned their defenses as a series of fortified lines. To keep open the routes of advance it becomes the responsibility of the engineers to break through these fortifications. Engineers become assault battalions. The fortifications were made invulnerable to heavy artillery fire but they were vulnerable to destruction by engineer explosives. Success has not been due to startling new weapons or tactics. Engineer troops were armed with rifles, machine guns and hand grenades. They were equipped with flame throwers, scaling ladders, crowbars, long poles, smoke candles, thermite grenades and explosives.

Let us picture a typical assault. It starts with light direct laying artillery firing directly at the ports and turrets of the fortifications. Under cover of this barrage the Combat Engineer flame throwers crawl forward, blinding the ports and searing the occupants. Then the engineer with smoke screens cuts off enemy observation; hand grenades and thermite bombs are manipulated by engineers, detonating in and around the ports; infantry stand in immediate readiness to repel counter attacks and consolidate ground taken; and, finally, engineer soldiers place their explosives against turrets, doors, hinges, ports and other vital parts of the defense. Engineers are thus employed to destroy the work of other engineers who designed and built the defenses.

Many civilian engineers are employed on both the design and construction of fortifications. Testing laboratories have been set up for Fortress Engineers. In planning an attack, models of the attack area, similar to those in our hydraulic and other laboratories, are constructed, and every detail of action developed and rehearsed. This includes, of course, the fabrication of bridges and other structures to replace where destroyed or needed. These are carried forward in the attack.

The active combatant work of the engineers, especially, in the flank protection has permitted decreasing the size of the reserve of the main Unit.

The combat or assault battalion is organized equipped and indoctrinated to get the infantry forward. It is called the breaker of the way and composed of 20 Officers and 750 enlisted men. A ratio of one to 37 compared to our ratio of 1 to 34, and the Division strength ratio engineers of 1 to 18 compared to our ratio of 1 to 24. The battalion train uses 5 ton trucks, 3 axles and 6 wheel power driven; reconnaissance cars 4-wheel drive and steering, for cross country. No dump trucks are used.

The success of the assault battalion and the Combat Teams is due to the precise coordination between arms, thoroughly trained personnel, adequate equipment, careful reconnaissance and thorough planning and rehearsing.

The use of the tank is closely allied with the engineer, tanks originating as part of the Engineer Unit, in the last War. Some 450 tanks are now included in the Armored Divisions. The effective rapidly moving tank columns are composed of the light tanks of about 8 tons and the medium tanks of about 20 tons, the latter being in greatest numbers. The 35 ton Skoda Tank has been mentioned as very effective. Also reported is a tank described as of about 100 tons armed with 3-75 mm and 2-37mm guns in addition to machine guns and carrying a crew of 15 men. Another tank is said to be 70 tons, armed with 1-105mm gun and 4 machine guns, and a flame thrower of approximately 250 mater range. Direct fire of 75s is required to stop tanks. In combatting tanks land mines are found effective against the first waves, but did not prevent passage of succeeding waves.

Communication is principally by radio which has been found satisfactory.

The supply of the troops is maintained entirely by trucks. This applies, especially, in the attacking forces inasmuch as all railroads have been destroyed. Supply is handled by huge 6-ton Diesel powered trucks, each pulling one or two

4-ton trailers. Seven of these units comprise a section. In the theater of operation three lines of traffic constantly jam the highways with supply trains and troops. Supply columns are heavy but short, ideally fitting in to the good roads and shortage of good experienced motor drivers.

National Defense has two legitimate and logical functions:

(a) The preservation of order at home.

(b) The prevention of aggression from abroad.

The force of 1,400,000 men shortly to be on duty is called solely for these two purposes.

The Army and the Navy are but a part of the National Defense system in the broad sense.

Wars as now carried on are total wars. They affect every part of the Nation involved. The continuous diplomatic intriguing; destruction of industries; curtailment and diversion of food; supplies and equipment; and secret international pacts and treaties make it necessary that every citizen play a part.

The people of our Nation are coming to realize this and thus National Defense, in the broad sense, consists among other things of:

a. The patriotism, loyalty, education and health of our people.

b. Geographical factors (real or artificial)—oceans, canals, rivers, harbors, mountains, etc.

c. Agricultural, mineral and chemical resources, cotton, rubber, coal, iron, oil, nitrates, etc.

d. Communication facilities, highways, railroads, commercial air-lines, merchant ships, port facilities, telephones, telegraphs, radios, etc.

e. Financial resources—money, credit and banking institutions, etc.

f. Civic organizations, churches, schools, fraternal orders, etc.

g. Foreign policies of the Government and their relation to the policies of other nations.

The continued education of our people to the necessity for adequate National Defense will prevent wars in the future and we hope participation in any War at the present time. To accomplish this engineers, must, and it is felt quite sure, will, assume the responsibility so vitally entrusted to them.

As a fellow Engineer, it is my sincere desire that all of you will try to carry through with us, cheerfully and willingly, in making our National Defense Program the success that it must and will be. Let me ask that you not only try to assist, but that you definitely carry forward the ideals of the engineering profession when and if called to help in this emergency which now faces our Nation.

Much depends upon our present National Defense Program and training. It will make known to the World our power and readiness for defense, insuring to us, peace rather than War.

SOME PHASES OF PRODUCTION AND DISTRIBUTION OF GAS IN NEW ORLEANS

By

HUGH M. BLAIN, JR.

Presented before the Society, Aug. 11, 1941

Superintendent Gas Production Division
New Orleans Public Service Inc., Member of the Society

The history of gas in New Orleans presents a picturesque, romantic background entirely in keeping with the interesting past of the Crescent City.

Authentic records disclose that New Orleans was the fourth City in the United States to use gas for street lighting, and it is interesting to note that James H. Caldwell, who completed the first gas plant here in 1835, had, during the previous decade, lighted his American Theatre with gas, using a "gas machine" imported from England.

The original gas plant was first operated by slaves. This plant was completely enclosed by a thick brick wall, fifteen feet in height, and the entrances were guarded by heavy iron gates. A three-story building, one side of which formed a part of the wall, was used as slave quarters, the dining room and kitchen being located on the first floor.

From 1835 to 1872, the gas business increased, and several necessary additions to the plant were made. However, from 1872 to 1901, principally because of the increased use of electricity for lighting purposes, the annual gas consumption in the city dropped from 270,000,000 cubic feet to less than 200,000,000 cubic feet.

From 1901 to the present time, increased demand for gas service in the City, together with the introduction of natural gas, has brought about many additions and improvements to the system.

Natural gas, which was first brought into New Orleans in the latter half of 1928, is purchased from the United Gas

Pipe Line Company at the "City Gate". A substantial portion of the gas used in New Orleans is supplied through a pipe line originating in the Monroe, Louisiana gas field, some 250 miles North and West of New Orleans. This line, which crosses under the Mississippi River, is built through many miles of swam lands and had to be laid at a considerable depth in many places because of soil conditions. The available supply of natural gas has recently been augmented by connections with gas reserves in other fields.

Natural gas has a heating value of approximately 1,000 B.T.U. per cubic foot as compared with the 600 B.T.U. gas previously manufactured. Because of this difference in heating value, it was necessary at the time the change-over was made, to readjust practically all gas appliances in the City, and later to alter the nine 11-foot manufacturing sets and auxiliary equipment maintained at the plant for standby and peak load purposes, to permit the manufacture of high B.T.U. gas, having characteristics similar to natural gas.

The oil gas process which is used at present was developed at our plant and is called the Single Stage Process. The finished gas made with this process is very similar and closely approaches the physical properties of the natural gas normally distributed by our system.

Oil gas is made by this process simply by the controlled cracking of gas oil in an atmosphere of steam, to the desired heating value and constituents in the finished gas. Oil used for gas making consists of complex chemical compounds of hydrogen and carbon known as hydrocarbons. Most of these hydrocarbons are made up of the paraffin, olefins and napthenes. The breaking down or the cracking of these compounds is accomplished by spraying the oil over or through fire brick maintained at a temperature ranging between 1500 and 1800° F. Cracking by means of high temperatures and low pressures favors the rupture of the carbon chain near the end which results in the formation of the simple gaseous compounds; methane, ethane, ethylene, and hydro-

NEW ORLEANS PUBLIC SERVICE INC.

DIAGRAMMATIC LAYOUT OF
GAS SET

SINGLE STAGE OIL GAS PROCESS

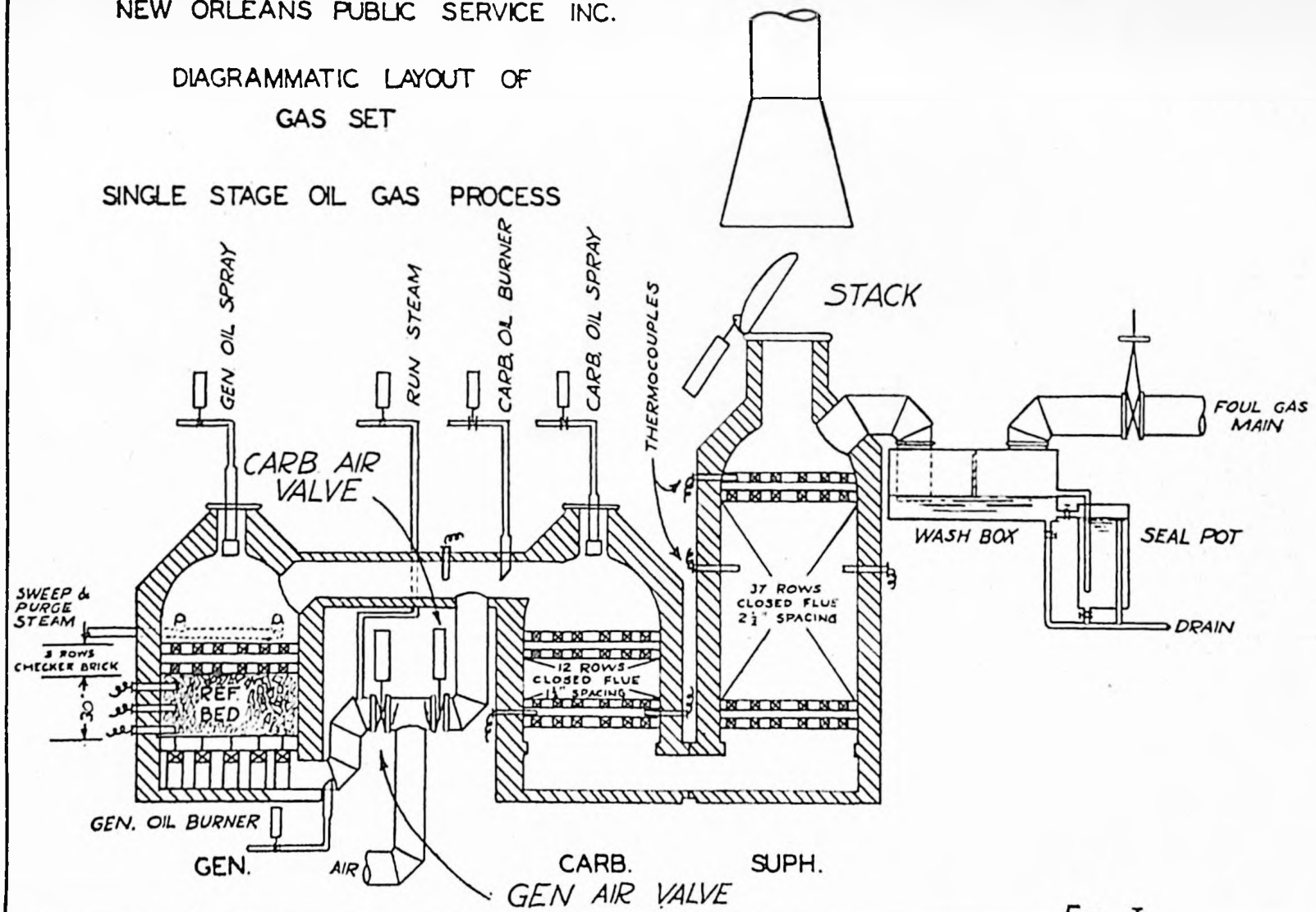


FIG. I

gen. If the temperature is too high, overcracking takes place, forming too much hydrogen and carbon. The only by-product obtained from the process is an oil tar which is readily marketable.

The apparatus used to make this gas is commonly called a "gas set", shown in Figure I, which consists of three round refractory lined shells: the generator, carburetor, and superheater. These same 11-Foot sets were formerly used to produce 600 B.T.U. carburetted water gas prior to their conversion. All three of these units are partially filled with fire brick in the form of checker brick, and this refractory is heated by means of two oil burners.

The cycle of operation for the sets consists of two main parts: the run and the blast. During the run, gas oil is sprayed into the top of the generator and carburetter with admission of steam. The oil coming in contact with the hot checker brick (about 1800° F.) is immediately gassified, the steam serving as an atmosphere for cracking and reacting with carbon to form hydrogen and carbon monoxide or water gas. The superheater serves as a final mixing and cracking chamber before the gases pass through a wash box. Following the oil run, steam is also used to purge the set of gas before admitting air and turning on of oil burners. This heat blast is that part of the cycle in which the set is reheated for the following oil run. The various air valves, steam valves, and oil valves are automatically controlled and timed through an automatic table which may be set to give the desired cycle. A complete cycle of operation requires only four (4) minutes, divided as follows:

Blast	135.0 seconds
Run	77.00
Steam Purge	13.00
Air Purge	14.00
Lost Time	1.00
	240.0 seconds

Approximate air, steam and oil rates are:

Generator Air	7,000-8,000	cu. ft. /Min.
Carburetter Air	7,500-9,000	" " "
Run Steam	25-50	Lbs. / Min.
Sweep Steam	100-125	" "
Purge Steam	150-175	" "
Generator Make Oil	75-85	Gals. / Cycle
Carburetter Make Oil	35-50	" "
Generator Oil Burner	6-8	" "
Carburetter Oil Burner	12-14	" "

A comparative analysis of the gas manufactured by this process with natural gas is outlined below:

	Manufactured Gas		Natural Gas
Carbon Monoxide (CO)	1.1%	CO_2	0.38%
Carbon Dioxide (CO_2)	18.8		
Illuminants	1.0	O_2	0.38
Oxygen (O_2)	24.2		
Hydrogen (H_2)	2.6		
Ethane (C_2H_6)	2.2	C_2H_6	3.24
Methane (CH_4)	42.8	CH_4	93.65
Nitrogen (N_2)	4.0	N_2	2.35
Butane & Propane	2.3		
Specific Gravity	.633		.586
Btu per Cu. Ft. (Dry & 8 Oz.)	1027		1056

The hot gas upon leaving the set, bubbles through a water seal known as a "wash box". Here it is partially cooled and most of the tar is extracted from it. This hot, unpurified gas is stored in a relief holder before it is pumped through washer coolers and purifiers. Direct contact between hot gas and cooling liquor takes place in the washer coolers, reducing the gas temperature to about 70-80° F. and washing out excess oils and tar. A Cottrell tar precipitator next removes from the cooled gas tar remaining in vapor form before it enters the purifiers for the removal of sulphur.

NEW ORLEANS PUBLIC SERVICE INC.
FLOW CHART OF GAS PLANT

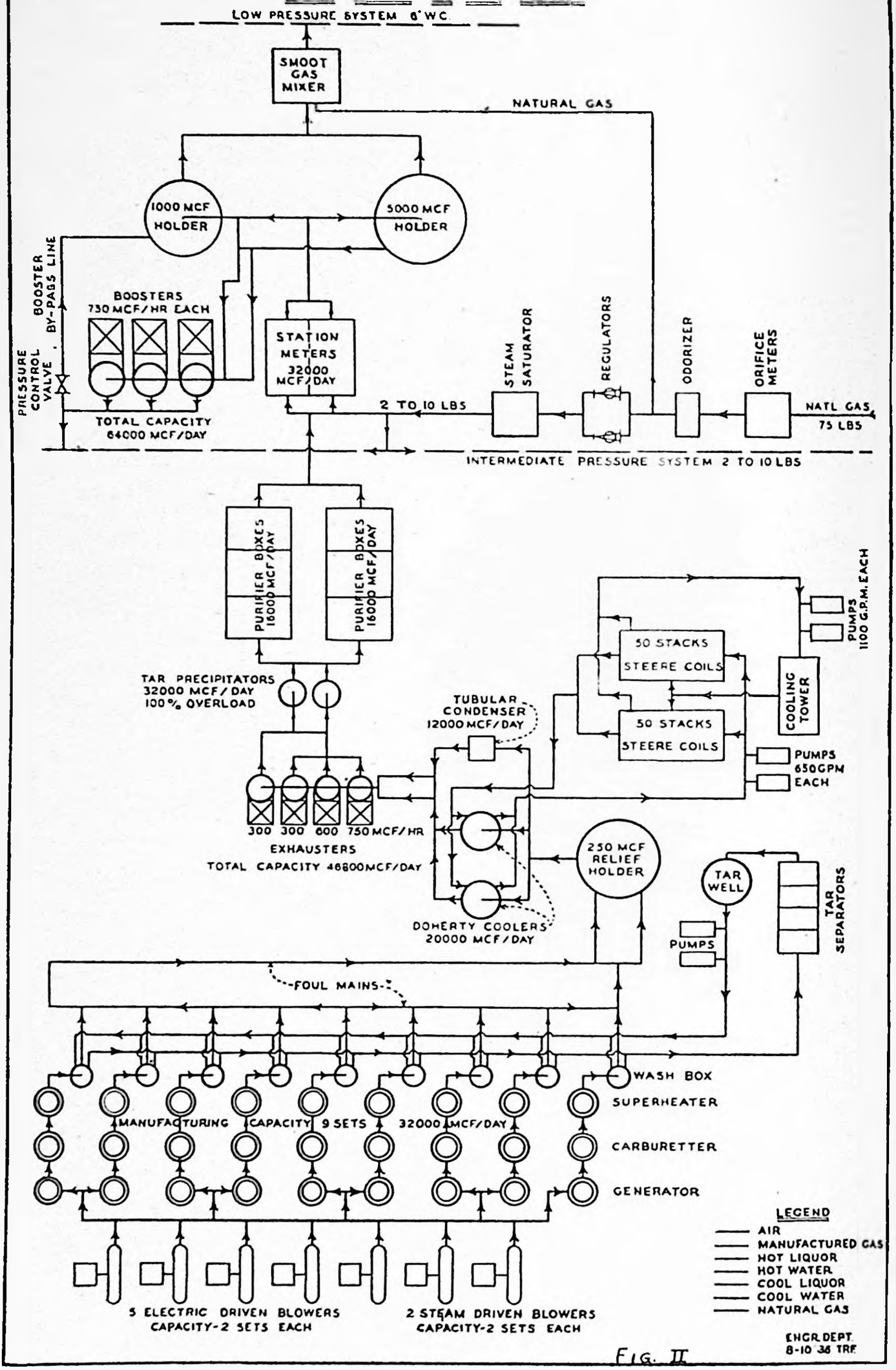


FIG. II

Figure II shows a flow diagram of the manufactured gas through the plant.

Sulphur, in the form of hydrogen sulfide, is the only remaining impurity. Its removal is accomplished by passing the gas through a mixture of shavings and iron oxide to give the reaction:—

$$Fe_2O_3 \cdot H_2O + 3\,H_2S = Fe_2S_3 + (X + 3)\,H_2O$$

The gas is then metered and stored in large gas holders ready for use.

These holders float on the line at all times, serving as a natural gas storage in cases of emergency. In addition they also help carry the load during peak demands. Depending on the size of the holder, the pressures vary from 6 to 18 inches of water, or not more than approximately 3/4 of a pound per square inch. Holders operate on the order of a folding drinking cup, one section placed inside of the other and sealed at their connections with water seals to keep the gas from escaping. These holders contain gas at relatively low pressures with positive exclusion of air. Because of this it is impossible for them to explode if struck by lightning or bombing a fact that is contrary to the general belief of the average layman.

We quote from the report of the National Technological Civil Protection Committee, appointed by the Secretary of War to investigate the effects of bombing on London and other British Cities:

"They have two types of gas tank: (1) the waterless, which is very dangerous and has been abandoned; and (2) the water sealed tank, which is much better. They abandoned the waterless type because it is highly explosive."

"Gas works have been hit, but with surprisingly little damage. Gas tanks have been holed, but this has resulted only in a fire easily dealt with, and not an explosion".

In normal usage, as a further example of the relative safety of gas holders, it is common practice in a great many companies to make minor routine repairs to them with the use of electric or acetylene welding apparatus.

The problems of distribution of gas, whether artificial or natural, are in general similar. The main difference lies in the fact that whereas artificial gas must be pumped to various parts of the city by compressors, natural gas is received at the "City Gate" at pressures great enough so as not to require any additional compressing.

Natural gas is delivered at the "City Gate" at pressures normally ranging from 175 to 225 pounds per square inch. After passing through a meter-regulator station, the pressure is reduced and it is received by the New Orleans Public Service Inc., at pressures ranging normally from 80 to 90 pounds per square inch. All gas received at the "City Gate" is odorized at that point. This gas is then carried through the company's high pressure distribution system to serve the Market Street Steam-Electric Generating Station, large industrial and commercial customers, certain district regulator stations, and the company's gas manufacturing plant. At the gas plant the pressure is again reduced and the natural gas is fed into the intermediate pressure system, also into the low pressure storage holders and distribution system.

At the beginning of the present year, the underground distribution system of New Orleans consisted of a total of approximately 715 miles of high, intermediate and utilization pressure mains, varying size from 3″ to 30″.

GENERAL OPERATING ORGANIZATION

The Gas Department of the New Orleans Public Service, Inc. is composed of two Divisions, namely, Production and Distribution.

The Production Division concerns itself with the operation of the high pressure distribution system, and maintenance, and operation, when necessary, of the gas plant.

The number of men continuously employed at the gas plant is determined by the maintenance requirements. Since this number is insufficient to operate the plant at full capacity, it is necessary to draw upon other Divisions and Departments for operating personnel. To be certain that this temporary help is competent, classes are held once every month for instruction in and discussion of the gas manufacturing processes. During this training, gas is actually manufactured with members of the classes operating and controlling the manufacturing equipment. This continuous training makes it possible to maintain an experienced operating crew with virtually no fluctuation in the Production Division personnel.

The general functions of the Gas Distribution Division are to operate distribution facilities directly affecting gas utilization; to furnish customers with gas service in connection with such operation; to maintain all distribution system facilities, and to make additions to the system when necessary.

Owing to the greater usage of gas during the winter months, many more service calls are received during these months then during the summer periods. The ratio of the calls received on a winter day as compared to those received on a summer day is frequently as great as eight to one.

To meet such rapidly changing conditions with a stable personnel, the employees of the meter repair shop are peri-

odically trained in service work, and are used to augment the field forces during the winter months. This is accomplished by scheduling the major part of meter maintenance in the summer months of the year. An appliance laboratory and school is maintained especially for this type of training. The theme that runs through these training activities is "courteous service" and "The customer's viewpoint". These factors are continually stressed, so that the employee unconsciously makes them the axis about which all his mental processes revolve.

I have attempted to present to you a more or less general picture of the production and distribution of gas in New Orleans, some of the major problems which are involved and the methods developed to overcome these problems.

Our organization has, over a period of years, adhered to a policy of providing for continuity of service in times of emergency by maintaining alternate facilities and by maintaining a high degree of personnel efficiency through job versatility. Because of this, and also by virture of the fact that our company is part of a private industry well equipped with capital and facilities to meet normal, plus emergency demands for service, we are confident of being able to meet the requirements of any contingncy that may arise in the future.

MINUTES OF THE MEETINGS AND BUSINESS OF THE SOCIETY

Minutes of the Meeting of the Board—July 8, 1941

The meeting was called to order by President Stewart with the following present: Kerr, Kohnke, Fromherz and Mayer.

The minutes of the last meeting were read and accepted.

A letter from Mr. C. G. Cappel proposing the formation of a committee for the purpose of advising with any Governmental authorities in regard to Defense Projects in Louisiana and vicinity was read. Letters from Mr. F. E. Johnson, Secretary-Treasurer of the New Orleans Section, A.I. E. E., and from Mr. John C. Parker, Chairman, National Civil Protection Committee, concerning the organization and correlation of various Civil Protection Committees in Louisiana were also read. It was decided to turn the above letters over to the Defense Committee of the Society with a request for suggestions as to the best methods for handling such matters.

A report of Chairman L. T. Frantz of the Library Committee was read. After some discussion it was decided to ask the Library Committee to attend the next meeting of the Board.

A letter from Mr. R. T. Basnett expressing his appreciation of the Junior Membership Award was read and received.

A new list of engineers from the several fields of engineering was submitted by the Committee on Professional Advancement. President Stewart is to write Governor Jones proposing the consideration of these men in filling any future vacancies on the Louisiana State University Board of Supervisors.

A report from General Chairman B. H. Bell for the 11th Annual Golf Tournament and Dinner was read and accepted.

There being no further business the meeting adjourned.

J. K. MAYER,
Secretary-Treasurer.

Minutes of the Meeting of the Society—July 14, 1941

The meeting was called to order by President Stewart with approximately 70 members and guests present.

The minutes of the last meeting were read and accepted.

President Stewart announced that a resolution endorsing the formation of a Junior Engineering Group was being drafted by a member of the Board and that this resolution will be sent to the voting membership of the Society with the next meeting notice and a vote taken at the next meeting.

Professor A. M. Hill made an announcement concerning the facilities of the Howard-Tilton Library. President Stewart commented on plans for the Society Library.

President Stewart introduced the speaker of the evening, Mr. Charles Lee Sens, Senior Cotton Technologist, Cotton Processing Division, Southern Regional Research Laboratory, Department of Agriculture, who delivered an interesting paper on "The Relationship of the Engineering Profession to the Textile Industry".

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

J. K. MAYER,
Secretary-Treasurer.

Minutes of the Meeting of the Board—August 5, 1941

The meeting was called to order by President Stewart with the following members present: Fromherz, Kammer, Kerr and Mayer. The Library Committee was represented by W. H. Scales and R. A. Steinmayer.

The minutes of the last meeting were read and accepted.

The previous report of the Library Committee was again read and President Stewart outlined the conditions in regard to the present library. After some discussion on future plans for the library, it was decided to return the report to the Committee with the request that the matter be reviewed and another report submitted.

Resignations of Warren A. Mackie and James F. Pierson were read and accepted subject to payment of dues to July 1st, 1941.

It was decided to ask the Baton Rouge Section to select a committee to draw up resolutions on the death of S. C. Magaw of Greenwell Springs, La.

A letter from Chairman Pillet of the Awards Committee proposing Mr. Robert N. Reed, recent graduate in Electrical Engineering, as recipient of the Junior Membership Award for Louisiana State University was read and approved.

A letter from E. C. Coburn announcing his election as Secretary-Treasurer of the Baton Rouge Section was read.

A report from Chairman B. S. Nelson of Membership Committee "B" stated that after a sincere effort the Committee had been unable to obtain additional sufficient information on Raymond J. Daigle to justify recommendation for grade of other than Junior membership. The decision was approved by the Board and the Committee commended for its excellent work in upholding the standards for membership.

After reading a letter from Chairman Rainville of the Technical Papers Committee requesting that the date of the September meeting be moved back one week to September 15th in order to accomodate the speaker, it was decided to take a vote on the question at the Society meeting on August 11th, this procedure being perscribed by the By-Laws.

A letter from F. N. Billingsley brought to the attention of the Board the fact that the Assistant City Architect had requested that the Committees of the Louisiana Engineering and American Society of Civil Engineers approve the proposed Building Code for the City of New Orleans. Since Mr. Billingsley had been appointed Chairman of a committee to cooperate in the revision of this code in 1940, it was decided that this committee be requested to represent the Society at this time.

A formal resolution endorsing the formation of a Junior Engineering Group according to the plan previously submitted was approved by the Board. The resolution is to be presented to the membership at large in written form and a vote taken at the August 11th meeting of the Society.

There being no further business the meeting adjourned.

J. K. MAYER,
Secretary-Treasurer.

Minutes of the Meeting of the Society—August 11, 1941

The meeting was called to order by First Vice-President Lassalle with approximately 45 members and guests present.

The minutes of the last meeting were read and accepted.

The following resolution was adopted by a unanimous vote of the members present:

> "Be it resolved that the Louisiana Engineering Society endorse the formation of a Junior Engineering Group in accordance with the plan previously submitted to the membership and approved by the Board of Direction."

It was voted to change the date of the regular September meeting to the third Monday (September 15th) in order to meet the schedule of the visiting speaker.

A life sketch of Mr. Berney Oakland written by Mr. S. E. Huey of Monroe was read. It was voted that it be spread upon the minutes of the Society and a copy sent to the family of the deceased.

Dean Lassalle asked to be informed of any unemployed engineers who would be available for employment in defense industries or engineering schools.

Mr. Hugh M. Blain, Jr., Superintendent, Production Division, Gas Department, New Orleans Public Service Inc., was introduced and presented a very interesting illustrated paper on "Some Phases of Production and Distribution of Gas in New Orleans". The speaker answered several questions at the conclusion of the paper.

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

J. K. MAYER,
Secretary-Treasurer

Oakland, Monroe. His first wife died in 1936. Later, Mr. Oakland was married to Miss Teresa Gertrude Howell who survives him together with a two year old daughter, Albertine.

Barney had an optimistic nature and was the life of every group with which he was associated. He had a ready wit and an inexhaustible fund of stories from his own wide travel and experiences. He was charitable and gave without stint to those who needed help. His friends were legion; few men in north Louisiana enjoy a wider acquaintance and friendship than did Barney. A man who knew him from his boyhood up had this to say of him, that he lived a full and rich life in the service of his fellow man and that he grew in stature until the day of his death.

By S. E. HUEY,
Member, La. Eng. Soc.

PROCEEDINGS
OF THE
LOUISIANA ENGINEERING SOCIETY

OCTOBER, 1941

"PATRONIZE OUR ADVERTISERS"

INDEX TO ADVERTISEMENTS

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.

LASEC NEWS

NEW ORLEANS, LA.

LASEC NEWS
5700 Garfield St.

Vol. III, No. 5 | Published Bi-Monthly | October, 1941

AS WE SEE IT

The American Society of Civil Engineers has on three occasions met in national convention in New Orleans. Now, after nearly 19 years, New Orleans will again be host to the Society at one of its national meetings. The earlier meetings in New Orleans set a high standard for interest and entertainment, and the present committee will certainly strive to maintain the city's reputation for southern hospitality. At least one feature of the earlier meetings, which has lost none of its fascination with the passage of time, will be repeated—opportunities to visit the charming and historic Vieux Carre where so much remains of the glorious and glamorous past when New Orleans was the Paris of the New World.

While the New Orleans committee will, no doubt, in characteristic fashion give every consideration to its social program for both members and their ladies, it will at the same time produce an exceptionally interesting schedule of technical sessions and inspection trips. Numerous Divisions will hold sessions; these will offer such a wide variety of subjects for discussion that practically every civil engineer and many engineers in related fields will find some technical reason to justify attendance. The committee will not be greatly concerned with what particular feature of the meeting accounts for a member's presence — it will simply guarantee that those who do come will enjoy every minute of their stay. So—*Remember!*

SPRING MEETING *1942* NEW ORLEANS

NEWS ITEMS

Arrangements are now being made for a meeting of the Section, to be held in Baton Rouge in the near future.

These Baton Rouge meetings in the past, have proven to be always among the most interesting and enjoyable of the year. An unusually large delegation from New Orleans is expected to attend, and it is hoped that many members from other sections of the state will arrange to be present.

The Secretary will send out the usual announcements.

A. M. Fromherz will represent the Louisiana Section at several important conferences to be held in connection with the Fall Meeting of the Society, which opens in Chicago, Ill., beginning October 13th.

The recent balloting on the formation of the Junior Engineering Group, resulted in favorable action by the membership of the Section.

The Board of Directors, meeting at the St. Charles Hotel in New Orleans, September 16th, was presented a letter from Col. V. J. Bedell, in which he asked to be relieved of his appointment as General Convention Chairman for the Spring Meeting to be held in New Orleans in 1942, due to his duties as Officer in Charge of Commercial Transportation at the New Orleans Port of Embarkation being such that he found it would be impossible for him to undertake the work involved as General Chairman. The matter was discussed at the meeting, but no definite action was taken thereon.

The Section is in receipt of a communication from Capt. T. A. Thomson, Jr., Acting Commandant, 8th. Naval District, advising that commissions ranging from Ensign to Lieutenant Commander in the General and Special Service branches of the U. S. Naval Reserve, are available to qualified engineers. Those interested should address a letter to the Director of Naval Reserves, 8th. Naval District, Federal Office Building, New Orleans, La.

PERSONALS

News has just come in that COL. WM. F. TOMPKINS served as an umpire in the mammoth war games in western Louisiana.

"PETE" HAMILTON is now connected with the Public Work Reserve office at New Orleans.

C. N. JOYNER, formerly with T. L. James & Co. of Rus-

ton, La., is now a senior business specialist with the Production Division, Office of Production Management, Washington, D. C.

HYMAN SAMUELSON, recently fellowship instructor at Tulane University, is located at Burwood, La., in connection with 8th. Naval District construction work.

Transferred from his post at Atlanta, Ga., COL. E. S. BRES is now assigned to the Office of the Construction Quartermaster, Santa Maria, California.

Another member now engaged in defense construction, is WALDO POWELL, located at the new Biloxi Air Base.

There's a rumor about, that LT. COMDR. H. McT. SYLVESTER is awaiting transfer orders. If true, COMMANDER, we're sorry to see you go. Best of luck.

Who is the new COLONEL who does not know he is being spoken to except when he is addressed as MAJOR?

CAN YOU IMAGINE?

We've found a member of the Section who has never heard of LASEC NEWS. YES, SIR!

DID YOU KNOW THAT:—

We are privileged to present a letter from a well known member of our profession, who has followed this column with interest and has written to us the following:

Dear Friends:

I know that your committee possesses sufficient traits of our late friend Rudolph Erich Raspe, the Baron Munchausen, to concoct from the following alleged facts some sort of a "Believe-It-Or-Not" for LASEC NEWS.

FAIRE PORTAGE, to carry a boat over land.

The right of portage was considered in early times in Canada and in the British, French and Spanish Colonies, subsequently the United States, as an undisputed privilege of explorers, trappers and merchants. There were no known enacted laws governing this right and it was not considered a trespass. The right of passage over cultivated or fenced lands could and was in some cases refused, the refusal being upheld by the owner, himself, backed up with his squirrel rifle which in those early times was a law unto itself. However, if any well defined and frequently used portages were established, they acquired the same right of passage

as a path or road, becoming a public servitude through the right of use or custom.

CORDELLE, a tow line or tow rope.

To "cordelle" a boat simply means to tow a boat by a rope fastened to a mast or pole set slightly aft of amidship and extending to the shore, the impetus being either man or animal power. The paths used by the towers or cordellers was a recognized right-of-way on all natural navigable streams. In the instance of artificial waterways, sufficient berm on each side of the stream for the passage of the towing men or animals, was provided in the purchase of the right-of-way. In English speaking sections this berm was known as a tow path.

The French and Spanish section of this country traversed by the Mississippi River and its tributaries, used the word "cordelle" almost exclusively. There were very few tow paths and no restrictions were placed against the rights of "cordellage". When these streams were at flood stage the tow paths, where they existed, were covered with water and boats were propelled against the current by "poling", "touer", (warping) or "bush whacking"; "poling" was to push the vessel forward by poles reaching to the river bottom, the "polers" walking toward the stern; "warping" (se touer) was to carry the tow line ahead, fasten it to a tree or stump and then hauling in on the line from the boat; and "bush whacking" was to propel the craft forward by grasping the bushes and branches on the edge of the stream.

There appear to be no laws on "cordelle" rights in Louisiana.

Sincerely,

M. T. D.

MEMBERSHIP CHANGES

ADDITIONS TO MEMBERSHIP

Junior:

ARTHUR EDWARD HULME, Baton Rouge, La.

APPLICATIONS FOR TRANSFER

From Associate to Member:

HARRY MONG HOUSE, DeRidder, La.

From Junior to Associate:

FRANCIS VICTOR BARNETT, Monroe, La.

APPLICATIONS FOR ADMISSION

For Associate:

FRANK JAMES GERMANO, University, La.

MERRILL ANTHONY GERSTNER, New Orleans, La.

RAYMOND THOMAS WEST, Leesville, La.

For Junior:

CHARLES HERMAN DIETH, New Orleans, La.

From Tulane University

JOHN ANDREW ALLISON
WILLIAM RICHARD BURK, JR.
EDMUND ROSS BUXTON, JR.
FRANCIS JOSEPH ORY
STEPHEN WALLACE PAINTER, JR.
PAUL HARDING RICKER

From La. State University

CARLOS JOSEPH CHRISTINA
FERD SESSIONS GODBOLD, II.
BERNARD ELIAS GREENBERG
CHARLES WILLIAM HAIR, JR.
HAROLD LESTER ODOM

THE PROCEEDINGS
OF THE
LOUISIANA ENGINEERING SOCIETY

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

ARTHUR M. HILL, Editor.

Subscription, $2.00 per annum Single copy, 35 cents

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

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

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

as a path or road, becoming a public servitude through the right of use or custom.

CORDELLE, a tow line or tow rope.

To "cordelle" a boat simply means to tow a boat by a rope fastened to a mast or pole set slightly aft of amidship and extending to the shore, the impetus being either man or animal power. The paths used by the towers or cordellers was a recognized right-of-way on all natural navigable streams. In the instance of artificial waterways, sufficient berm on each side of the stream for the passage of the towing men or animals, was provided in the purchase of the right-of-way. In English speaking sections this berm was known as a tow path.

The French and Spanish section of this country traversed by the Mississippi River and its tributaries, used the word "cordelle" almost exclusively. There were very few tow paths and no restrictions were placed against the rights of "cordellage". When these streams were at flood stage the tow paths, where they existed, were covered with water and boats were propelled against the current by "poling", "touer", (warping) or "bush whacking"; "poling" was to push the vessel forward by poles reaching to the river bottom, the "polers" walking toward the stern; "warping" (se touer) was to carry the tow line ahead, fasten it to a tree or stump and then hauling in on the line from the boat; and "bush whacking" was to propel the craft forward by grasping the bushes and branches on the edge of the stream.

There appear to be no laws on "cordelle" rights in Louisiana.

Sincerely,

M. T. D.

MEMBERSHIP CHANGES

ADDITIONS TO MEMBERSHIP

Junior:

ARTHUR EDWARD HULME, Baton Rouge, La.

APPLICATIONS FOR TRANSFER

From Associate to Member:

HARRY MONG HOUSE, DeRidder, La.

From Junior to Associate:

FRANCIS VICTOR BARNETT, Monroe, La.

APPLICATIONS FOR ADMISSION

For Associate:

FRANK JAMES GERMANO, University, La.

MERRILL ANTHONY GERSTNER, New Orleans, La.

RAYMOND THOMAS WEST, Leesville, La.

For Junior:

CHARLES HERMAN DIETH, New Orleans, La.

From Tulane University

JOHN ANDREW ALLISON
WILLIAM RICHARD BURK, JR.
EDMUND ROSS BUXTON, JR.
FRANCIS JOSEPH ORY
STEPHEN WALLACE PAINTER, JR.
PAUL HARDING RICKER

From La. State University

CARLOS JOSEPH CHRISTINA
FERD SESSIONS GODBOLD, II.
BERNARD ELIAS GREENBERG
CHARLES WILLIAM HAIR, JR.
HAROLD LESTER ODOM

THE PROCEEDINGS
OF THE
LOUISIANA ENGINEERING SOCIETY

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

ARTHUR M. HILL, Editor.

Subscription, $2.00 per annum Single copy, 35 cents

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

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

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

as a path or road, becoming a public servitude through the right of use or custom.

CORDELLE, a tow line or tow rope.

To "cordelle" a boat simply means to tow a boat by a rope fastened to a mast or pole set slightly aft of amidship and extending to the shore, the impetus being either man or animal power. The paths used by the towers or cordellers was a recognized right-of-way on all natural navigable streams. In the instance of artificial waterways, sufficient berm on each side of the stream for the passage of the towing men or animals, was provided in the purchase of the right-of-way. In English speaking sections this berm was known as a tow path.

The French and Spanish section of this country traversed by the Mississippi River and its tributaries, used the word "cordelle" almost exclusively. There were very few tow paths and no restrictions were placed against the rights of "cordellage". When these streams were at flood stage the tow paths, where they existed, were covered with water and boats were propelled against the current by "poling", "touer", (warping) or "bush whacking"; "poling" was to push the vessel forward by poles reaching to the river bottom, the "polers" walking toward the stern; "warping" (se touer) was to carry the tow line ahead, fasten it to a tree or stump and then hauling in on the line from the boat; and "bush whacking" was to propel the craft forward by grasping the bushes and branches on the edge of the stream.

There appear to be no laws on "cordelle" rights in Louisiana.

Sincerely,

M. T. D.

MEMBERSHIP CHANGES

ADDITIONS TO MEMBERSHIP

Junior:

ARTHUR EDWARD HULME, Baton Rouge, La.

APPLICATIONS FOR TRANSFER

From Associate to Member:

HARRY MONG HOUSE, DeRidder, La.

From Junior to Associate:

FRANCIS VICTOR BARNETT, Monroe, La.

APPLICATIONS FOR ADMISSION

For Associate:

FRANK JAMES GERMANO, University, La.

MERRILL ANTHONY GERSTNER, New Orleans, La.

RAYMOND THOMAS WEST, Leesville, La.

For Junior:

CHARLES HERMAN DIETH, New Orleans, La.

From Tulane University

JOHN ANDREW ALLISON
WILLIAM RICHARD BURK, JR.
EDMUND ROSS BUXTON, JR.
FRANCIS JOSEPH ORY
STEPHEN WALLACE PAINTER, JR.
PAUL HARDING RICKER

From La. State University

CARLOS JOSEPH CHRISTINA
FERD SESSIONS GODBOLD, II.
BERNARD ELIAS GREENBERG
CHARLES WILLIAM HAIR, JR.
HAROLD LESTER ODOM

THE PROCEEDINGS
OF THE
LOUISIANA ENGINEERING SOCIETY

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

ARTHUR M. HILL, Editor.

Subscription, $2.00 per annum Single copy, 35 cents

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

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

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

JOHN K. MAYER
Secretary-Treasurer

LOUISIANA ENGINEERING SOCIETY

Suite 422 St. Charles Hotel

OFFICERS FOR 1941

President, DAVID W. STEWART, 317 Baronne St.
1st Vice-Pres., LEO J. LASSALLE, University, La.
2nd Vice-Pres., C. GLENN CAPPEL, 833 Howard Ave.
Sect.-Treas., JOHN K. MAYER, P. O. Station 20.

DIRECTORS

ALVIN M. FROMHERZ, 226 Carondelet St.
KARL P. KAMMER, 317 Baronne St.
CHARLES M. KERR, 5831 S. Robertson St.
RICHARD B. KOHNKE, 932 Picheloup Place.
WILLIAM H. RHODES, 505 Canal Building.

BATON ROUGE SECTION OFFICERS FOR 1941

President, W. W. TENNANT
1st Vice Pres., N. E. LANT
2nd Vice Pres., F. F. PILLET
Sect.-Treas., EARL C. COBURN

STATE BOARD OF ENGINEERING EXAMINERS

J. T. BULLEN, Pres.
E. S. BRES
DONALD DERICKSON
B. H. GREHAN
B. W. PEGUES

DISTRICT CONTACT REPRESENTATIVES

3rd Dist. THOMAS J. JONES, New Iberia, La.
4th Dist. J. T. BULLEN, 4026 Curtis Lane, Shreveport, La.
5th Dist. S. E. HUEY, Ouachita Bank Bldg., Monroe, La.
6th Dist. C. A. MYERS, Dept. of Highways, Baton Rouge, La.
7th Dist. L. P. ELBERSON, Crowley, La.
8th Dist. D. E. FUELLHART, Natchitoches, La.

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

LOUISIANA ENGINEERING SOCIETY

STANDING COMMITTEES FOR 1941

Committees Sponsored by C. Glenn Cappel

Awards
F. F. Pillet, Chairman
Donald Derickson
B. W. Pegues
J. M. Robert
H. W. Waterfall
C. S. Williamson
J. C. Bendler
L. G. Ireland
John Klorer
A. E. Marks
J. A. McNiven
H. P. Newton
J. H. O'Neill
W. H. Rhodes
A. M. Shaw
C. Floyd

Finance
O. K. Oleson, Chairman
D. W. Godat
G. C. Kerr
J. K. Mayer
H. L. McLean
J. L. Fortier

Defense
E. S. Bres, Chairman
V. J. Bedell, Vice-Charman
Donald Derickson
A. M. Hill

Professional Advancement
J. M. Todd, Chairman
V. J. Bedell
F. N. Billingsley
H. Johnson
R. J. Kuhn
L. J. Lassalle
H. A. Levey
G. E. May
B. S. Nelson
C. B. Norris
John Riess
J. E. Morehiser

Committees Sponsored by Alvin M. Fromherz

Civic and Industrial Affairs
C. L. Nairne, Chairman
A. E. Abaunza
R. T. Burwell
C. C. Crawford
E. L. Cowan
C. B. Dicks
R. E. Gosa
A. J. Harris
P. F. Hoots
S. E. Huey
W. S. Leake
H. L. McLean
A. J. Naquin
J. L. Porter
G. A. Seaver
J. L. White
W. N. Tuller
F. N. Billingsley
E. S. Bres
A. M. Fromherz
B. H. Grehan
W. B. Gregory
H. B. Henderlite
W. T. Hess
F. E. Johnson, Jr.
T. J. Jones
K. P. Kammer
L. J. Lassalle
G. E. May
J. A. McNiven
F. F. Pillet
W. H. Rhodes
F. M. Stone
C. S. Williamson
W. P. Wallace

Legislation
D. W. Godat, Chairman
S. V. Applewhite, Vice-Chairman

Library
L. T. Frantz, Chairman
M. C. Abrahm
W. H. Scales
R. A. Steinmayer
R. M. Shaw

Committees Sponsored by Karl P. Kammer

Engineering Education
C. W. Ricker, Chairman
S. W. Elberson
L. T. Frantz
F. G. Frost
W. B. Gregory
A. M. Hill
W. H. Rhodes
F. M. Taylor
J. M. Todd
H. W. Waterfall
Wm. Whipple
Sidney Ellis, Jr.
B. H. Bell
H. W. Fletcher
J. A. Glover
O. K. Olsen
W. S. Rainville, Jr.
Frank Riess

Publicity
J. J. Bulliung, Chairman

Student and Junior Activity
L. J. Cucullu, Chairman
M. C. Abrahm
J. E. Harvey
G. A. Heft
W. S. Nelson
M. G. Zervigon
W. P. Wallace

Technical Papers
W. S. Rainville, Jr., Chairman
H. M. Blain, Jr.
J. M. Guillory
F. E. Johnson, Jr.
C. M. Kerr
G. C. Kerr
H. A. Levey
E. A. McLellan
E. L. Mire
R. A. Steinmayer
B. J. Haney

Committees Sponsored by Charles M. Kerr

House
R. L. Nall, Chairman
E. S. Bres
H. E. Crump
A. H. Guillot
W. T. Hogg
E. S. Lanphier
W. S. Nelson
M. J. Cramer
C. E. Dolhonde
L. P. Elberson
S. W. Elberson
O. H. Elverum
C. H. Fenstermaker
D. E. Fuellhart
J. B. Gates
A. E. Hotard
J. B. Howze
S. E. Huey
T. J. Jones
N. E. Lant
H. L. Lehmann
C. A. Myers
H. P. Newton
B. W. Pegues
B. B. Pierce
A. F. Rideout
P. T. Eeashore
Harry Shutts
T. B. Smith
I. W. Sylvester
S. A. Theard
A. G. Jarreau

Entertainment and Outings
B. H. Bell, Chairman
L. F. Alexander
J. J. Bulliung
R. J. Dreuding
A. L. Dunlap
H. W. Fletcher
R. P. Lockett
David Moodie
H. B. Myers
A. J. Naquin
O. K. Olsen
N. H. Ross
R. M. Seago
A. J. Fransen

Membership, Division "A"
A. L. Dunlap, Chairman
C. E. Abrahamson
F. R. Adams
V. J. Bedell
J. L. Bourgeois
J. T. Bullen
E. L. Cowan

Publications, Division "A"
A. M. Hill, Chairman
J. C. Baehr
H. J. Molaison
J. M. Robert
H. S. Salzer
F. M. Taylor
G. F. Williamson

Committees Sponsored by Richard B. Kohnke

Membership, Division "B"
B. S. Nelson, Chairman
D. S. Elliott
C. A. Myers
J. H. O'Neill
H. I. Brown

Publications, Division "B"
N. H. Ross, Chairman
E. C Coburn
H. W. Fletcher
J. T. Floyd, Jr.
I. D. Ford
W. H. Grant, Jr.
S. L. Hebrard
G. W. Hill
C. J. Kelly
G. C. Kerr
H. J. Lane
R. P. Lockett
N. L. Marks
L. C. H. McLean
W. P. Oster
E. J. McNamara

Employment
R. P. Bassich, Chairman
E. L. Fithian
G. A. Heft
E. A. McLellan
R. F. Muller
J. C. Bartley

Public Relations
A. T. Dusenbury, Chairman
L. F. Alexander
J. C. Baine, Jr.
B. H. Grehan
A. S. Hackett
G. R. Hammett
A. C. Hays
Noel P. Kammer
A. R. Keiler
N. E. Lant
H. P. Newton
D. H. L. Morris

The last name on each committee is the Junior member, who sits with the committee, but without vote.

PROCEEDINGS
OF THE
LOUISIANA ENGINEERING SOCIETY

VOL. XXVII. DECEMBER, 1941 NO. 6

CONTENTS

EDITORIAL NOTES AND COMMENT

Secretary-Treasurer John K. Mayer. You have all heard from him in one way or another, how many have met him? His picture is opposite; if you have paid your dues his look will appear very kindly, if not your conscience may alter it to an expression of inquiry.

The Secretary-Treasurer runs that office of the Society efficiently and accurately. We are fortunate in having his services.

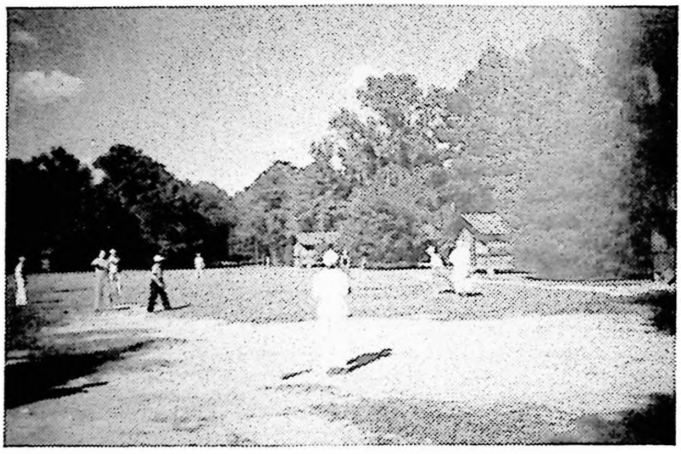
Our Annual Meeting. When the lights burn until midnight in the rooms at 422 St. Charles Hotel, the signs of the Annual Meeting are appearing. And it takes many hours on the part

of various industrious committees to arrange all the dozens of details for the meeting.

You will soon receive a program of events occurring on January 9 and 10, 1942. Plan now to attend and take part in all of the sessions possible. The banquet and dance will be held on Saturday, January 10.

———

The Picnic. The picnic held at Camp Salmen on October 19th was a grand affair again this year. The weather was perfect and there were games for all — baseball, badminton,



Ball Game at the Picnic

horsehoes, races, swimming, etc. Prizes were donated by the Woman's Auxiliary. Beer, soft drinks and coffee were provided in abundance and the picnic baskets brought by the participants seemed to produce an amazing amount of food. The register showed 47 men, 46 wives or "dates" and 45 children on hand. It is to be hoped that the fall outing will continue as an annual function and that those who were unable to join in the fun this year will be present in the future. General Chairman Ole K. Olsen, the Woman's Auxiliary and all the Committees deserve a vote of thanks for the time and effort spent on arrangements.

President Stewart. Our president gave a brief but appealing address at a recent initiation of Tau Beta Pi, honorary engineering fraternity, of which he is a member. Mr. A. J. Naquin, an active member of the L. E. S., was toastmaster.

Joint Meeting with American Institute of Electrical Engineers. On October 20 the Society met with the A. I. E. E. Each year L. E. S. endeavors to schedule a number of joint meetings. Such gatherings are a clear and forceful argument for a single national engineering organization.

When will the majority of the members of the various state and national organizations raise their voices in such numbers that action toward unification must be taken? Let's make it more than a dream. Think of the power of an American Engineering Society!

President Stewart and Chairman Babin presided. Mr. Sheals' paper is presented in this issue.

Minute-Men are to us characters in history, and that brings us to the fact that the minutes of the Society form the history of the Society. Do you read the minutes? The minutes of the Board are particularly important; they acquaint you with behind-the-scene activity. See what *your* Society is doing, help if you agree; if you don't agree, the President and Board are anxious for constructive suggestions. Read the minutes!

New Members. Below are listed members elected on a recent ballot. Included in the list also are members who have been transferred from one grade to another.

Read the list, and know your fellow members.

Cassidy, John F. Member. Age 33. Endorsed: H. P. Newton, K. Ward, Jr., H. J. Molaison. 1930—B. S. in Ch. E., Montana State College. 1930-34—Investigating smelter fume damage caused by Canadian smelter in Northeastern part of state of Washington for Bureau of Chemistry and Soils, U. S. Dept. Agriculture. 1934-40—Insecticide research in connection with control of apple insects in Wenatchee and Yakima,

Wash. and in Vincennes, Ind. 1940 to date—Asst. Engr., Engr. and Development Div., Southern Regional Research Laboratory. 846 Bungalow Court, New Orleans, La.

Earl, Thomas Collins. Member. Age 26. Endorsed: J. L. Porter, Wm. Hardy, A. M. Hill. 1938—B. E. in M. E., Tulane. Jr. Engr. Inspector in regional headquarters for P. W. A. in seven states. Mechanical and civil resident engineer for Lewis Chambers Construction Co. on levee construction work. Mechanical engineer on estimating, sales and supervision of installation of plumbing, heating and mechanical equipment for Wilton M. Ellin. Mechanical engineer with Glenn L. Martin Co. in air craft engineer training course and bomber construction work in the engineering department. Mechanical engineer with W. Horace Williams Co. at Camp Claiborne on general mechanical engineering work. Head of Mechanical Engr. Div. of Engr. Dept. with Horace Williams Co. at Camp Polk, in charg of all mechanical engr. work. c/o W. Horace Williams Co., Camp Polk, Leesville, La.

Helm, Malcolm Boord. Member. Age 46. Endorsed: H. E. Crump, G. C. Rackerby, L. P. Raynor, W. F. Standke, Jr. 1917—B. S., U. S. Military Academy. 1920—Rodman, Midwest Refining Co., Casper, Wyoming. 1921—Draftsman, La. Oil Refining Corp., Shreveport, La. 1923-30—Draftsman, The Texas Co., Shreveport, La. 1930-33—Chief Draftsman, Texas Co., Shreveport. 1933 to date—Asst. Div. Engr., Texas Co., Shreveport and New Orleans. Registered Professional Engr. (Civil), State of Texas. Member: Society American Military Engr., American Society of Engineers. 1727 Broadway, New Orleans, La.

Pominski, Joseph. Junior Member. Age 26. Endorsed: H. J. Molaison, W. N. Tuller, F. H. Fenn. B. S. in Ch. E. from L. S. U. in 1935. Sept., 1935 to August, 1938—Junior Engr. Aide (Chemical) with U. S. Engr. Aug., 1938 to May, 1941—With U. S. Food and Drug Administration. May, 1941 to date—Junior Chemical Engr. with Southern Regional Research Laboratory. 337 Hillary St., New Orleans, La.

Sens, Charles Lee. Member. Age of 46. Endorsed: D. W. Stewart, K. Ward, Jr., H. P. Newton. Technical Studies of

machines and methods in textile manufacturing plants. Installed complete mill unit of textile experimentation plant. Employed by Mt. Vernon-Woodberry Mills, Inc. for 16 years. For 12 years general supt. of their three Baltimore mills in charge of manufacturing, purchasing, maintenance and repairs, employment and reorganization of machine layouts and labor schedules. Present—Senior Cotton Technologist, Cotton Purchasing Div., Southern Regional Research Laboratory. 1620 Mirabeau Ave., New Orleans, La.

Stevenson, Frank M. Member. Age 44. Endorsed: F. R. Adams, E. L. Erickson, J. P. McCullough. 21 yrs. service with Southern Bell Telephone and Telegraph Co. 1923-1926—Office Engr. to Div. Plant Engr. in Mississippi Div., Jackson, Miss. 1926-28 Exchange Engr., field telephone engr. work. 1928 to date—Right of Way Engr. in charge of Right of Way Dept. of Louisiana Div. 84 Maryland Drive, New Orleans, La.

Transfer from Student to Junior Members: R. W. Adamson, H. J. Bultman, Jr., John Culbertson, J. T. Dwyer, Jr., M. J. deLerno, L. D. Fadrique, S. C. Murphy, F. J. Ory, J. A. Polack, G. H. Thompson, W. A. Wood, Jr., R. A. Herrod.

Who Knows—Do You? Below are listed some of our members whose correct addresses are unknown.

Do you know? If so, please write or phone Secretary Mayer.

Members whose addresses are unknown:

A. L. Black, Jr.
A. W. Brodtman
A. J. Cooper, Jr.
Linton C. Cooper
Robert S. Cooper
Raymond J. Daigle
Fred H. Fenn
Patrick E. Garner
Edward H. Gessner
W. S. Henning
K. W. Mackenzie
J. I. McCain
J. McInerney
A. J. Meyers
P. L. Morris
Cecil K. Oakes
Wm. O. W. Pankey
Arthur C. Porter
Hyman Samuelson

Papers in This Issue. Both papers in this issue concern themselves with phases of national defense.

"Gas-Filled Cables" by Mr. Sheals of the General Electric Co. deals with performance of various types of cable.

Mr. Peirce, now a Teaching Fellow at University of Michigan, presents some interesting design data in connection with performance of air plane wings.

Both papers present their respective subjects in a most interesting and entertaining manner.

PAPERS AND DISCUSSIONS

SOME IMPORTANT FACTORS IN MODERN AIRPLANE DESIGN

CARROLL J. PEIRCE, JR.*

The design of a modern commercial airplane can be separated into three divisions, namely: Structural Design, Aerodynamic Design and Instrument Design. If the airplane be one of the military type a fourth division, that of Armaments, must be included. We will restrict ourselves in this discussion to an aspect of Aerodynamic Design, known as Boundary Layer Control.

The theory of the lift of an airfoil or of an airplane wing moving through the air is most easily developed by assuming that the air is a perfect fluid, being incompressible and possessing no viscosity. Using this assumption the theory of the flow around airfoils, and even around bodies of arbitrary shape, has been developed. It has been found that the magnitudes of the pressures and velocities in the region around the airfoil predicted by the theory are in close agreement with the experimental values, provided that the measurements are made at points which are not too close to the surface of the airfoil. In other words, except for a region very close to the surface the flow picture can be adequately described on the assumption that the air is a perfect fluid. The region close to the airfoil in which pecularities in behavior are encountered is known as the boundary layer. In the first slide are shown in cross section the flow lines or stream lines around an ordinary airfoil. The airfoil is shown at some angle which is called the angle of attack. As can be seen the flow is from left to right. The solid lines represent theoretical stream lines or flow lines which have been calculated on the assumption that the air is a perfect or inviscid fluid, that is, one with no viscosity. The dotted lines represent experimental results obtained in the wind tunnel.

* Teaching Fellow in Engineering Mechanics, University of Michigan. Presented before the Society on Sept. 15, 1941.

The measured values of the velocities and pressures agree with the theoretical values to within 2%. Note, however, that no measurements are shown very close to the airfoil. At the stagnation point here at the leading edge the velocity is zero and the pressure is a maximum and equal to the full dynamic pressure of the flow namely $\frac{1}{2}\ \rho V^2$, where ρ = density in slugs/Ft.^{3}, V = velocity in Ft./Sec. As the surface of the

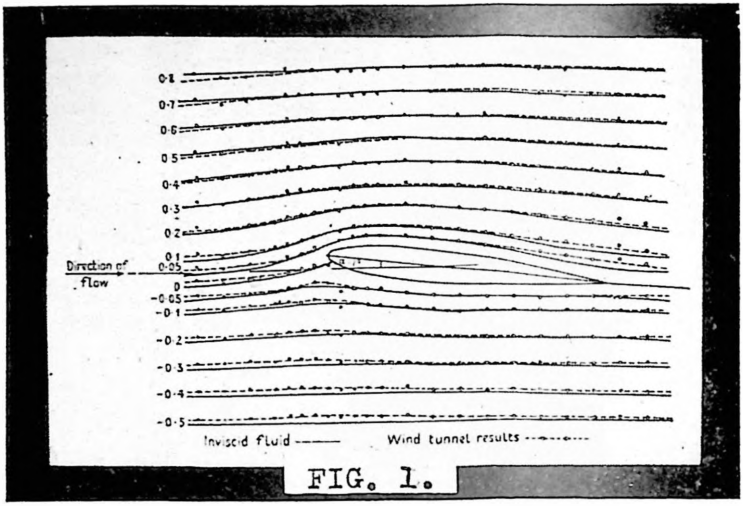


FIG. 1.

airfoil is approached, we enter the boundary layer and the 2nd slide shows the condition close to the surface. Again the flow is from left to right and velocities are represented by the lengths of the horizontal lines. U is the undisturbed air velocity at some distance away from the surface of the airfoil. Just before the air begins to flow over the surface of the airfoil we see that the velocity at various distances out from the surface is uniform. As the air travels along the surface those particles which are closest to the surface are retarded due to the effect of friction of the surface and due to the viscosity of the actual air, and the particles immediately in contact with the surface lose all velocity, with the result that there is no slip at the surface. The particles further out are also retarded as shown by the curve. As the flow con-

tinues this region of retarded flow continues to thicken, the dotted line representing the outer boundary of the retarded flow. This region close to the surface in which the flow is affected by friction and viscosity is called the Boundary Layer. In an actual airfoil the Boundary Layer may vary in thickness from a few thousandths of an inch at the nose or leading edge to several inches near the trailing or rear edge.

In laminar flow the stream lines or flow lines remain parallel and there is no trace of mixing or turbulence. In turbulent flow which is the type encountered in actual airfoils considerable mixing and eddying occurs and the velocity gradient in the boundary layer no longer resembles a parabola but is much steeper near the surface as shown by the dotted line curve. One way of defining the thickness of the boundary layer is to state that it is the distance out from the surface at which the velocity is 99% of that of the free stream and the thickness is generally designated by the symbol delta. The thickness of the laminar boundary layer is denoted by δ_l while that of the turbulent layer is denoted by δ_t. The laminar boundary layer is thicker than the turbulent layer, and that turbulent flow is most often encountered in the actual airfoil. The formation of the boundary layer is accounted for by the fact that the air has viscosity and the velocity gradient in the layer or what is the same thing the relative velocities between adjacent layers of air, produce losses due to the air viscosity. The fact that the wing in moving through the air carries with it a thin film of air which is stationary at the surface and has a horizontal velocity gradient as we pass outward through the film accounts for a number of important characteristics of the wing. Fig. 2 shows an ordinary airfoil or wing at some angle of attack with respect to the air, the angle of attack being the angle between the air direction and some arbitrarily chosen line on the airfoil in this case the bottom chord line which is straight, and the angle is denoted by the symbol alpha. The lift force on the wing is perpendicular to the wind while the drag force is parallel to the wind as shown on the slide. The characteristics of an airfoil are often shown by plotting the variation of C_l and C_d with angle

of attack. C_l and C_d are non-dimensional lift and drag coefficients, respectively, and are plotted as ordinates against the angle of attack as abcissae. For a given angle of attack C_l is much larger than C_d. The coefficient of lift increases linearly with angle of attack until fairly large angles are reached, and then as the angle of attack is increased further the curve flattens out and finally decreases and the wing is said to have burbled in this region. The coefficient of drag is small for angles of attack and increases rapidly as the angle of attack is increased.

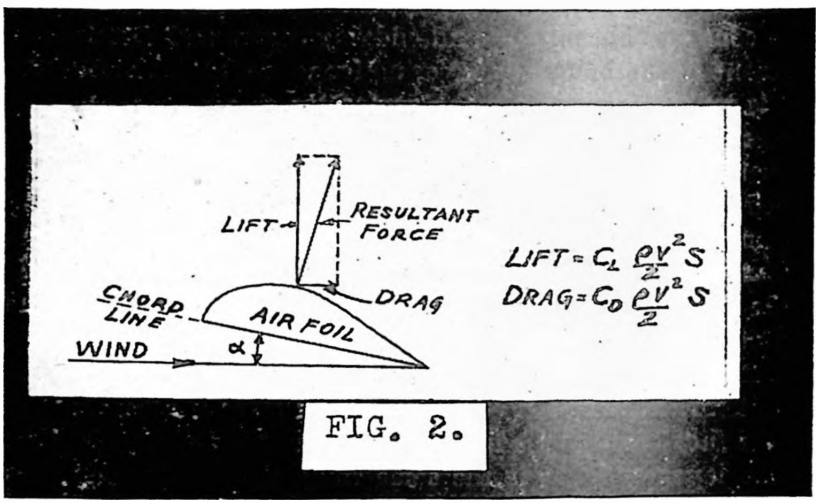


FIG. 2.

Returning our attention to the coefficient of lift curve, if the phenomena of burbling, which will be described in detail later, could be controlled, the wing could be worked at much higher angles of attack and correspondingly higher coefficients of lift could be obtained. The burble or the fall off of the lift as the angle of attack is increased can be explained by means of the boundary layer, and the idea of boundary layer control is to delay this burble so that higher coefficients of lift can be obtained. The pressures on the upper surface alone are shown as boundary layer control is concerned only with the upper surface of the wing. You will recall that the velocity of the air is greater over the upper surface than over the lower surface of a wing and that the pressure on the upper surface

of a wing is a negative pressure or a suction, and that most of the lift of the wing is due to this suction on the upper surface. Now let us consider a particle P which is close to the surface of the airfoil and within the boundary layer. As this particle moves over the upper surface its velocity increases until it is a maximum where the negative pressure or suction is the greatest which is at Point B. This is in accordance with Bernoulli's Theorem which states that the sum of the pressure and velocity heads in constant, neglecting losses. Hence at a point where the velocity is greatest it would be expected that the pressure would be least and vice versa. Note further that as the particle moves backward from the front or leading edge it is acted on by a pressure gradient which tends to increase its velocity in the rearward direction for the negative pressure or suction on the front face of the particle is greater than that on the rear face. However, after the particle has passed the point of maximum negative pressure, it is acted upon by an adverse pressure gradient which tends to oppose its rearward motion, for the suction on the rear face is now greater than that on the front face and this tends to diminish the rearward velocity. If there were no losses Bernoulli's equation would apply to the flow over the whole surface and the particle when reaching D, a trailing edge would have the same amount of energy that it had at A and the flow would leave the airfoil smoothly at the trailing edge. As the angle of attack of the airfoil is increased the pressure over the upper surface becomes more negative, the velocity over the upper surface increases considerably, the velocity gradient in the boundary layer grows larger and the losses in the boundary layer, which are due to viscosity show a corresponding increase. The particle P due to these losses may not reach the trailing edge of the airfoil, but may come to rest at some intermediate point such as C. The particle now at rest at C is acted on by an adverse pressure gradient, as pointed out previously, which tends to pull it back toward the leading edge, and the flow reverses its direction at this point, a vortex forms and the air separates from the surface of the airfoil. The phenomena just described is called the burble and accounts for the decrease

in the lift of the airfoil as the angle of attack is increased. It can be seen that the burble is due to viscosity energy losses in the boundary layer. Fig. 3 shows flow at large angle of attack when burble has occurred. This turbulence and separation of the flow from the upper surface of the wing is called the burble.

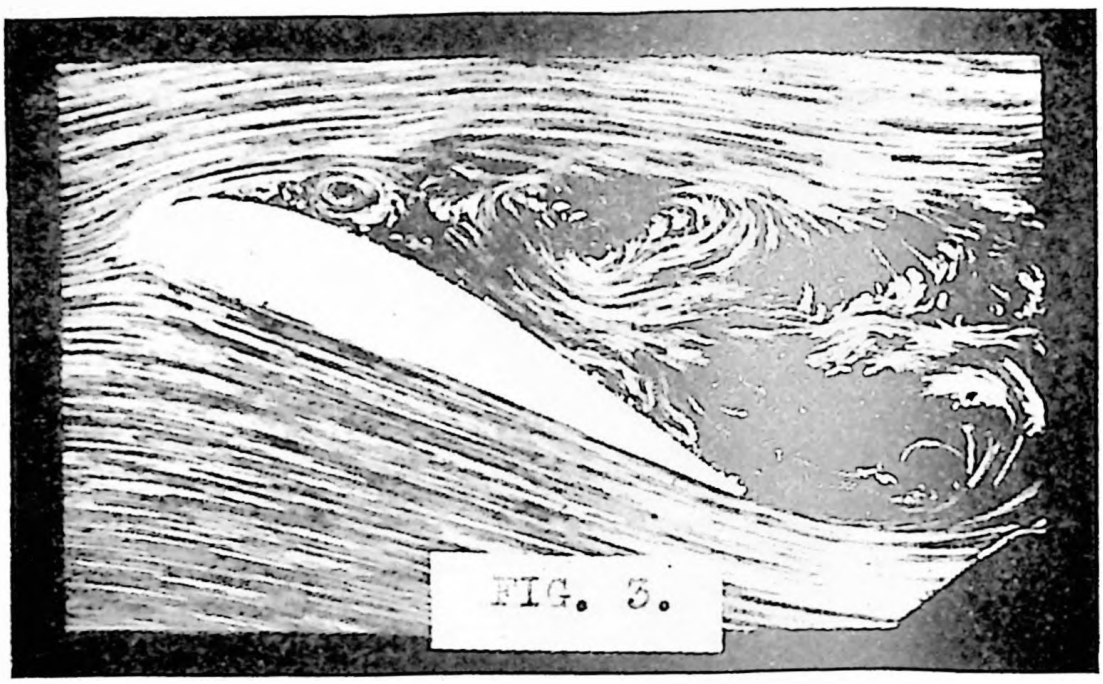


FIG. 3.

The purpose of Boundary Layer Control is to introduce energy into the boundary layer in order to delay the reversal of flow or burble and several methods for doing this will be Discussed later.

The first experiments in boundary layer control were due to Prandtl, who removed the boundary layer from a sphere by suction thru slots in the spherical surface and found that the aerodynamic characteristics were appreciably changed by this process. The procedure was first applied to airfoils by Ackeret Betz and Schrenk. The first experiments in this country were performed at the University of Michigan by Professor E. A. Stalker in 1923.

There are two ways of controlling the boundary layer; first, by blowing air into the layer through slots cut in the upper surface of the wing, and second, by sucking the slow moving air of the boundary layer into the interior of the wing

through slots also in the upper surface of the wing. These methods are represented diagrammatically in Fig. 4. In the blowing process the air is discharged parallel to the wing surface through the slot and the added energy is sufficient to maintain flow to the trailing edge, thus preventing burble until very high angles of attack are reached. In the suction process the slowly moving air is drawn into the wing through the slot and thus the reversal of flow which results in the burble is delayed.

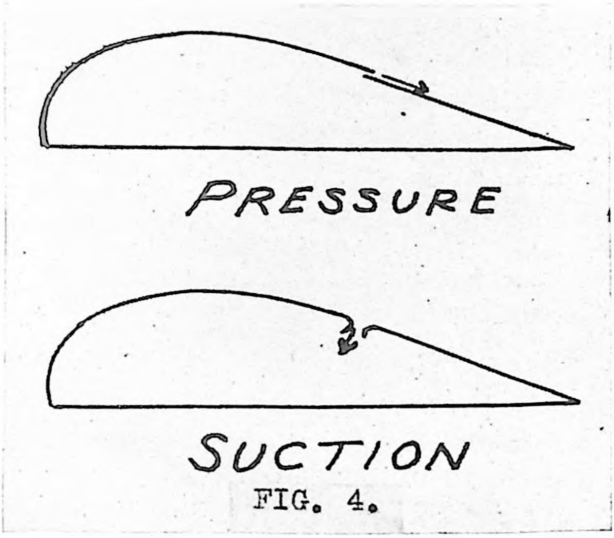


FIG. 4.

Many experiments have been performed using both methods in this country and in Europe and we will have time tonight to merely summarize a few of the results. Investigations have covered such questions as the best slot location on the upper surface of the wing, the effect of slot size, the effect of various pressures and suctions and the relative merits of the pressure and suction processes. The amount of energy required to produce the same effect is the basis of judging the merits of the two methods of boundary layer control. The first result that we note is that the amount of air required by the suction method is much less than that required by the blowing method.

To produce a lift coefficient of say 2.5 by the suction process required a power coefficient C_{qs} of 0.02 while the blowing process requires a power coefficient of 0.085 or more than four (4) times as large. It can be seen that the suction process requires considerably less power than that needed by the blowing process and most experiments have been concerned with the suction process.

The most important effect of boundary layer control, is the increase in the maximum coefficient of lift. C_L, the coefficient of lift is plotted as ordinate against angle of attack as abscissae. The maximum C_L is important because it determines the maximum weight which the wing can lift.

Note that the maximum coefficient of lift is now 2.9 and that it occurs at an angle of attack of 18 degrees. The maximum value of the lift coefficient has been increased by 97%. The suction used for this had a magnitude of 12 times the dynamic pressure corresponding to the motion of the wing through the air. These results are for a single slot located at 53.9% of the chord back from the leading edge which location was found by cut-and-try to be the best.

Other experiments using several slots have yielded lift coefficients as high as 5.5 or more than 3½ times the maximum value obtainable from an ordinary wing. Hence, it can be seen that by means of boundary layer control the lift of a wing can be increased several hundred per cent.

Let us now consider the conditions under which high coefficients of lift are desirable. High coefficients of lift are important principally at take off and at landing and, in general, boundary layer control would only be in operation under these conditions. The landing speed of an airplane is determined by the value of the lift coefficient. Taking a specific case for a small airplane, the landing speed of the plane with the ordinary wing is 47 mph while the landing sped with boundary layer control is 33.2 mph, a reduction of 30%. Slow landing speeds are very desirable from the standpoint of prevention of accidents. The take off velocity for the ordinary wing is 49.5 mph while the take off with the boundary layer control is 35 mph, a reduction of 29%. The

take off velocity is usually considered as the velocity sufficient to lift the ship off the ground when the wing is operating at an angle of attack corresponding to 0.9 of the maximum coefficient of lift.

Another interpretation of this data is that for the same wing area and the original landing speed, 47 mph, the weight of the airplane with the boundary layer control could be increased to 3400#, that is the weight could be doubled. The quantity of air to be removed from the wing surface using the suction method is 127.1 cfs and the internal wing suction pressure is 8.51 #/sq. ft. The power required to do this is 2.8 hp or only 2.8% of the total rated hp of the engine. The landing speed for the ordinary wing on a transport is 64mph. For boundary layer control it is 50 mph, a decrease of 22%. The take off speed for the ordinary wing is 68 mph while take off for the boundary layer control wing is 52 mph. The decrease in take off speed is 23%. The amount of power required in this case is about 5% of the engine rated hp. It can be seen that controlling the boundary layer with an expenditure of power equal to only a few per cent of the engine hp will produce appreciable decreases in the take off and landing speeds of airplanes. A practical difficulty which has prevented the use of this method to date can be seen by examining the figures on quantity of air to be removed. For the transport plane 1075 cfs of air at a suction pressure of 27.5 #/Sq. Ft. must be sucked off the surface of the wing.

The design of a blower to handle this much air and at the same time fit inside an airplane is no easy problem. Yet it is not unlikely that this problem will be solved by applying boundary layer control to the design of the blower itself. Another important result of boundary layer control which we will only mention in passing concerns the stability of the airplanes at low speeds. An airplane tends to exhibit lateral or spin instability at low speeds and this characteristic has accounted for many accidents which have occurred when the plane is flying at slow speeds during take-off and landing. Boundary layer control will provide additional stability under these conditions and will tend to prevent such accidents. The

problem in connection with bombers is one of getting a machine heavily loaded with fuel and explosives off the ground with a take-off run of reasonable length. The take-off run is governed to some extent by the lift coefficient and boundary layer control when applied to bombers will shorten the take off appreciably. With planes of the fighter or pursuit interceptor type the difficulty lies in the high landing speeds required by these machines and here again control of the boundary layer will reduce these speeds considerably. Finally, in the future, when interest has shifted back to commercial types of planes the application of the method of boundary layer control will permit planes to take off and land safely with far heavier loads than any that are carried at present.

LOW-PRESSURE GAS-FILLED CABLE

VINCENT A. SHEALS *

Any invention or development which insures reliability of flow of power is a direct contribution to National Defense. It is therefore a source of considerable satisfaction to me that I have had some part in the development of such a device and that you have given me an opportunity to tell you the story of how it came about.

This is the story of a new development in the field of transmission and distribution of electrical power—the story of low-pressure gas-filled cable.

Every new development arises from a need for it. In order to show you why this gas-filled cable was developed, I must digress a bit into some of the history of high voltage power cables. Let us define high voltage as any voltage higher than 7500 volts.

Impregnated paper is the universally used insulation for practically all high voltage cables. Different systems vary only in the technique of manufacture, the character of the impregnating compound and the method of installation and operation.

There are only two high voltage cable systems that can be classified as "standard"; these are the usual or "solid type" cable and the "oil filled" cable.

SOLID TYPE CABLE

This solid type cable consists essentially of a conductor, paper insulation, impregnated with a viscous oil, and a lead sheath covering.

About twenty years ago, the necessity for higher operating voltages, greater reliability and reduced costs resulted in major improvements in quality of insulation and a corresponding reduction in insulation thickness which resulted in a more economic and reliable cable system. The voltage range was extended gradually from 26 KV to 66 KV.

---

* Asst. Designing Engineer, General Electric Cable Engineering Dept., Schenectady, N. Y. Read before the Society Monday, Oct. 20, 1941.

Present average working stresses run from 42 to 58 volts per mil thickness of insulation. It is the opinion of many cable engineers that present day insulation thicknesses can be reduced by a small percentage and still obtain a satisfactory service record, but "solid type" cable has now about reached its ultimate development.

Modern solid type cables are so thoroughly impregnated, in order to obtain insulation quality, that the physical problem has been increased. In fact, the limitations of solid type cable are inherently physical. They are:

First—We have no positive method of controlling the large pressure variations caused by expansion of the impregnating compound during load cycles. The lead sheath is subjected to very high internal pressures which cause permanent stretching, frequently resulting in splits and other sources of leakage.

Second—Once a solid type cable is loaded to its maximum temperature, it operates frequently under a negative pressure at lower temperatures. If any leaks exist air or moisture are drawn in and sooner or later failure occurs.

Third—Migration of the impregnating compound and stretching of the lead sheath cause the formation of voids in the insulation. These voids are ionized at relatively low voltage stresses during periods of negative pressure. Constant ionization leads to serious deterioration and in many cases electrical failure.

I do not want to convey the impression that all of the thousands of miles of "solid type" cable on your systems will not continue to give you good service.

If a leak develops in the sheath or in joints or terminals, in solid type cable, there is no way of knowing it until it results in a service failure.

OIL FILLED CABLE

The excellent service record of oil filled cable over the past 14 years is too well known to need discussion here.

Oil filled cable, too, consists of a conductor, impregnated paper insulation and a lead sheath covering. It differs from the solid type in that it is impregated with a more fluid mineral oil, has longitudinal oil channels and in service has oil reser-

voirs attached which allow expansion and contraction of the oil over the complete temperature range without developing excessively high pressures or negative pressures. A minimum oil pressure of one or two lbs. per sq. in. is maintained under all conditions so that no voids and therefore no ionization can exist.

The oil pressure depends on the contour of the cable line. A single lead sheath is used up to 15 lbs. and a simple reinforced sheath between 15 and 30 lbs. per square inch.

The average working voltage stress used in oil filled cable runs from 80 to 143 volts per mil of insulation thickness, considerably more than double that for solid type cable.

So far as 60 cycle working stresses are concerned these stresses could be materially increased with corresponding reduction in insulation thickness.

However, the impulse strength of the insulation is the limiting feature and unless means are developed to better protect the cable from lightning and switching surges, we do not believe it wise to make further reductions in insulation thickness on oil filled cable.

The oil-filled system is so arranged that in case of leakage of oil an automatic alarm is given. Service can be maintained by replenishing the supply of oil until such time as it is convenient to make repairs.

From a technical standpoint oil filled cable is correct in principal, and being a low pressure system is relatively easy to install and maintain.

However, in the lower voltage range, its use cannot be justified except under unusual conditions because of its higher cost.

The relative installed cost of "solid type" cable and "oil filled" cable shows that 40 KV is the dividing line below which "solid type" has the advantage in cost. Of course, special conditions, such as the use of existing small diameter ducts, the need for greater reliability of service, etc. frequently make oil filled cable cheaper than solid type at voltages considerably lower than 40 KV. This is evidenced by large quantities being used at 27 and 33 KV.

DEVELOPMENT OF LOW PRESSURE GAS FILLED CABLE

The success of oil-filled cable proved conclusively the value of maintaining a cable under a positive pressure during shipment, installation and service. Accordingly, we felt that pressure maintenance should be our foremost design criterion for a new system.

In order to make a cheap and simple system we came to the conclusion that the use of gas as a pressure medium offered the best possibility. It appeared to be simple to establish and maintain. Problems of hydrostatic head pressures, due to steep profiles, would be eliminated. The accessory designs should be simple especially if relatively low pressures could be used.

Of course, the gas must be inert to prevent oxidation or other chemical deterioration and it must be pure and free from moisture.

Gas pressure must be transmitted to all portions of the insulation and maintained during changes in temperatures with a minimum of time lag. In order to do this we decided that the most promising method was to have the gas completely permeate the insulation and that longitudinal gas channels along the cable would be necessary.

Our first step was to build cable samples in which the excess oil was drained from the cable, after first thoroughly impregnating it, and displaced with gas.

Studies were made to determine the voltage at which ionization starts in the butt spaces between the paper tapes at various gas pressures. When these spaces are under vacuum, as they are frequently, in a "solid type" cable, ionization starts at a relatively low voltage stress, in fact, at stresses at which this type of cable is now operated (50 volts per mil).

If ionization were to be completely suppressed at stresses at which oil filled cable is commonly operated (140 volts per mil) we would have to use pressures of more than 150 lb. per sq. in. This would seriously complicate installation, operation and maintenance besides increasing the cost to the point of making the system entirely too expensive.

Therefore, why not see what could be done with a pressure which an ordinary lead sheath would withstand. This is about 15 lb. but since temperature changes also bring changes in pressure 15 lb. must be the maximum so we decided on a pressure range of 10 lb. minimum to 15 lb. maximum.

From curves, we find that using 10 lb. pressure we would get no ionization at voltage stresses just below 70 volts per mil. This would be a material gain over solid type cable.

Accordingly, we made up cable samples as follows: The cable was carefully vacuum dried and thoroughly impregnated with a viscous mineral oil but while still hot the oil was drained off and replaced with an atmosphere of pure, dry, inert gas. When cold the cable was placed in an atmosphere of the same gas directly behind the lead press and the lead sheath applied without exposure of air.

Our test procedure consisted of setting up a 60 ft. length of cable in the form of an inverted U, the terminals being inverted also, so that oil from them would not run into the cable and so that the cable itself would be free to bleed any excess oil down into the terminals.

A gas pressure of 10 lb. per sq. in. was maintained and low voltage insulating transformers used to circulate current through the conductors, while high voltage stress was superimposed on the cable.

We started with a voltage stress of 80 or 85 volts per mil, well above the 70 V. mil which would start ionization and imposed three load cycles per day, from room temperature to 80° Centigrade on the cable.

We found that the cable rose in power factor at the start of each voltage step as did the ionization but stabilized at 80 volts per mil and also at 100 volts per mil.

Later tests show even better results.

During the past seven years we have made tests on 15 different samples and now have two samples on test and more proposed. In the course of our tests we have investigated five different impregnating compounds, several different constructions and three different gases.

Out of all these tests we have come to the following conclusions:

First—The paper tapes must be tightly and uniformly applied to form a dense compact insulation in order to keep the gas spaces as small as possible.

Second—A sticky, viscous straight mineral oil made from a naphthenic base crude oil and having the viscosity of a heavy cylinder oil is the best impregnating compound.

Third—Of all gases available, we have found nitrogen to give the best results. The nitrogen must be free from moisture and have a negligible oxygen content.

You may well wonder why, on our tests, we got considerable ionization at each voltage step and then it disappeared. It is interesting to analyze briefly what happens.

Between the edges of the butt wrapped papers we have a rectangular space about 6 mils thick by 20 to 30 mils wide. The walls are covered by a film of viscous oil and the remaining space is filled with gas under 10 lb. pressure. Ionization starts and changes the oil into a heavy wax, which is an excellent insulating material. This building up of wax reduces the thickness of the void to a point where the gas is no longer ionized and the cable becomes stable electrically.

Actually in operation, we do not operate the cable at stresses where ionization exists. Our present cables operate at about 65 volts per mil. Cables operated for a period of over a year at this stress show no signs of ionization.

One might question whether the impulse voltage strength and the heat conductivity would be affected in a drained cable. We have made tests which show that gas filled cable does have somewhat lower impulse strength and heat conductivity than new solid type cable. However, a solid type cable after a period of service loses some of its initial characteristics while the gas filled cable does not change. Therefore, we feel that the impulse strength is adequate. We also rate the cable so far as ampere loading is concerned the same as oil filled cable because as pointed out previously maximum loading does not impose excessive pressure strains on the lead sheath.

INSTALLATION AND OPERATION

In the factory a pulling bolt having a sealed opening is applied to one end and a short length of lead pipe terminating in a tire valve on the other. The cable is shipped under 8 to 10 lb. gas pressure. Upon receipt in the field the presence of this pressure insures that no leakage has taken place.

In splicing, a high pressure cylinder of nitrogen gas is connected through reducing valves to the opposite ends of each of the two cable sections to be spliced. A slow flow of gas is maintained during splicing to prevent entrance of air or moisture.

SPLICES

The splice is made like any splice in a solid type H cable. Loss of gas is limited by plugging the gas channels with pieces of sponge rubber held in place by simple clamps. These clamps and plugs are removed just before the casing is put in place.

One end of a copper tube is terminated at the top of the splice. The other end is brought out through the wipe and connected back to the casing through a fitting that can easily be disconnected. The joint casing is filled with gas.

TERMINALS

The terminal has a semi-stop, made of compressed cork, in the base, the copper tube being terminated below the cork seal. The body of the terminal above the cork seal is filled with high melting point petrolatum. The cork seal will allow seepage of gas through it, thus maintaining the whole terminal under pressure but preventing the petrolatum from leaking past it into the cable.

We have recently developed and have just installed terminals completely filled with gas and with no cork seal.

RELAY

A simple and reliable pressure relay is attached to one or both ends of the line which gives an alarm if the pressure drops below 10 lb. or goes above 15 lb.

Stand by high pressure cylinders of gas are connected to one or both ends of the cable line to supply gas in cases of leakage after the alarm indicates a leak.

THE COPPER TUBE

Since it is difficult as well as undesirable to bleed the cable too thoroughly in the factory, there is bound to be some bleeding of oil out of the insulation after it is installed. This oil will naturally collect in the low spots and if a leak occurred at a point remote from the relay there could be enough of these pockets or slugs of oil to prevent the pressure from dropping to a low enough value at the relay to operate it and the cable would eventually fail due to ionization or entrance of air or moisture.

The copper tube is a pressure equalizer which insures that the whole cable line is maintained at a uniform pressure by feeding gas both ways from each joint during filling of the cable.

When and if a leak occurs the tube keeps open a clear gas passage from one end of the cable line to the other, thus insuring prompt relay action.

The oil slugs are a convenient means of locating leaks. In case of a leak pressure differences establish themselves across these slugs so that pressure measurements at various joints by disconnecting the copper tube at these joints allow quick and accurate determination of the point of leakage. This has been demonstrated twice in actual service, both leaks being in joint wipes which were easily found and repaired.

OPERATING RECORD AND INSTALLATIONS

The first gas filled cable lines were installed on the systems of the Yonkers Electric Light & Power Co. of Yonkers, N. Y., and the Consolidated Edison Co. of N. Y. City. These were both rated 15 KV and were three conductor 800,000 CM with 150 mils insulation. Installation was made in 1938.

Since that time the Consolidated Edison Co. has installed large quantities of this cable at both 15 KV and 27 KV.

A year ago the Hartford Electric Light Co. at Hartford, Conn. installed a 16,000 ft. feeder operating at 27 KV to supply power to various defense industries.

A total of over 140,000 ft. of this cable is now installed and in operation. There have been no failures and only a few leaks have been experienced.

A small amount of single conductor gas filled cable is also in use.

One interesting installation in New York City consists of two 27 KV feeders through a tunnel from the Bronx to Astoria in the Borough of Queens. The vertical shafts of this tunnel are 250 ft. deep. Ordinary solid type cables could not be operated under such conditions without migration of compound which would build up extremely high pressures and burst the lead sheath.

One day last year the pressure relay gave an alarm on one of the N. Y. City installations. The repair crew set out to find the point of leakage. As they were patrolling the line they saw an excavation over the duct line. Taking a chance on looking for trouble there, they found that the contractor had damaged the lead sheath. The sheath was repaired without removal of the cable from service. In the case of an ordinary type solid cable, nothing would have been known of this damage and a failure would have been caused sooner or later. No doubt, the failure report would have read "cause unknown." The contractor on this job is still amazed at how the power company men found the damage he had done within an hour of the time when he had done it.

In my opinion the logical field of application for low pressure gas filled cable is for important tie lines and feeders at voltages from 10 to 40 KV. In these days it is fast becoming necessary to load cables to the limit. Gas filled cable will stand maximum loads without deterioration which would be caused in solid type cables.

Gas filled cable can be used much more safely where only one feeder can be installed and reliability of service is essential, as it is in many cases, particularly for defense loads. Of course, a direct hit by a bomb or a steam shovel digging into a duct bank could cause a failure without warning, but any other type of attempted sabotage or any leaks would be detected.

To what extent it will replace solid type cable, I will not venture to predict, but I do feel that it will be used very widely when its advantages are fully realized.

MINUTES OF THE MEETINGS AND BUSINESS OF THE SOCIETY

Minutes of the Meeting of the Board—September 9, 1941

The meeting was called to order by President Stewart with the following present: Fromherz, Kammer, Kohnke and Mayer.

The minutes of the last meeting were read and approved.

A report submitted by Chairman Bassich of the Employment Committee was read.

A letter of appreciation from Robert N. Reed, recipient of the Junior Membership Award for Louisiana State University, was read.

It was announced that Charles D. Evans had given the Society a set of transactions of the American Society of Civil Engineers covering the years 1925 to 1941. The Board requested that a letter of thanks be sent Mr. Evans.

President Stewart summarized the activities of the General Committee for the 1942 Annual Meeting.

After some discussion of conditions tending to affect the status and salary scale of the professional engineer it was decided to invite several members of the Society to the next meeting of the Board in order to further discuss this subject and to prepare a course for Society action.

The names of the following applicants for membership were ordered placed on a letter ballot:

For Member: John F. Cassidy, Thomas Collins Earl, Malcolm Boord Helm, Charles Lee Sens and Frank M. Stevenson.

For Junior Member: Joseph Pominski.

Transfer from Student to Junior Members: R. W. Adamson, H. J. Bultman, Jr., John Culbertson, J. T. Dwyer, Jr., M. J. deLerno, L. D. Fadrique, S. C. Murphy, E. J. Ory, J. A. Polack, G. H. Thompson, W. A. Wood, Jr., and R. A. Herrod.

The Board decided to request Chairman Bell of the Entertainment and Outings Committee to make plans for a fall outing of the Society.

There being no further business the meeting adjourned.

J. K. Mayer, Secretary-Treasurer.

Minutes of the Meeting of the Society—September 15, 1941

The meeting was called to order by President Stewart with approximately 110 members and guests present.

Mr. Wood Brown gave a five minute talk urging the engineers to contribute to the coming Community Chest drive.

The minutes of the last meeting were read and accepted.

A report of the Employment Committee was read. President Stewart mentioned several positions now open to engineers.

Chairman B. H. Bell of the Entertainment and Outing Committee reported on plans for a Fall Outing of the Society at Camp Salmen on Sunday, October 26th.

After reading a letter from Chairman Rainville of the Technical Papers Committee regarding the October meeting, it was voted to move the meeting date from the 13th to the 20th, if necessary, in order to facilitate the arrangement of a joint program by the Society and the New Orleans Chapter of the American Institute of Electrical Engineers.

The speaker of the evening, Mr. Carroll J. Peirce, Jr., Teaching Fellow in Engineering Mechanics, University of Michigan, was introduced and presented a very interesting illustrated paper on "Some Important Factors in Modern Airplane Design." Mr. Peirce answered a number of questions at the conclusion of his paper.

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

J. K. MAYER, Secretary-Treasurer.

Minutes of the Meeting of the Board—October 13, 1941

The meeting was called to order by President Stewart with the following Board members present: Kammer, Kerr, Kohnke, Rhodes and Mayer. Messrs. A. T. McNiven, C. W. Rieker, J. M. Robert and C. S. Williamson were present by invitation.

President Stewart outlined recent developments affecting the status and salary scale of the professional engineer and asked for discussion on the subject.

The consensus of opinion of those present was that unification of all engineering societies would be the most important step in advancing the general status of the engineering profession. It was therefore decided to write the Engineering Council for Professional Development and all local sections of the national engineering societies enquiring as to their stand on this subject and suggesting that such a movement be started if not already in progress.

The invited members were then excused with thanks for their attendance by President Stewart and the regular business meeting of the Board proceeded.

The minutes of the last meeting were read and approved.

Mr. Kerr reported the plans for the Alumni Meeting were progressing nicely and that the technical papers would soon be lined up. Speakers for the keynote address and the Friday evening meeting were discussed.

A Nominating Committee composed of W. H. Rhodes, Chairman, F. G. Frost and J. M. Robert was selected by the Board and appointed by the President.

A letter of resignation from M. G. Zervigon was held for consideration.

There being no further business the meeting adjourned.

J. K. MAYER, Secretary-Treasurer.

Minutes of the Meeting of the Society—October 20, 1941

The meeting was called to order by President Stewart with approximately 120 in attendance.

The minutes of the last meeting were read and approved.

Invitations for the members of the Society to attend the following were read: Annual Meeting of the Mid-South Section, American Society of Civil Engineers, at Vicksburg, Mississippi; New Orleans Harbor inspection trip aboard the Dock Board boat, Hugh McCloskey; Electrical Association of New Orleans exhibit of flourescent lighting. Several engineering positions open in Panama were announced. Names of members joining the Society since July 1st were read. President Stewart welcomed the new members and commented on the above letters.

President Stewart then turned the meeting over to Chairman B. P. Babin of the New Orleans Section, American Institute of Electrical Engineers, who presided over a brief business meeting of the Section.

Mr. Stone Leake introduced the speaker of the evening, Mr. Vincent A. Sheals, Assistant Designing Engineer, General Electric Cable Engineering Department, Schenectady, N. Y. Mr. Sheals presented a very interesting illustrated paper on "A New Gas-Filled Paper Power Cable" and later answered several questions on the subject.

Chairman Babin introduced a number of guests present and then turned the meeting back to President Stewart.

The meeting adjourned with thanks to the speaker.

J. K. MAYER, Secretary-Treasurer.

PROCEEDINGS
OF THE
LOUISIANA ENGINEERING SOCIETY

DECEMBER, 1941

"PATRONIZE OUR ADVERTISERS"

INDEX TO ADVERTISEMENTS

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.

LASEC NEWS

SECTION OFFICERS

President,
J. A. McNIVEN
1st Vice-President,
F. N. BILLINGSLEY
2nd Vice-President,
V. J. BEDELL
Secretary-Treasurer,
D. W. GODAT
314 Terminal Station Bldg.

NEW ORLEANS, LA.

PUBLICITY COMMITTEE

J. M. LeDOUX, Chm.
CHARLES M. KERR
GEORGE JANVIER, JR.
JACOB T. BULLEN

LASEC NEWS
5700 Garfield St.

Vol. III, No. 6 | Published Bi-Monthly | December, 1941

AS WE SEE IT

It is generally known that attempts are being made in Louisiana and elsewhere, to enlist the participation of sub-professional engineering personnel in a coalition of the sort which is common to the trades. Whether much success has been achieved in this activity can be only a matter of conjecture, little enthusiasm having been evident on the surface up to the present.

As is to be expected, no member of the Louisiana Section has lent himself to the furtherance of the purposes of this organization. Indeed, with one or possibly two exceptions, no engineering graduates of any reputable university have become identified in any way with tthe movement.

It would be an exaggeration to say that this new element constitutes a challenge or a threat to the integrity of the profession, as engineers are, and have long proven themselves to be, each one individually, capable of looking after their own affairs without extraneous advice or direction and would promptly and vigorously reject any approach along the lines mentioned. Wise counsel would indicate, however, that it would be imprudent not to closely observe the development of this situation and carefully formulate plans for the protection of the interests of the profession in any eventualities which may arise.

The ruins of the stately structures of antiquity and the engineering marvels of today attest to the honored position of the engineering profession. This position it is our duty to maintain.

SPRING MEETING *1942* NEW ORLEANS

NEWS ITEMS

The Louisiana Section has been advised by the Society that certificates of Life Membership will be presented to Colonel William Benjamin Gregory and Commodore Ernest Lee Jahncke. The presentation of these certificates will be made at the Annual Meeting in January.

The Board of Direction entertained Mr. James E. Jagger, National Field Secretary, at dinner at Galatoire's in New Orleans on October 29th.

The Dock Board, of New Orleans, through its General Manager, Colonel Marcel Garsaud, has invited the Section to be its guest aboard the Yacht McCloskey for an inspection trip of the Port. This trip not only takes in the river terminals, but also those along the Industrial Canal.

The Secretary has been instructed to draft a suitable resolution recommending to the Commission Council of the City of New Orleans, the adoption of the Pacific Coast Building Code, with the modifications recommended by the Joint Committee of the Engineering Societies in Louisiana. A copy of this resolution is to be presented to the Commissioner of Public Property.

The Board of Direction of the Section has announced the appointment of Alvin E. Fromherz to be General Chairman of the Convention Committee of the 1942 Spring Meeting of the Society. An announcement covering general details of arrangements for the convention in New Orlans is expected to be made by Chairman Fromherz in the near future.

A meeting of the Section held in New Orleans upon October 29th was addressed by Mr. James E. Jagger, National Field Secretary. Numerous topics of vital current interest to the Society were discussed in open Forum Session.

Mr. Jagger emphasized the need for greater activity in the field of civilian protection in wartime, and also stressed the desirability of close cooperation between National Headquarters and Local Sections in the solution of problems now confronting the profession.

Mr. Jaggers trip to the Louisiana Section proved a beneficial stimulus to the general activities of the section, and brought about a more thorough understanding of the needs of the profession under present conditions.

The joint meeting of the Louisiana Section of the American Society of Civil Engineers and the Louisiana Engineering Society was held on Monday, November 17th, 1941 in the Hunt Room of the St. Charles Hotel at New Orleans. The Louisiana Section of the Society of Military Engineers attended as guests.

A large attendance received with interest an address by Lieut. Col. Clark J. Kittrell, District Engineer of the New Orleans District, United States Engineers Office. Col. Kittrell's paper, "Flood Control Works in the Atchafalaya Basin", was supplemented by details, maps and diagrams. The general discussion from the floor which followed the address, accentuated the many interesting facts developed by the speaker. A rising vote of thanks was accorded Col. Kittlrel in appreciation of his splendid presentation of the subject which is of such vital concern to this section of the country.

The presentation of the technical paper was preceded by a business session of the section, and followed by the usual collation.

The Annual New Orleans Meeting of the Louisiana Section of the American Society of Civil Engineers will be the occasion for the election of officers for the coming year.

This meeting, traditionally a gala occasion, will be held at the residence of Ole K. Olsen, in New Orleans. A splendid program is being arranged by the committee in charge.

Allen J. Negrotto, Louisiana State Director, Public Work Reserve, will be the speaker of the evening. His subject will cover the aims, objectives and operations of the Public Works Reserve. The activities of this Agency are of special interest, in as much as they open to both the salaried and Consulting Engineer a field of orderly and systematic long range planning and programing of Public Improvements.

PERSONALS

JOHN H. O'NEILL, Chief Division Public Health Engineering, has been elected President of the National Malaria Society, and Trustee for Louisiana of the Southwest Water Work Association.

B. M. SOUDER, of the Louisiana State Health Department, has requested that he be placed upon the mailing list of the Louisiana Section. Yes Sir! It is a pleasure.

Now with Geo. J. Glover Company, ALEX BEREA, Jr. is busily engaged in the activities now under way at the United States Naval Station, New Orleans.

And — CAPTAIN BERNARD DORNBLATT is now assigned to the Mobile, Alabama office of the United States Engineers.

Circulating prominently at the American Water Works Association Convention, debonaire CLIF STEM showed his usual good form.

Again the fine showing of the Tulane Student Chapter, under the direction of PROFESSOR DONALD D E R I C K S O N, has earned the commendation of the Louisiana Section.

MAJOR ALLEN HACKETT, of the 23rd Engineers—World War No. 1—attended a re-union of his old Regiment at Camp Polk, and celebrated the occasion by experiencing his first tank ride.

Having just entered the Service, 2nd LIEUTENANT G. A. HEFT has been assigned to duty as an engineer officer with the 3rd Air District, and is stationed at McDill Field, Tampa, Florida.

STUDENT ACTIVITIES

TULANE UNIVERSITY

The Tulane Student Chapter has, for the seventh consecutive year, been awarded a letter of commendation by the President of the Society for the year 1940-41.

The Tulane Chapter enjoys the distinction of being the only Chapter in the Society to be so recognized every year since the inauguration of this award.

On October 28th, Mr. S. A. Jagger, National Field Society delivered a very interesting address before the Chapter.

LOUISIANA STATE UNIVERSITY

The Student Chapter has completed its organization activities for the coming year, and has outlined an interesting program of meetings and inspection trips.

On Friday, November 28th, the Chapter accompanied by Professor B. W. Peques, visited the plant of the Louisiana Shipyards on the Industrial Canal at New Orleans, and later, as guests of the Dock Board, inspected the Port Facilities—aboard the Yacht McCloskey.

DID YOU KNOW THAT—

Earliest maps and plans for engineering work, yet found by man, were made by the Egyptians. One of the most interesting and oldest of these, is a plan on a clay slab dating back almost 5000 years. The engineer, perhaps pressed for drawing materials, used both sides of the slab.

MEMBERSHIP CHANGES

ADDITIONS TO MEMBERSHIP

Associate:

CHARLES CLIFTON BARNARD, New Orleans, La.

Junior:

JOHN JUNIOR LIEB, Camp Claiborne, La.

GEORGE STAEHLE SCHRENK, New Orleans, La.

MEMBERSHIP TRANSFERS

From Associate to Member:

CLIFFORD HOEY STEM, New Orleans, La.

From Junior to Associate:

EDWIN EMMONS GIBSON, New Orleans, La.