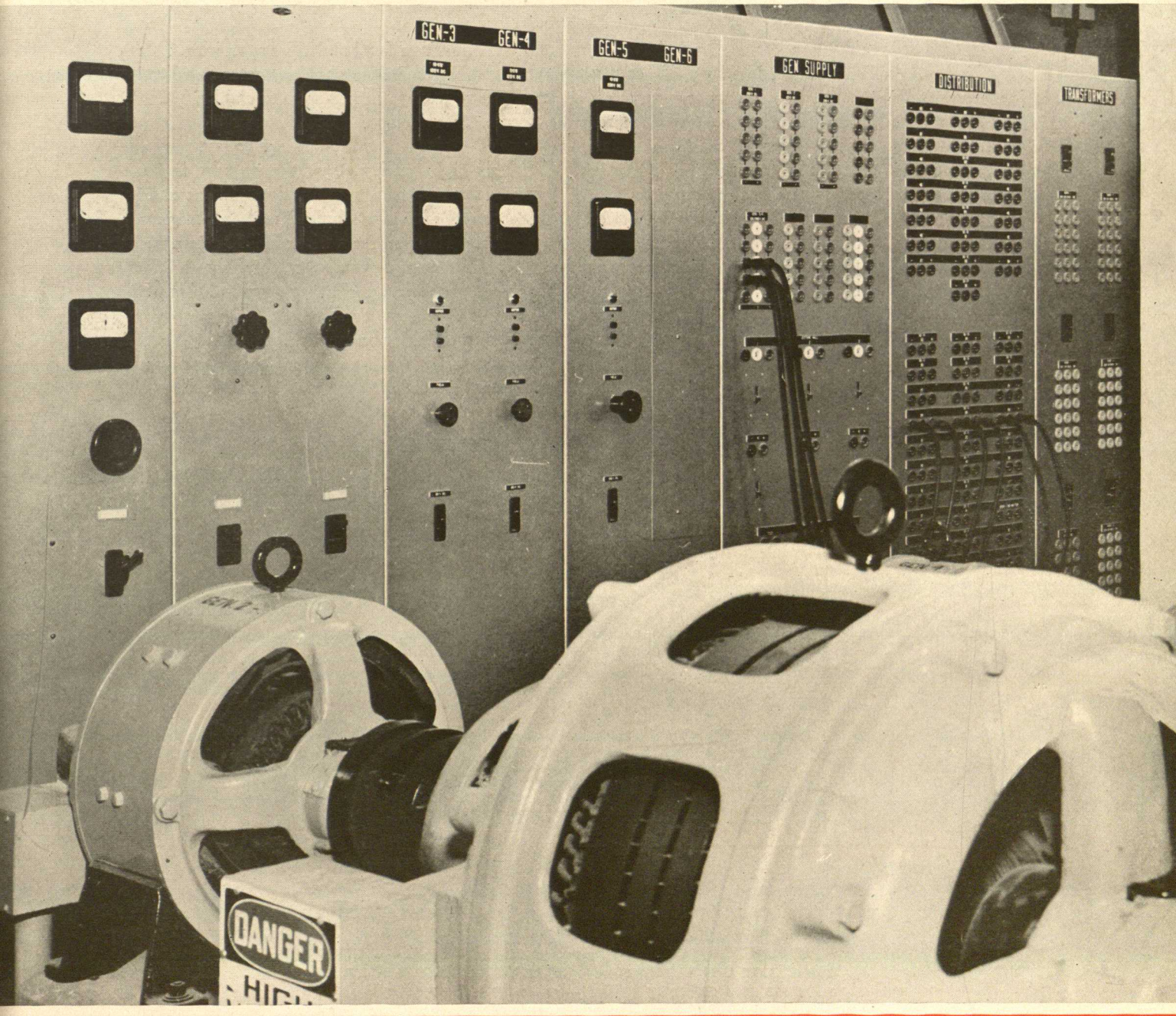
Spartan ENGINEER



SCHOOL OF ENGINEERING

MICHIGAN STATE COLLEGE

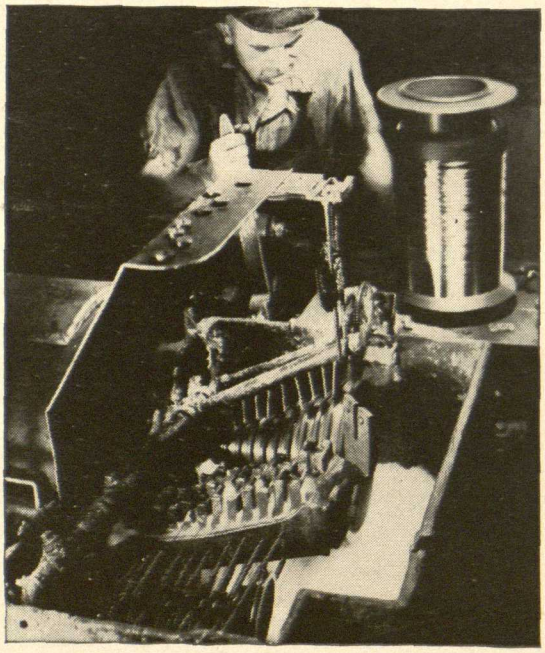
Nov. 1948

Vol. 2 No. 1

SUPER TENSILE MUSIC WIRE PLATED WITH PURE GOLD...

developed by American Steel and Wire Company

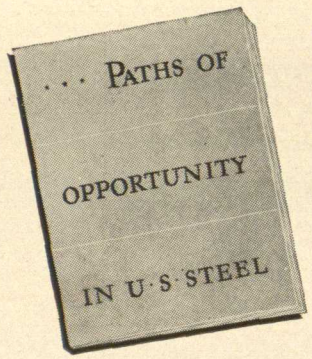
Tenor banjo and tenor guitar players have long been plagued by unsatisfactory "A" or first strings. This string, when properly tuned, is under such high strain that most wires barely reach pitch. At the request of the Mapes Piano String Company, the Metallurgical Department of the Worcester Works of the American Steel and Wire Company, a subsidiary of United States Steel, created, after months of research, a wire specifically for this purpose. This new wire is made so strong that it possesses more than twice the tensile strength, in pounds per square inch, of cross sectional area, of the steel wire which American Steel and Wire spun into cables to suspend the 8¼ mile bridge across San Francisco Bay from San Francisco to Oakland, California. This makes the new string the strongest wire of its size of any kind known today.



This high quality super tensile wire is produced by a special combination of heat treatments and exceptionally long and exacting cold working. The result is a wire of 0.010 gauge with a tensile strength of approximately 460,000 pounds per square inch. One pound of this wire extends 3749 feet, or sufficient footage to pass from nut to bridge on approximately 1500 banjos or guitars. This unusual wire is then plated with pure gold in order to prevent rust and to impart beautiful appearance.

Opportunities

This wire development is typical of the work being done in United States Steel Laboratories. But such research is only one kind of development to be found within the United States Steel industrial family. United States Steel and the steel industry are famous for development of men.



Have you seen our book "Paths of Opportunity in U·S Steel?" Ask your Placement Officer about it.

AMERICAN BRIDGE COMPANY · AMERICAN STEEL & WIRE COMPANY · CARNEGIE-ILLINOIS STEEL CORPORATION · COLUMBIA STEEL COMPANY
H. C. FRICK COKE AND ASSOCIATED COMPANIES · GENEVA STEEL COMPANY · GERRARD STEEL STRAPPING COMPANY
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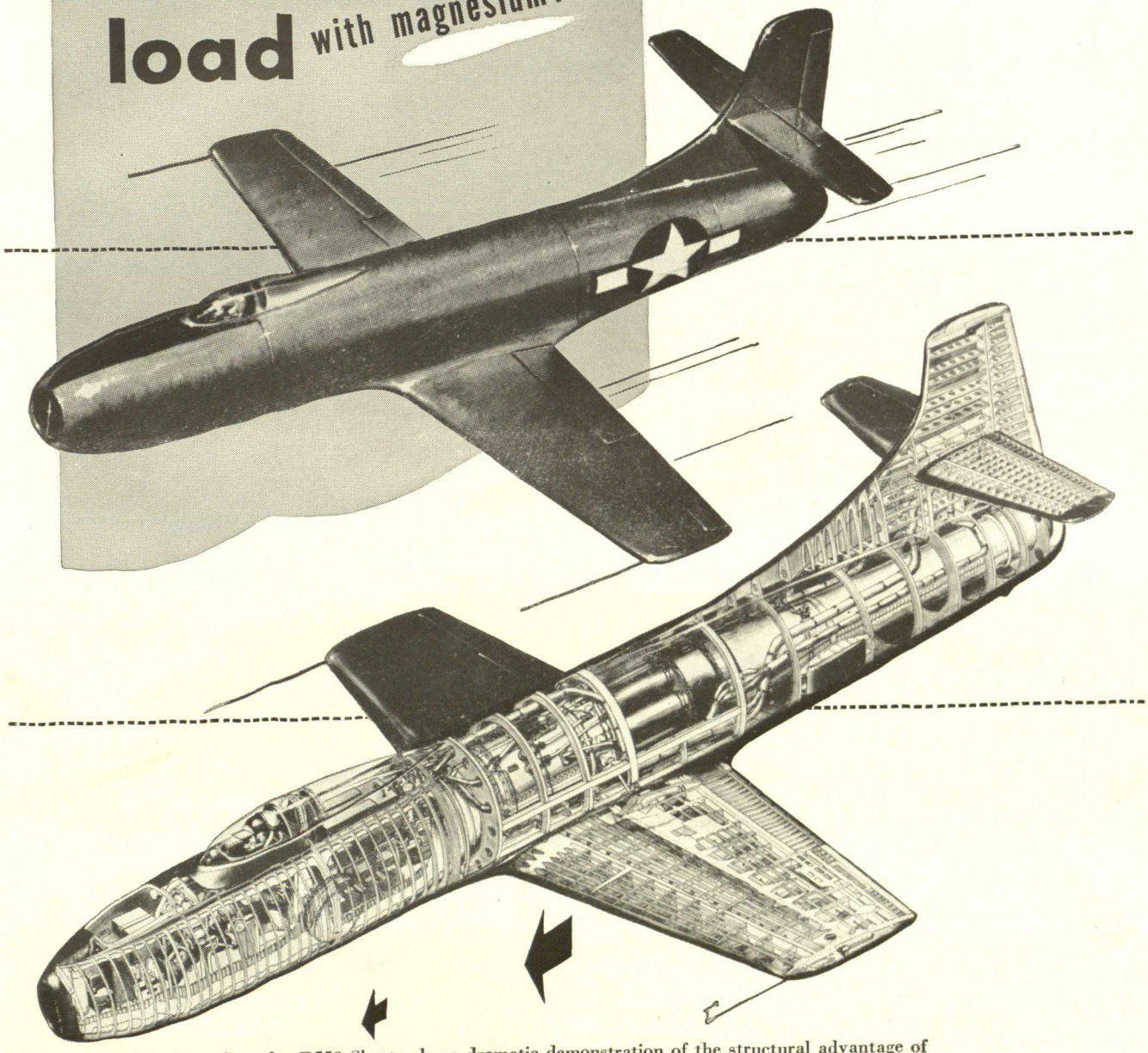
USS

UNITED STATES STEEL

less "dead" load with magnesium... lightest of all structural metals



Here you see the Navy-Douglas D558 Skystreak—a dramatic demonstration of the structural advantage of magnesium. Strong magnesium alloy sheet is literally "wrapped" around the Skystreak's powerful jet engine to form the entire fuselage skin aft of the pilot seat. This makes possible a monocoque structure which completely eliminates the usual stringers, except for frames carrying concentrated loads.

However, this is only one use of magnesium. It is also used for binoculars, typewriters, pruning shears—in fact, wherever flexible design properties as well as lightness and strength are desired, magnesium should be considered.

Dow produces, in addition to magnesium and plastics, more than five hundred essential chemicals from plants strategically located in Michigan, Texas and California. Among these are pharmaceutical chemicals such as chloroform, iodine and aspirin; also insecticides like Dowklor and DDT, which aid greatly in increased agricultural production. Dowtherm, the liquid heat transfer medium for use in processing plants, is another of Dow's products, as is Methocel, which is used in many industries as a binder, thickener, and dispersing and emulsifying agent.

This, in brief, is some indication of how Dow serves agriculture, as well as industry and the public welfare in general; helping to maintain and raise still higher, the American standard of living.

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DOW

CHEMICALS INDISPENSABLE
TO INDUSTRY AND AGRICULTURE

Spartan ENGINEER

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The Cover This Issue: Photograph of main power and distribution switchboard in the new Electrical Engineering Building—Story on page 10.

Frontispiece: Antenna used for receiving information from a light-weight device which transmits 28 items of information each 1/35th of a second from 3800-mile-an-hour-rockets.
—Courtesy of General Electric

The Spartan Engineer is published by the students of the School of Engineering, Michigan State College. Editorial and Business offices, Room 512, Electrical Engineering Building, P. O. Box 468, East Lansing, Michigan. Price per issue, 25 cents.

EDITORIAL...

OUR AIM

Growing Pains are a part of any new organization and we don't claim any exception. It will take time and work on our part and honest criticism, by which we may index your acceptance, before this publication is firmly established.

The "*Spartan Engineer*" is primarily a service organization and as a service organization we have a twofold purpose—to disseminate engineering facts and act as an organ of communication and persuasion through which the student engineer may become better acquainted with the duties to his profession and to himself.

Textbooks, professors and staff members are for instruction. Our first purpose then is not primarily instruction but rather to present straightforward semi-technical material written by students which will be of general engineering interest.

Our second aim is to help overcome the engineering student's apathy towards anything that hints of extra-curricular activity. Even though there are over 2500 engineering students enrolled at State, our participation in constructive outside activities and especially in our own organizations is not what is should be. We need, and should have, powerful student organizations through which we can first break away from the theoretical and learn to cope with the more practical and professional problems that we will someday face. Our Engineering Council, Professional Societies, and student publications are just a few of the organizations that offer you this important supplementary training.

C.F.A.

"WAS LAME IN BOTH HIS FEET"

DEAN L. H. MILLER

Dean Miller

Ancient history has recorded for us the story of the life of a young man born 3000 years ago who might, but for the chance of time, have been today an Engineering student at Michigan State College.

The father and grandfather were prominent and well-known citizens of the community in which the family lived. They were prominent in the business life of the community, took an active part in politics, in fact held important offices at various times in the government. More than that they participated in such educational features as the settlement afforded and were in addition the religious leaders of the group.

With such a cultured background it was of more than passing interest that the planning for the future was observed. His teachers had always noted that he was an outstanding student who had won honors for many accomplishments. He could quote from memory large portions of the Pentateuch, he was well known for his orations given at many academic celebrations, his grandfather had taught him and he was an accomplished flutist, and he had exhibited traits of leadership seldom seen in one so young. "Surely," the interested folks concluded, "he will become one of our great leaders."

The family planning took a somewhat different direction. Junior, as a prominent member of the ancient counterpart of 4H clubs, had raised the prize lambs several times; his uncle, a successful landowner, had large flocks of sheep and could furnish the best of opportunity. Yes, a career as a shepherd was most desirable. Did it not furnish opportunity to see the most beautiful of the Judaen rustic beauty, miles of it while following and attending the herds? Did it not provide great opportunity for developing a sound body in the fresh air and sunshine? Would he not soon become a partner in Uncle's business with fine financial prospects? Would it not help preserve home and political ties? Certainly this career as a shepherd presented the greatest opportunity.

A sad fact had been overlooked by all concerned. His teachers and associates swayed by personality and citizenship, his family by future prospects, had both failed to see the insurmountable handicap in the fact that he was *lame in both his feet!!*

Young men select an engineering career, at times, in a similar manner. Perhaps they have enjoyed or been "handy" at repairing the family car, perhaps radio has been a hobby, perhaps some employment with a surveyor or contractor has been challenging, perhaps the work of the metallurgist or designer in the plant where you have been has looked interesting or even the income of some family friend has appeared pretty satisfactory. In some cases Uncle Harry has a place for you to start; in others location, surroundings or personality have influenced you. These influences may be fine and helpful, but—*are you lame in your feet?*

Engineering training stands pretty firmly on the two feet which we might designate as the science and the art. Educationally speaking science is represented in the Engineering curriculum by such fields as Chemistry, Mathematics, Physics, Thermodynamics, Mechanics and allied subjects. Mastery of these subjects requires certain abilities, and these abilities should be possessed in rather liberal amounts or the student should consider transfer to another field where these traits are not such a prime requisite. We feel that grades earned in these fields are a fair estimate of natural ability, and that below average grades indicate to us that these boys are not too well fitted for competition in the Engineering field. The College provides a department of testing and measurements where anyone may get a thorough check-up and advice for future plans.

Engineering art is not so easily described. Roughly it may be described as the ability to visualize in three dimensions, to invent for a purpose, to adjust for maximum efficiency, to plan for future uses or to best utilize materials at hand for the need of the day. In the vernacular it is referred to as "practice," "experience" or "engineering judgment." The faculty estimates of your probable ability in the art of the profession appears as their judgment of your designs, laboratory reports and even your questions concerning pertinent themes.

We are reminded that engineering graduates fail largely because of character defects, not for a lack of technical ability. It is good to be reminded, however, that the race is long and rugged and to win coveted prizes you cannot be "lame in both your feet."

This is...

WKAR–FM

HENRY DARLINGTON, Phy. Jr.

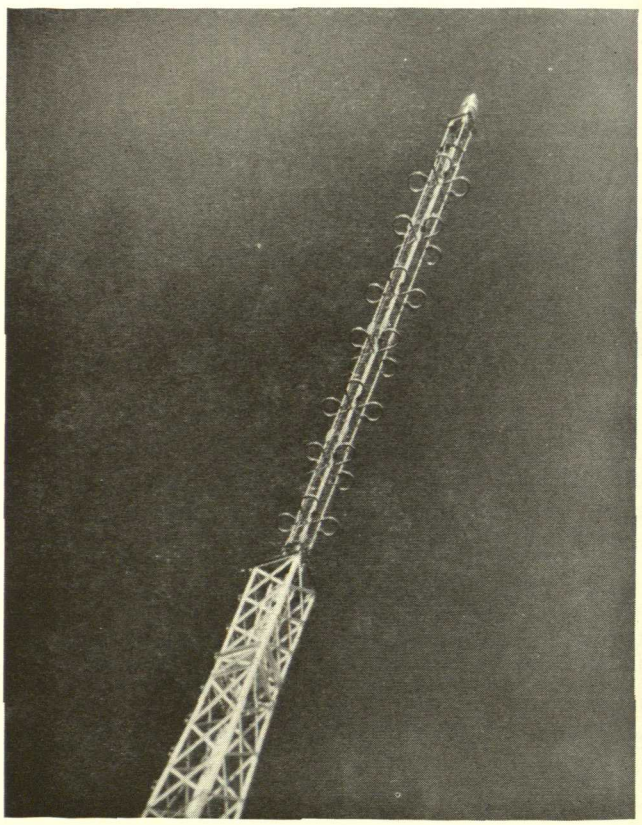
Since the early experiments of Major Edwin Armstrong, frequency modulation or FM has become increasingly popular as a mode of communication. There are several characteristics of FM which are primarily responsible for its present popularity. These characteristics will be discussed and compared with the conventional amplitude modulation system which has been used in broadcasting stations for many years.

Several rather important general problems confronting the broadcast engineer are: 1. Fidelity or naturalness. 2. Natural and man-made interference. 3. Inter-station interference. 4. Maximum coverage. The FM system admirably meets and surpasses the AM system on the first three requirements. For a given power, an AM transmitter will have more coverage than an FM. On the other hand, many more FM stations may be installed without encountering inter-station interference.

Two outstanding features of FM are its fidelity and its lack of interference or static. Federal Communications Commission requirements specifiy that all FM broadcast transmitting equipment must be essentially linear throughout the audio spectrum from 50-15,000 cycles per second. If the receiver is of high quality, this audio range may be faithfully reproduced. The best AM systems cannot faithfully reproduce frequencies above 5000 cycles per second and therefore, many of the higher tones and overtones found in music and the voice cannot be heard. The problem of static is practically eliminated with FM. The FM receiver is so designed that if the signal reaching the receiving antenna is of at least a certain minimum strength, interference will be virtually eliminated.

WKAR-AM has been in operation since 1922 on a daylight schedule as authorized by the Federal Communications Commission. In order to extend its broadcasting day into the evening and to bring the listeners of central Michigan the many advantages of FM, WKAR-FM has been added to the present facilities.

The new FM transmitter which is located about a mile and a half south of the campus was placed in regular operation October 4, 1948. The transmitter occupies the same building as the AM transmitter, both being attended by one operator. The transmitter is a 3000 watt unit built by the General Electric Company.



Telescopic photograph of the clover leaf antenna mounted atop a 260-foot tower.

The simplest method to explain the fundamental operation of any electronic apparatus is by means of a block diagram. Each stage or part of the transmitter which fulfills a specific purpose in the overall operation of the transmitter will be represented by a block or square in the diagram. Figure 1 is a simplified block diagram of the WKAR-FM transmitter and some of its associated equipment. The diagram shows only the audio and radio frequency circuits. The various D. C. power supplies and control circuits are omitted for the sake of simplicity.

The heart of any transmitter is the oscillator. This transmitter uses a quartz crystal oscillator of conventional design. The crystal is maintained at a constant temperature by means of a thermostatically controlled heater. The crystal oscillates at a frequency of 209.491 KC. Radio frequency energy from the oscillator is then fed through an amplifier and into a special network. This network, known as a Scott connected transformer, changes the single phase RF energy from the oscillator into three phase RF at the same frequency.

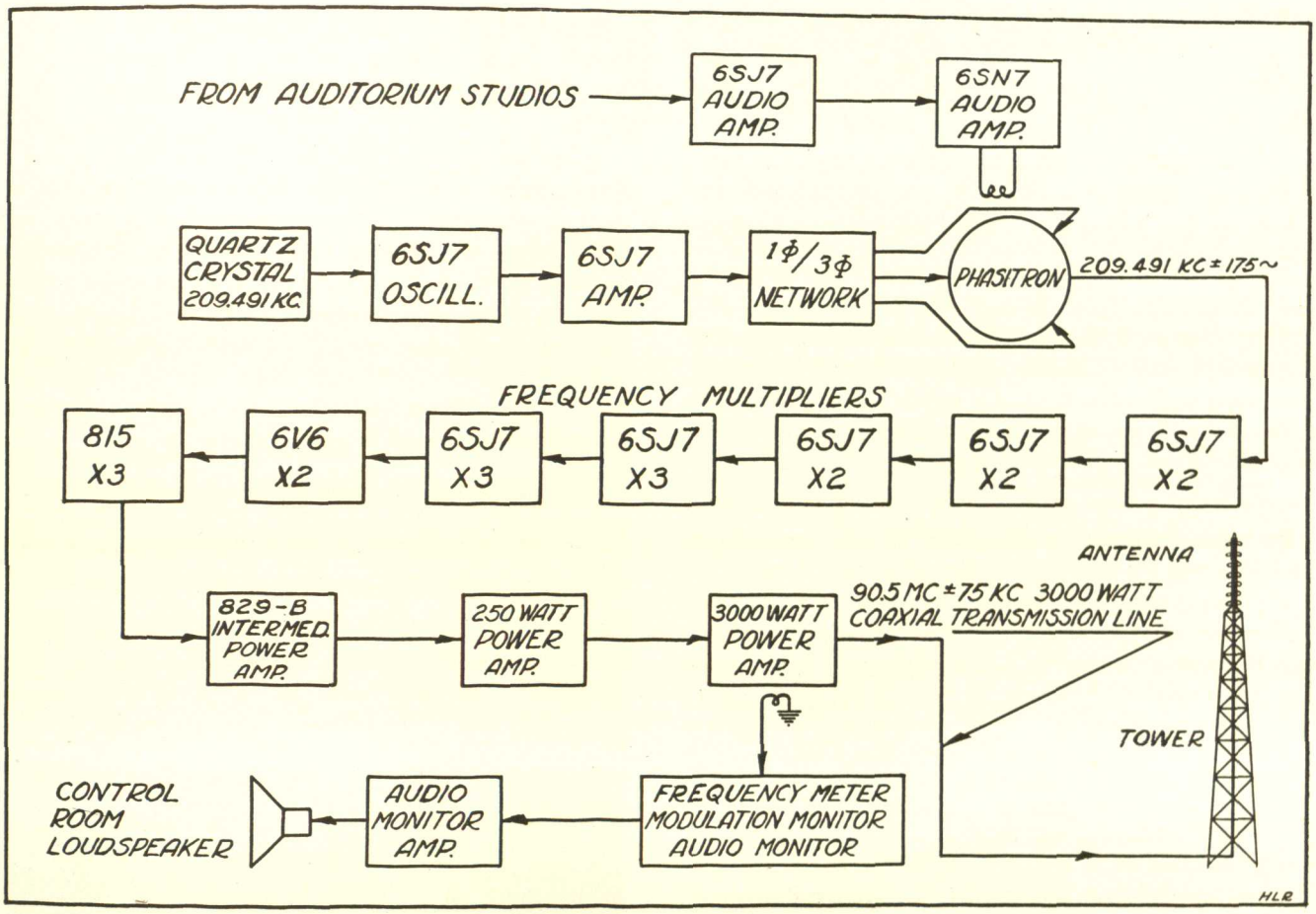
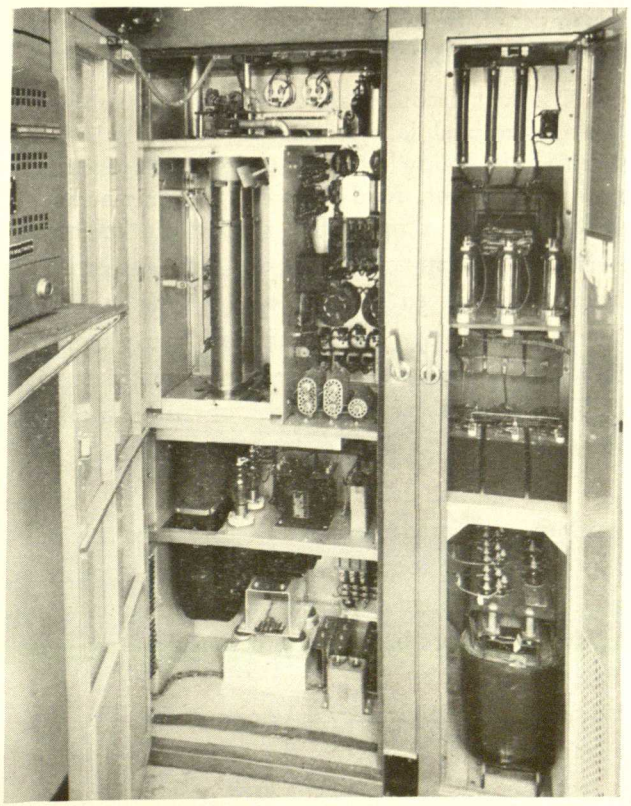


Fig. 1. Simplified Block Diagram

The next block represents one of the unique electronic developments of recent times. General Electric calls it the "Phasitron." It is a special vacuum tube which modulates or changes the frequency of the RF in accordance with the audio such as music or the voice. The theory of the phasitron is unique and very interesting but beyond the scope of this article. The purpose, then, of the phasitron is to combine the RF energy from the oscillator with the audio frequency in such a way that the frequency of the RF is changed in accordance with the instantaneous amplitude of the audio signal. The output of the phasitron is single phase 209.491 KC ± not more than 175 cycles per second. This energy is then fed into a chain of frequency multipliers which increase the center frequency to 90.5 MC and the maximum deviation to ± 75 KC. From the multipliers the RF is passed through three successive power amplifiers, the output from the final amplifier being 3000 watts. Amplifiers of this power which can operate at frequencies encountered in FM broadcasting are comparatively new developments in the radio art. Many design problems are encountered which wouldn't be found in lower frequency amplifiers as used in AM broadcast transmitters. Instead of using coils and condensers in the tuned circuits, the FM amplifier employs quarter-wave transmission lines, shorted at one end. The final tank circuit consists

Continued on page 23



Rear view of the power amplifier and high voltage power supply. The final tank circuit with tubes in place can be seen in the enclosed box at the left. The unit on the left is the high voltage power supply.

SERVING AMERICA'S LARGEST INDUSTRY

VERNON H. BAKER, A.E. Grad.

Another link in the chain of agricultural engineering progress has been forged by the dedication of the new agricultural engineering building at Michigan State College.

Engineers from all over the United States and many foreign countries have travelled to the campus to see this new "dream" building which is the headquarters in Michigan for the application of engineering to America's largest industry, Agriculture.

Ideally located on the South Campus, close to other agricultural buildings and just a short walk to the main campus, construction of the agricultural engineering building was started in the summer of 1946 and completed in the spring of 1948. Built at a cost of about $800,000, in the collegiate gothic architectural design, the building has a total floor space of over 60,000 square feet (about 1½ acres).

Three main activities are carried on in this new building: teaching, research, and extension work. During the winter term of the school year 1947-48, 1200 students were enrolled in agricultural engineering classes. Of this number, 100 students were majoring in agricultural engineering; 30 were minoring in this field; 21 students were working toward a Master of Science or a Doctor of Philosophy degree, and the remainder of the 1200 were agricultural students taking courses in agricultural engineering.

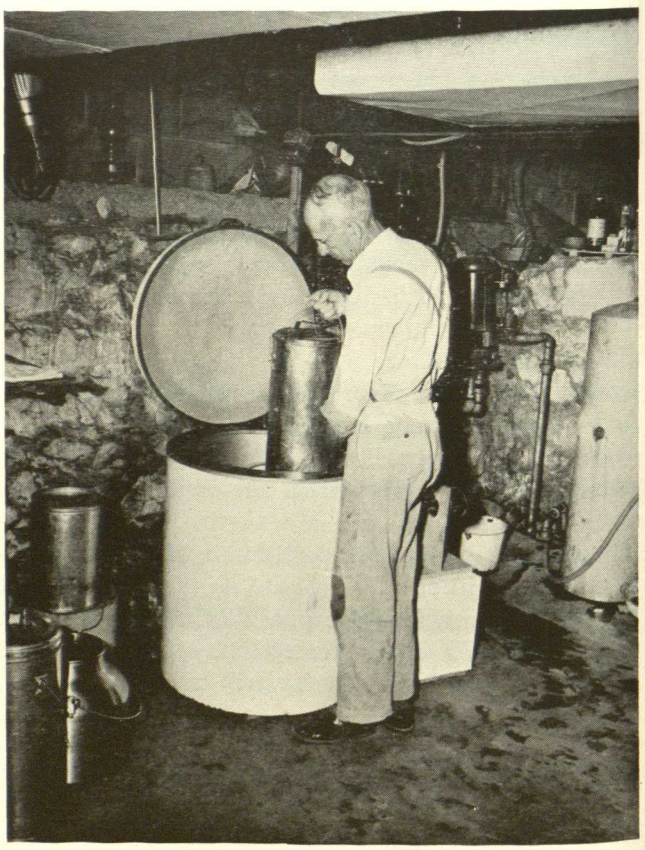
Excellent facilities are available for teaching in class rooms and laboratories. Class work is being given in the following laboratories: rural electrification, refrigeration, food engineering, farm machinery, research, wood shop, metal shop, farm structures, land development and irrigation. The departmental library is open to students and will soon have a comparatively complete selection of books and periodicals on subjects of engineering as applied to agriculture. This library is a branch of the main campus library.

The research laboratory (9,000 sq. ft.) is the headquarters for departmental agricultural engineering research. It contains a machine shop, tool room, welding equipment, and other miscellaneaus equipment used for building experimental apparatus. Already a number of unique devices have been developed in the laboratory. Among them are a special sugar beet seed planter with fertilizer attachments, a frost prevention machine, a low cost cream cooler, a vacuum harvester, and an experimental mixture of concrete and corn cobs to produce a low cost building material having better insulation properties.

The extension service is in the hands of experienced agricultural engineers whose full-time job is to convey to the farmer and others information on engineering as applied to agriculture. Extension workers have access to the service drafting room where plans of drawings are made of farm equipment, farm buildings, and experimental apparatus. Between the periods of July 1, 1947, and June 1, 1948, more than 15,000 blue prints and plans were sent to farmers and others interested in agriculture.

What Is Agricultural Engineering?

A number of engineering and agricultural students have asked this question recently. Agricultural engineering is the application of engineering to rural living and to the production, transportation, and processing of farm products.



The new cream cooler being tested on the farm.

Agricultural engineering is a single profession; its parts are interwoven and bound together because all apply to a single industry. As a recognized profession, agricultural engineering is one of the youngest. In 1907 the American Society of Agricultural Engineers was founded at the University of Wiscon-

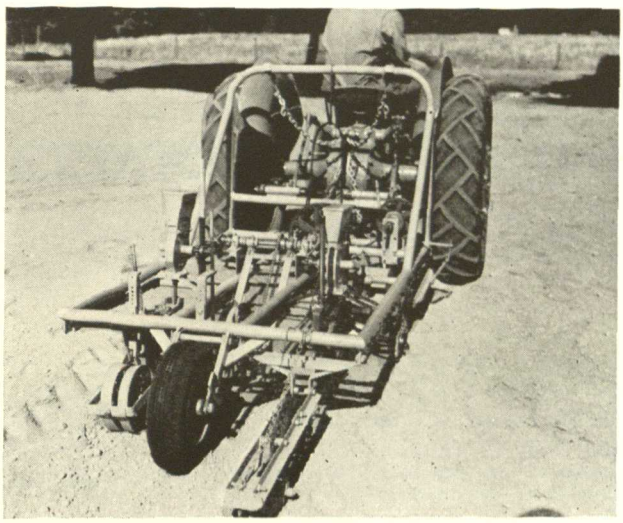
son, and in 1910 the same institution conferred the first degree of Bachelor of Science in Agricultural Engineering. The present national headquarters of ASAE is located in St. Joseph, Michigan, with a membership of about 2650.

The professional curricula in agricultural engineering offered by the different institutions are strikingly similar, and that is because experience has shown what it takes to train a well-qualified agricultural engineer. The curriculum for agricultural engineers should be designed to include such basic engineering subjects as mechanics, hydraulics, thermodynamics, machine shop, and electrical engineering, with physics, chemistry, and mathematics included. Agricultural engineers should also be well trained in certain agricultural subjects as soil science, bacteriology, farm crops, horticulture, and dairy.

With a background in basic engineering, agricultural and agricultural engineering subjects such as farm power and machinery, rural electrification, farm structures, soil and water conservation, and food processing, the agricultural engineer should be as well trained in the fundamentals as any other engineer. It should be pointed out here that the agricultural engineering subjects just mentioned must be of a high caliber, in no way inferior to the "basic" engineering subjects. There is every reason to justify as much mathematical and technical treatment of the subjects of farm power and machinery, irrigation and land development, and farm structures as for the subjects of electrical machinery, mechanics, and hydraulics.

Opportunities in Agricultural Engineering

Agricultural engineers have five major divisions of agricultural engineering in which to choose a major field while in college and after graduation.



The experimental sugar beet seed planter.

These are farm power and machinery, farm structures, rural electrification, soil and water control and conservation, and food processing.

Many agricultural engineers are in public employ. In past years, more than one-half of the members of the American Society of Agricultural Engineers were public employees. The trend now is toward a much greater employment of agricultural engineers by industry and other private agencies.

In public service agricultural engineers may be employed by:

State Colleges
United States Department of Agriculture
Tennessee Valley Authority
United States Department of the Interior
Soil Conservation Service
R.E.A. Cooperatives

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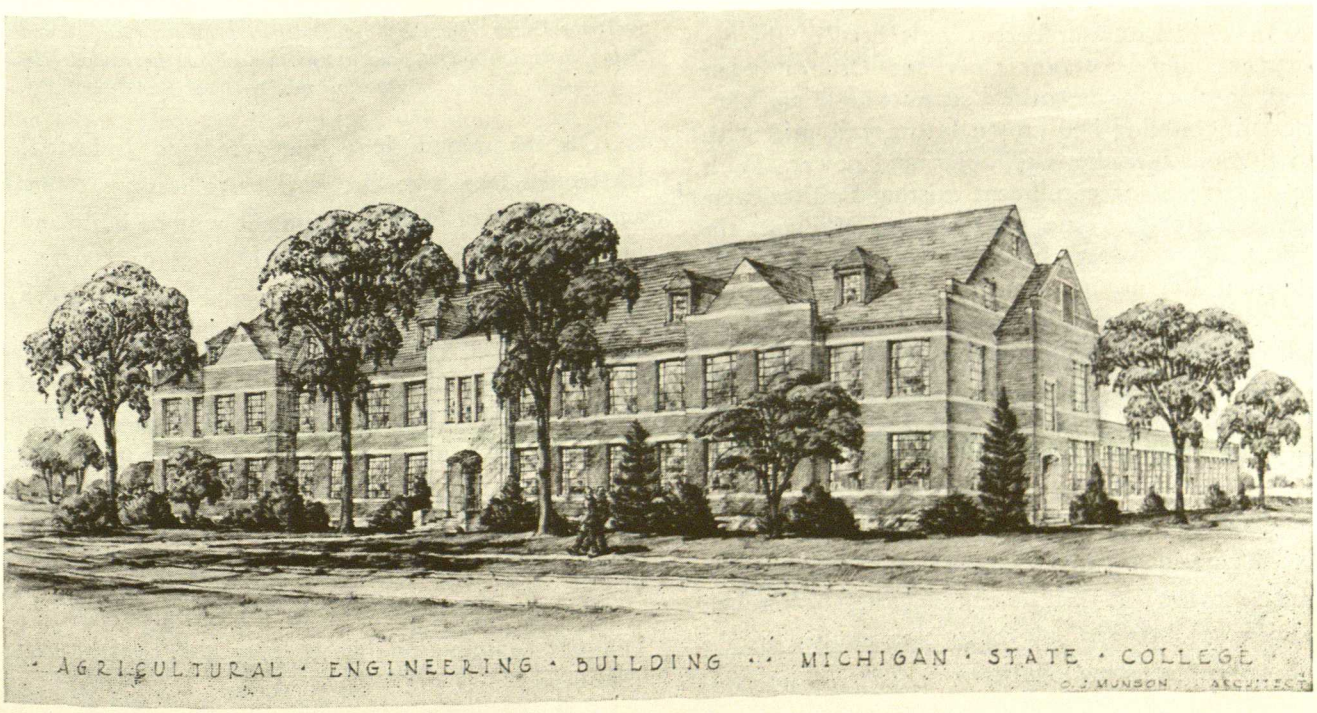
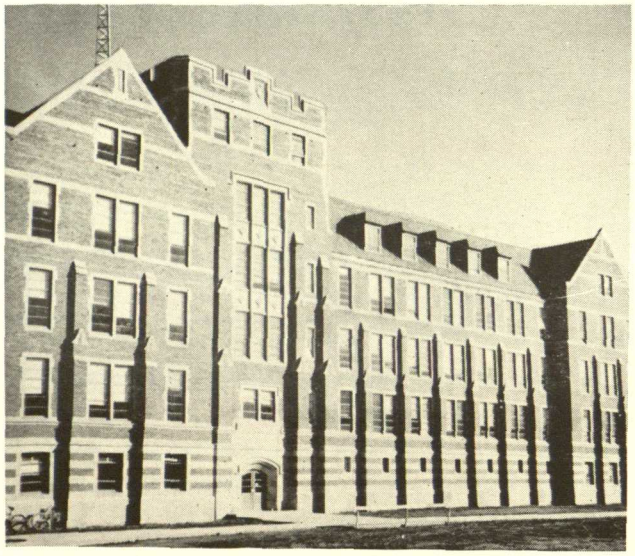


NEW ELECTRICAL ENGINEERING BUILDING

CARROLL F. AUGUSTINE, E.E. Jr.



Electrical Engineering Building.

Five stories of the latest word in everything electrical, the new Electrical Engineering building located just west of the band shell on the banks of the Red Cedar, is the newest addition to the school of engineering.

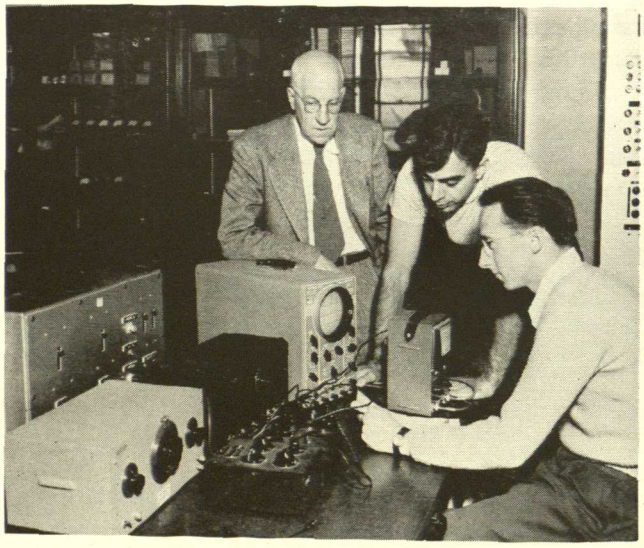
The new building is included as part of the general expansion program at Michigan State College, but the idea that the Electrical Engineers have a building of their own originated twenty years ago. Dean Bissel, who was Dean of Engineering in 1928, first suggested that an extension be built onto Olds Hall for the Electrical Engineering Department. Plans were drawn but final approval for the new wing was never granted.

In 1940 Professor Baccus, now head of the department, and Professors Cory and Osborn began work on plans for an entirely separate building. Electrical Engineering had grown into a vast field with subdivisions in radio, electronics, and power. With steadily increasing enrollment existing facilities were just not enough. Four complete sets of plans, the end result of painstaking work and study by the Electrical Engineering Department, were completed before the final plan was submitted to President Hannah and the now retired Dean Dirks.

Two years ago President Hannah announced that the new building had been approved. In the early spring of 1947 ground was first broken and the steel framework was completed in near record time during the summer. The brickmasons started working last December and just nine months later the department began moving into their new headquarters. Thorough cooperation between sub-contractors resulted in the very short construction time.

Building Layout

Most of the heavy machinery used in laboratory courses is installed in the four machinery laboratories and the transformer and servo mechanism lab on the first floor. The two outstanding wartime applications of servo control, the ball turret and the directional radar antenna, will be used to demonstrate operating principles in this new field. On the same floor is an x-ray room lined with ten inches of solid concrete and equipped with a new Westinghouse 150 kilovolt x-ray machine. The unit will be used mostly in Industrial Electronics courses to take x-ray pictures of metal castings. This equipment will be available for use by small Michigan industries.



Professor Corey (standing) gives Charles Meyer (center) and Ralph Robinson a few pointers on the use of the cathode ray oscillograph.

On the second floor there are two Industrial Electronics labs, two circuits labs, a reading room, and a large shop where equipment will be built and maintained. The reading room is large, very attractively designed, and will make available a large stock of engineering periodicals.

Radio and Communications labs are on the third floor along with two electronics labs, one measurements lab, three class rooms and a computation room. The Radio and Communications labs are complete with every piece of equipment that the "Electron Chasers" might conceivably find use for.

The fourth floor has one ultra high frequency lab, one illumination lab, a relay and control lab, four class rooms and a design room.

In a class in DC and AC circuits, fundamental concepts are investigated in preparation for more advanced courses. Left to right, Ernest Kamis, Instructor Byron Main, Joe Eckert, Clifford Hrcksel and Ray Gale.

The four graduate research and the two general research labs on the fifth floor offer opportunities for the inquisitive engineer to work by himself. In fact, future plans call for extensive research along many different lines. If good facilities and equipment are prerequisites for success, the new building will soon become a center for electrical research.

The highest level, the tower, will serve as a demonstration place for radio, television, and radar. The campus amateur radio club is using part of the space for their station W8SH and when it arrives, Navy type ASG radar gear will be installed and operated from the tower.

Building Cost

Equipment is still being installed and wired, but when the last sub-contractor leaves before next January, the cost of the building and new equipment will stand at about one and one-quarter million dollars.

A unique, but expensive, technical feature is the central control system. Voltages and currents of every description are generated at a central point and wired into twenty-five separate main switching panels located in the various laboratories. These main panels control a multitude of smaller outlets used by the students at the testing tables. The fact that in one of the circuits labs there are 8,500 feet of wiring tied in with this system indicates its complexity. The custom built panels alone added 30,000 dollars to the overall expense.

ALUMNI NEWS

R. J. Waalkes, M.E. '42, has returned to M.S.C. to do graduate work in the field of heating and ventilating. After graduation, Mr. Waalkes worked with the Chrysler Corporation in Detroit for 1 year, did repair and conversion work in the Navy for three years, and then returned to Chrysler. From November, 1946, until he returned to Michigan State, he served as technical secretary of the National Warm Air Heating and Air Conditioning Association. At the present time Mr. Waalkes is teaching a course in internal combustion engines in addition to his graduate work.

Another alumnus and faculty member, James Anderson, M.E. '43, has recently received his Master's degree here. His graduate study was in the field of heat transfer and fluid flow.

Samuel Carapella, Met. E. '44, read a paper on the iridium-bismuth phase diagram at the National Metal Congress and Exposition in Philadelphia.

Marion Surls, Met. E. '29, is now located with the Charles C. Kawin Company, in Chicago.

W. C. Dent, Met. E. '42, is a Foundry Engineer and part owner of the Midland Iron Works, Midland, Michigan.

Harold McGrath, and William Wiseman, M.E. '40, are now with the Buick Division of General Motors in Flint.

Carl Rush, M.E. '47, is assistant City Engineer of Midland, Michigan.

Gene Stissen, Ch. E. '42, is doing Chemical Engineering work with the Dow Chemical Company.

Charles V. Kilburn, M. E. '39, is with the Kulhman Electric Company, Bay City, Michigan.

The following alumni registered in the Dean's office during Homecoming, October 16:

Marshall Houghton, '26; Robert E. Lenz, '47; Webster L. Bowler, '32; Charles F. Derr, '47; Harold Neumann; George H. Mead, '40; Robert J. Buzenberg, '40; Don Clark; Bruce LaFrance, '46; Rodney Perry; Fred M. Southworth, '42; Floyd Guest, '46; Pat Guest, '46; John Shedd; Leanord Sobkowsky; Frank Foster.

ALUMNI—
Send information and photographs that you would like to have appear in this feature to the Alumni Editor, P. O. Box 468, E. Lansing.

THE SOCIETIES

Officers of the Engineering Council. Left to right—Charles Storms, Secretary; Gene Mohlie, President; Jack Osgood, Vice President; Emmet More, Treasurer.

TAU BETA PI

M.S.C. was the second institution in the United States to accept the Tau Beta Pi as an honorary society. At the present time Prof. Merton M. Cory of the E.E. department is President of the National Society of the Tau Beta Pi.

At present this chapter includes twenty-nine students with thirty initiates beginning November 4th. The officers of the society include: George W. Michel (sr.), as President; Charles H. Single (sr.), Vice President; Robert W. Jurgensen (sr.), Recording Secretary; Melvin Nuechterlein, Corresponding Secretary; Prof. Leonard C. Price, Treasurer; John C. Bullock (sr.), Cataloger.

The ASCE announces the largest membership of its history at M.S.C.: 87 members. The faculty advisor is Prof. Chester L. Allen. Officers of the society are: President, Paul T. Spelman; Vice-president, Robert J. Wargowski; Treasurer, Denton S. Montrose; Secretary, Raymond W. Crovella.

The first meeting this fall term included over 100 people whose enthusiasm was very evident. Mr. Harry Conrad of Christman Builders and Contractors and Contact Representative for the National ASCE spoke on the advantages of membership in the student ASCE, the service of the placement bureau of the Association of General Contractors and an open invitation to the ten annual meetings of the Downtown Engineer's Club. The second speaker was Mr. Carl Haussman, C.E. graduate of M.S.C. and now affiliated with Christman Builders.

At another meeting, Mr. L. A. Davidson, well-known Lansing building and road constructor, talked on road and bridge problems and the requirements for the present program of road maintenance and construction in Michigan. Plans for the Activities Carnival and possible location of an organization room were discussed.

On November 4th a regular meeting was held with the wives of the C.E.'s invited. Movies shown at this meeting were "Driving the Alva Adams Tunnel," "Building the George Washington Bridge" and "Highways Ahead."

On November 16th Mr. Harry Ward, Deputy Highway Commissioner, addressed the chapter on "Advantages with the State Highway Department." Movies were "Irrigation and Conservation."

The ASCE display at the Activities Carnival was arranged by Bob Wargowski and Jack Ryan.

AMERICAN SOCIETY OF AGRICULTURAL ENGINEERS

Claiming a 50% membership of undergraduate Agr. Engineers, the M.S.C. Chapter has the following student officers: President, Donald N. Feather; Vice President, Allen K. Gillett; Treasurer, Vernon E. Clark; Secretary, Garth O. Hall. Faculty advisor is James Sterling Boyd, Prof and head of the department of Agr. Engineering.

One of the projects of the Ag. E.'s is the completion of their club room in the new Agr. Engineering building. Furnishing the room is another problem.

A.S.C.E. Officers. Rear, left to right—Henry Schwabe, Leonard Kline, Denton Montrose. Seated, left to right—Robert Wargowski and Paul Spelman.

It was also announced that, instead of having the usual fall Agr. E. dance, the Ag. E.'s would back the Engineering Association Dance Saturday, January 29. In addition, the Aggies plan a fall outing to be on Saturday, November 13th.

At one meeting Prof. Crabb, supervisor on the Hydrologic Research Project, gave a talk illustrated with slides.

The largest project that the ASAE's will participate in this year will be to assist in the Summer Conference of the ASAE which is held at a different school each year. Among the usual plans for the conference is the publication by the host school of the National Student Journal. Men elected to the staff of the Journal are: Editor, Glenn Peterson; Associate Editor, Henry Hose; Business Manager, Harold Dunn; Circulation Manager, Al Gillette.

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS

The M.S.C. Section of the A.C.S. began the school year under the direction of student officers as follows: President, Wilbur W. Kennett; Vice President, Richard A. Hiscox; Secretary, Charles S. Sisler; and Treasurer, William S. Springer. The Faculty Advisor is Prof. Randell W. Ludt.

The "aiches" at one meeting saw a movie, "Water, Water, Everywhere," based on a water softening device known by chemists for sometime

Tau Beta's plan for new crop of initiates. Left to right—Melvin Nuechterlein, Robert Jurgensen, John Bullock, Charles Single, and George Michel.

but not used commercially until recently. It is the replacement of ions, an adsorption process.

The following meeting was a double feature, a speaker's dinner at Hunt's Tea Room and a talk by Mr. E. C. Croker of the Arthur C. Little company on "The Chemistry of Odors and Flavors."

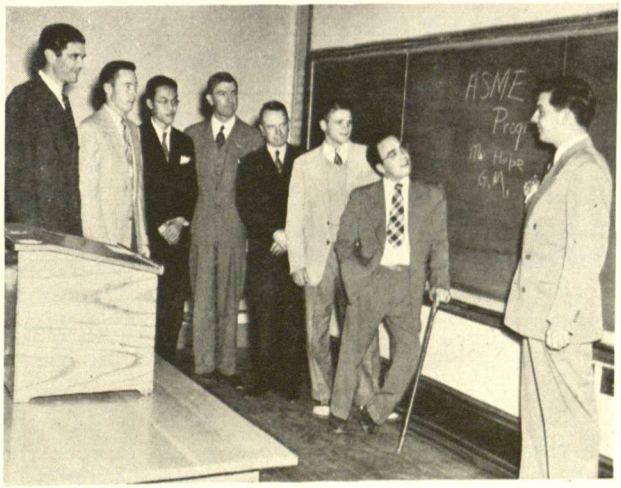
On November 3rd, 7:30 P.M., a meeting was held in Morrill Hall with Mr. George Holgrum, engineer from the Shell Oil Co.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS

An enthusiastic group of future Mechanical Engineers attended the first fall meeting of the A.S.M.E. Ross Christian, President of ASME, opened the meeting and introduced Mr. Leonard Price, head of the M. E. department. Mr. Price gave a short talk on the history and purpose of the society. At this meeting eighty new members were welcomed.

At another meeting, Mr. L. A. Hope of the G. M. research laboratory division spoke on the Mechanical Measurements of Torsional Vibrations. Mr. Hope explained induction of stresses by torsional vibrations and the instruments used in vibrational measurement with the aid of a projector and the assistance of "'Vince" Sylvester.

This year's officers include: President, Ross W. Christian; Vice President, Vincent A. Sylvester; Treasurer, Clifford G. Hecksel; and Secretary, Paul B. Reish. Mr. C. V. Ip is the faculty advisor.



Left to right—Guest speaker, Mr. L. F. Hope, Clifford G. Heskel, Chaing V. Ip, Jesse M. Campbell, Leonard C. Price, Paul B. Risch, Vincent A. Sylvester and Ross W. Christian.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERING

This duo organization listened to a guest speaker early this term. Mr. Adolph W. Rauth, head of the Consumer's Power Testing Laboratory in Jackson, Michigan, spoke on "What Engineering Societies Have to Offer to Engineers."

The A.I.E.E. and I.R.E. lists two hundred and eight members this year. Officers of the group are as follows: Chairman, William R. Carlyon; Vice Chairman, Clare K. Tubbs; Secretary, MacRoger Doolittle; Treasurer, William Rupple; A.I.E.E. Secretary, MacRoger Doolittle; I.R.E. Secretary, Roy A. Paananen. Faculty Advisor is Charles E. Goodell.

On November 17th a meeting was held in the Auditorium of the new E. E. building. Mr. George Chute, Application Engineer from the General Electric Co., Detroit, spoke on "Industrial Applications of Electronics."

AMERICAN SOCIETY FOR ENGINEERING EDUCATION

A society not so well known to the student but very active on the campus and nationally is the A.S.E.E. This is composed entirely of faculty people in Engineering and Science departments. At M.S.C. this society includes one hundred and three members. Officers are as follows: President, Harold P. Skamser; Vice President, Donald S. Pearson; Secretary, Donald J. Renwick; Treasurer, Charles A. Miller.

The program committee composed of Denton D. McGrady, James R. Burnett, Paul J. DeKoning, Kenneth A. Campbell, have announced the programs for the year. The fall term activities are:

November 4th: Speaker was Mr. Otto Hall, President of the Michigan Society of Professional Engineers on "The History and Development of State Registration of Professional Engineers.

December 2nd: Prof. A. W. Farrall will review his paper on "Agricultural Engineering" published in the April, 1948, Journal of Engineering Education.

It is also announced that Prof. J. M. Apple will direct the teacher training course.

M.S.C. METALLURGICAL SOCIETY

A mere infant of one year but rapidly becoming a "permanent party," the Met. E.'s drew seventy-five students in October to see three technicolor sound movies titled, "Copper," sent from the Anaconda Copper Mining Co., New York, N. Y.; "Unfinished Rainbows," sent from the Aluminum Co., of America; and "Golden Horizons," from the Ampco Metal, Inc.

Mr. R. D. Chapman, research metallurgist for the Chrysler Corporation, will be on the campus the third week of November to speak on "the Factors Affecting the Choice of Automotive Steels." Mr. Chapman is a former M.S.C. graduate of the class of '37. All interested persons are invited.

The Metallurgical Society plans a display showing some of the features in the study of metallurgy. This display was part of the Activities Carnival interests.

Student officers of the Met. E.'s this year are: Chairman, Sheldon Smith; Secretary-Treasurer, William S. Fixcus; and Council members, John Disantis, John Milne, and Ted Borden. Faculty Advisor is Prof. Robert L. Sweet.

MICHIGAN STATE ENGINEERING ASSOCIATION

At the first meeting this fall, officers for the association were elected for the remainder of the college year. The officers are: President, Gene Mohlie; Vice President, Jack Osgood; Treasurer, Emmett Moore, and Secretary, Charles Storm. The date of Saturday, January 29th, was set for the Engineer's Ball, to be held in the women's gymn. Co-chairmen of the dance are Henry Schwabe and Jack Osgood. The possibility of an Engineer's Field Day in the spring term was discussed but no decision was reached at this meeting.

The Activities Carnival Chairmen attended this meeting representing their various societies and final plans were made for the exhibits.

M.S.C. RADIO CLUB

By far the most helpful, active, but hetero group is the M.S.C. Radio Club. Many in the organization are members of the American Radio Relay League. At certain periods, and during emergency, during the day messages are originated, relayed and delivered. There is always someone in the transmitting room; either a new member learning code or a licensed member operating. Moving into new quarters in the tower of the new E. E. Building, recently, has restricted their transmission but they'll be back on the air when the gear is squared away. Of the ten top officers in the club, eight hold their own license.

The station call is W8SH and under F.C.C. regulations is held in Trusteeship by John G. Nauman. Faculty advisors are: William M. Nellis and Robert F. Nelson. Student officers include: President, Edgar G. Nessman; Secretary, Arthur D. Craig; and Treasurer, Richard A. Goldfogle. Regular business meetings are held Thursday of every week.

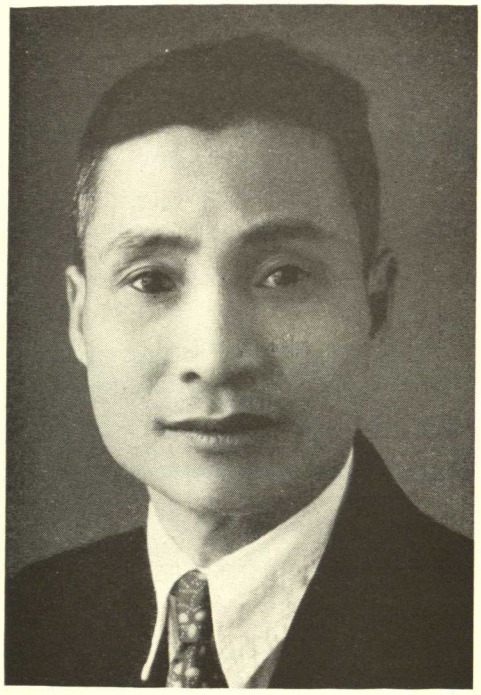
Continued from page 9

In Industry:

- Trade Associations
- Farm Equipment Manufacturers
- Farm Equipment Retailers
- Building Materials Manufacturers
- Food Processors
- Electrical Equipment Manufacturers
- Public Utilities Companies

Private Engineering Practice

Foreign Service



Mr. Y. C. Lin, C.E. '30, staff C.E. department.

WE PRESENT

Mr. Y. C. Lin came to Michigan State College in September, 1926, from China. After receiving his degree here, Mr. Lin returned to Fukien Christian University where he taught surveying, mechanics, strength of material and mathematics. Mr. Lin also assisted in the difficult task of moving the University to the hills.

Fukien Christian University is located in Foochow, a city on the coast of China. This region was in great danger of attack from the Japanese; therefore, it became imperative to move the University inland.

Travel in China, always fraught with hardships and uncertainties in peace-time, became a major problem in war-time. One of the difficulties of transportation was caused by the topography of this section of China which literally rises from the sea. The land is very mountainous and the rivers are rapid and steep, so steep in fact, they seem almost perpendicular. Lack of funds and suitable equipment only added to the difficult moving task. Most of the transportation facilities were used by the Chinese Government for military purposes. However, four river launches with double diesel engines were obtained and the long hard journey commenced.

About 150 students, 30 faculty and staff members, as well as some of the more important and less cumbersome pieces of laboratory apparatus were taken on the trip. The launches brought them to Yemping, about 130 miles inland. Supplies and passengers were transferred to trucks, as the remainder of the journey had to be made by land.

Some old buildings belonging to the American Board Mission were loaned to the University. From humble beginnings in 1938 with 150 students, the University expanded—by 1942 12 new buildings were erected and the enrollment rose to 650. Life at the University was not easy by any means; it was hampered by lack of funds, a great shortage of food and, in 1940, by inflation. Students and faculty alike devoted their spare time to planting food.

Some of the supplies and laboratory apparatus, particularly the bulky pieces had to be left behind in Foochow. The city was first occupied by the Japanese for about nine months toward the end of 1941 and the beginning of 1942. Very little damage occurred at this time but during the second occupation in October 1943 things were quite different —Foochow was destroyed. All the property was destroyed, as well as the water supply and electrical wiring in the school buildings. The gas plant for the Science Hall was gone. The school museum, with its pottery, antiques and large collection of books, was gone. Foochow was gone.

One thing remained—the University in the hills. It was now time to move back; the time was December, 1945. Mr. Lin was in charge of moving the supplies and equipment. Three hundred sampan (small river boats) were propelled down the river with bamboo poles. These boatmen were skilled in traveling through China's rapid rivers; only one mishap occurred on the way down—a good record, considering the number of boats and the swiftness of the river. While it took one month to go up, it only took eight days to come down. In about three months everything was moved—apparatus, dormitory furniture and library; even the temporary wooden buildings were torn down and moved. These building sections were placed on rafts especially made for the purpose.

It was hard and sometimes uncertain but that trip from Foochow to Shaowu was a means of saving the University—a never-to-be-forgotten adventure.

NEW DEVELOPMENTS

This tiny electric motor is unusual in that it has been built "inside out." Developed for Army Ordnance's Proving Grounds, Aberdeen, Md., by the General Electric Company, it is rated one-tenth-horsepower at 80,000 revolutions per minute. The positions of the rotor and stator in the motor are the reverse of the usual arrangement, hence the term "inside out."

TESTING GAS TURBINES

In its work on gas turbines the Boeing Aircraft Company propulsion laboratory has developed an intersecting testing device. In the testing of turbine components, parts are placed in a special pit and turned at a high rate of speed.

The pit is made of several layers of steel plate and contains heating coils of nicrome wire that provide similated operating temperatures up to 1750 degrees F.

The article to be tested is attached to one end of a shaft which is driven by a compressed air turbine. The complete unit is then lowered into the test pit and the air removed by a vacuum pump. The article is then rotated at speeds as high as 100,000 R.P.M.

One end of the drive shaft is painted half black and half white. A photoelectric cell focused on the end of the shaft, transmits an electrical impulse to a recording instrument each time the black part of the shaft passes it. This counter has been electrically timed and checked and found to have an accuracy of one-half of one percent.

If during testing a part is broken a photograph is instantly taken of it. When the double concentric screens that line the pit are hit by a broken part a circuit is closed operating a mercury lamp for the exposure time of one five millionth of a second.

X-RAY AND TELEVISION COMBINED

A combination of x-rays and television may help in the detection of defects in thick castings and other metal structures used in industry, Dr. William D. Coolidge, noted x-ray authority suggested in a recent talk.

When x-rays are now used, either to examine the interior of a piece of metal, or to look into the human body, radiographic methods are employed, shadow pictures on photographic film or on a fluoroscope where the x-ray image is formed and made directly visible by fluorescence. The viewing of the fluorescent screen by television has often been suggested, but even the most sensitive camera tubes (image orthicons) have not given satisfactory results in medical applications. High x-ray intensities may be used in industry to get the sufficiently high illumination of the florescent screen necessary for the television camera. Considerable time could be saved in the inspection of castings by development of such a system, the time lag between exposure of the film and developing would be eliminated. The television receiver would be located away from the x-ray tube and offer protection to the operator who would be located behind a thick protective wall.

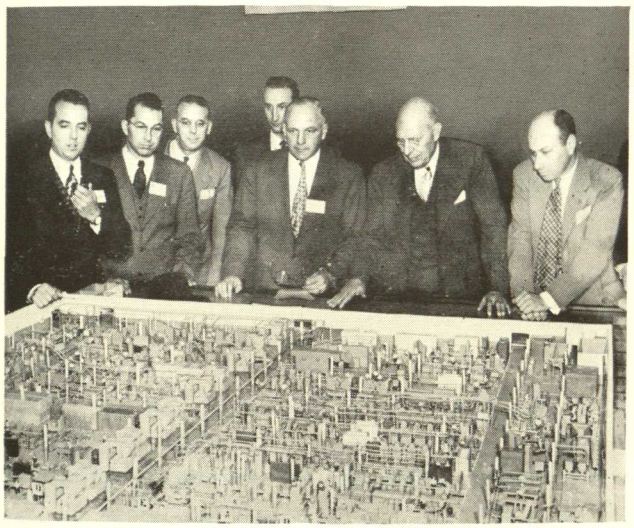
RAM AND PULSE JET DEVELOPMENT

The possibilities of the ram and pulse jet engines for aircraft have started many development projects. Engines of this type are a practical reality for guided missles and now we are about to see their use in man carrying craft. One of the first applications is the use of ram jets in the McDonnel-Air Force helicopter, "Little Henry," a one-man five hundred pound helicopter.

In jet helicopters the jet units are set in the tips of the rotors and provide a not very efficient, but an extremely light, source of power. In more conventional aircraft the jet units are mounted in the tips of the propeller.

The General Electric Company has built a $100,000 development center for the design and testing of jet helicopter components. The center contains a large dynamometer set in a circular pit for the testing of engines mounted in the tips of helicopter blades and also facilities for static testing.

Proponents of the new type power system seem to think that it will find many uses in both the military and civilian fields of aviation.



Charles F. Kettering, noted GM research engineer, (second from right), and S. C. Skinner, General Manager of Oldsmobile, Lansing, inspect the three-dimensional model layout of the new Oldsmobile engine plant.

GENERAL MOTORS V-8 ENGINE

Latest General Motors research into the realm of high efficiency engines is being incorporated into the new Oldsmobile high-compression engine. Now in production at the newly equipped plant in Lansing, Michigan, this new powerhouse, known as the "8-90" engine, will be installed in the 1949 models.

The principles of the engine were developed by Charles F. Kettering, noted GM research engineer, who worked with the idea of increasing the industry's average compression ratio of 6.5 to 1. An experimental model was finished in June, 1947, with a ratio of 12.5 to 1, consequently necessitating approximately 100 octane gasoline with a subsequent fuel saving of 30 to 40 percent. Inasmuch as oil companies were not able to produce this gasoline in quantity, the compression ratio of the new Oldsmobile engine was adjusted to the maximum for present premium fuel.

The engine as it is now being built, operates at a ratio of 7.25 to 1 and requires only an 86 octane gasoline. As compared to the old in-line type, there is an increase from 115 HP to 135 HP in the power rating and an increase in fuel economy of about 1 mile per gallon.

Behind the production of the new engine is the new, well-engineered layout of the plant which was developed from a large scale model of every operation. New to the automobile industry are transfer-type machines which are capable of multiple operations with only one operator. Capacity of the plant is 30 engines an hour. Latest inspection machines for the close tolerances of the Kettering engine check and classify the diameter, roundness, taper and bell-mouth of cylinder bores in a matter of seconds.

Oldsmobile's progress in the direction of high-compression engines of increased efficiency will undoubtedly prompt other manufacturers to take similar steps in renovating their power plants for passenger vehicles.

Quantity	*Conversion Factors*	
Potential difference	1 Statvolt	299.8 Volts
Current	1 Abampere	10 Amperes
Electric charge	1 Abcoulomb	10 Coulomb
Resistance	1 Statohm	8.988×10^{11} Ohms
Inductance	1 Stathenry	8.988×10^{11} Henries
Capacitance	1 Abfarad	10^{9} Farads
Mass	1 Pound	453.6 Grams
Length	1 Foot	30.48 Centimeters
Force	1 Poundal	13,826 Dynes
Energy, work	1 Foot-pound	1.356×10^{7} Ergs
Power	1 Horsepower	745.7 Ergs/sec.
Quantity of heat	1 B.T.U.	252 Calories

CAMPUS NEWS

DEAN MILLER NAMES RADFORD

Dean L. H. Miller recognized the fact that the Engineers were not utilizing the full benefits of the representatives on campus for the purpose of interviewing graduating seniors. He therefore created a new department to expedite the placing of these seniors. To head this department, Dean Miller appointed Prof. Stanley S. Radford, Eng'r. Drawing, in addition to his teaching schedule.

Mr. Radford has been in industry throughout the larger cities in Michigan holding responsible jobs and knows most of the policies and proceedures of these interviewing companies as well as many of their representatives.

Mr. Radford states that the largest problem is to get the student to the interview and that too many overlook this important service. The largest fault in the past has been the failure of the student to remember the interview. The second fault was that many times seniors failed to know of an interviewer being on campus. This year with the number of graduating seniors amounting to about 700 it is most important that every advantage be taken of our placement bureau.

NEW MSC PUBLICATION

The first issue of METHODS ENGINEERING NEWS was mailed in October to approximately 2000 Michigan manufacturers. This new publication, believed to be the first of its kind, is being distributed to the small manufacturers of the state. This group, employing between 25 and 300 persons, has been selected because it was felt they are large enough to give thought to Methods Engineering, but probably not large enough to warrant full time use of a man in this field.

According to Prof. James M. Apple, originator and editor of the publication, this bulletin will serve as a medium of exchange of information for the small industries of Michigan. It will offer information on such subjects as time and motion study, plant layout, materials handling, and production control.

Feature articles will be of such a nature as to be helpful to manufacturing men, while other departments of the bulletin will be devoted to the sources of information on operating practices, based on current periodicals, books, manufacturers literature, and questions and answers.

Left to right—Leonard C. Price, Dean, M.E.; W. G. Gude, Editor, "The Foundry"; R. L. Sweet, Prof., Met. E., M.S.C.; J. E. Coon, Packard Motor Car, Detroit.

FOUNDRY CONFERENCE NOTES

Foundrymen from throughout Michigan and from the Four Michigan Chapters of the American Foundryman's Society met October 1 thru 2, 1948, for general session in 111 Olds Hall. This is sponsored annually by the M.E. department. Its purpose is to bring men together who are actively interested in foundry problems, to discuss common concerns, and to present the newest and best thinking of authorities in the field.

The surprise and highlight of the conference was the unexpected appearance of E. W. Horlebein, Vice Chairman of the A. F. S. and President of the Gibson & Kirk Co. of Baltimore, Maryland, who spoke on policies of the A. F. S.

MILLER APPOINTS NEW DIRECTOR

Dr. C. C. DeWitt, formerly Chairman of the Department of Chemical and Metallurgical Engineering, has been appointed Director of the Engineering Experiment Station. In addition, his new duties will include general supervision of graduate study and research in the Engineering School. He will continue to be the representative of the Engineering School on the Graduate Council, and will retain his professorship in chemical engineering. Dr. DeWitt, a native of Pennsylvania and a graduate of the University of Michigan, has been connected with educational work in chemical and metallurgical engineering in Michigan since 1927. Prior to that time his industrial experience was concerned with the manufacture of iron and steel, organic chemical manufacture, and the development of high-speed electroplating. He is a registered professional engineer, the author of many scientific papers, and holds a number of United States Patents.

Dr. DeWitt also holds membership in the National Honorary Scientific Societies: Sigma Xi, Phi Lambda Upsilon, Iota Alpha. His fraternity is Alpha Chi Sigma.

TEXAS SIZED CONVENTION

The 1948 National Convention of Tau Beta Pi held at University of Texas, Austin, Texas, was done up in Texas-sized style from start to finish. The convention was planned to get the maximum of mixing, fellowship, business, and entertainment into three short days; the boys from Texas Alpha really showed us just how full you can pack twenty-four hours. From the minute the delegate was met at the train or plane and given his Texas-sized badge that proclaimed him to anyone within thirty feet to the time he had to leave, he didn't have a dull moment.

Business at the convention was handled right on schedule and with a minimum of confusion. Engineers can do it, in spite of the fact that such ticklish subjects as full membership of women into the organization and changes to the constitution were among the many items on the agenda. In addition, a lot of helpful ideas as to chapter projects and practices were gleaned from the chapter coordination sessions and the frequent bull-sessions.

But enough of the serious stuff. The entertainment surpassed all hopes that even the most wishfull thinker had dreamed up. The first evening was spent at Barton Springs where we all were treated to a real Texas barbeque which included "liquid" refreshments of several kinds. They served more meat per serving than the average housewife can afford to buy up here for an evening's meal. After the meal, a magician, a choral group, dancers, and movies wound up the evening.

Friday night brought a banquet which was followed by a semi-formal dance. Getting blind dates for some eighty fellows would be a job for any man but the Texan they put in charge of getting them for the dance was up to it. He had sent blanks earlier in the summer on which you were to request the size, shape, speed, etc., of the date that you wanted; how he found them, no one will know. And no one had a gripe. In fact, Prof. Cory of the E.E. Dept., the national president of Tau Beta Pi, seemed to like them all so well that he was cutting in on everyone that even came close to him.

Saturday afternoon brought a football game between Texas and Arkansas. Texas managed to pull it out of the fire, 13-7. It was hard to realize that football would even be played as eagerly as they did in that 90 degree plus temperature.

The convention wound up that night with another banquet that had for a main feature, a steak the size of which you only have dreams of ever seeing.

No matter where we went those three days, no matter what we did, we were made to feel welcome,

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just like those boys from Texas tell about no matter where you meet them.

And just to remove all doubts, this report on the convention was not written by the Texas Board of Pushing Texas Ahead . . . if there is such a thing . . . but just by a D. . . . Yankee who had a whale of a time in Texas.

GEORGE WILLIAM MICHEL,
President, Tau Beta Pi,
Michigan Alpha Chapter,
Convention Delegate.

Continued from page 7

of a quarter wave line with a "lighthouse" type tube mounted in each leg at the open end of the line. Heat dissipated by each tube is carried away by air forced up through each leg of the quarter-wave line.

The Antenna

The output, 90.5 MC ± 75 KC at 3000 watts, is then transferred to the antenna by means of a coaxial transmission line. The antenna is mounted on top of a 260 foot tower, making the entire structure 300 feet tall. The FM antenna is a directive array, that is, it concentrates or focuses the energy in a path perpendicular to the tower. Such a system directs the radiated energy where it is most needed instead of in the up-and-down directions where it would only be wasted. The antenna is popularly known as a "clover leaf" antenna due to its clover leaf shaped elements. The antenna was designed by the Bell Telephone Laboratories.

Monitoring and Trouble Shooting

In order to facilitate rapid diagnosis of trouble within the transmitter, a series of trouble indicating lamps have been provided. These lamps are connected to various overload relays, door switches, etc., and are normally lighted. If trouble should develop in one of these strategic points the corresponding lamp would be extinguished, thus immediately localizing the trouble. Adequate safety from high voltage shocks has been provided by door interlock switches.

The transmitter is provided with an auxiliary unit which is used to keep a constant check on the overall performance of the transmitter. The most important function of this unit is to indicate the difference between the center frequency and the assigned frequency. The center frequency must always be kept within the Federal Communications Commission tolerance of ±2000 cycles from the assigned frequency. In addition, this unit serves as a percentage modulation indicator and an audio monitor for the control room.

WKAR-FM is licensed to operate on unlimited time. The present schedule is from 7:00 A.M. until 10:00 P.M.

The entire installation was made during the summer of 1948 under the general supervision of Mr. Norris Grover, chief engineer of WKAR.

What Is the Future for Highway Engineers?

By BERNARD GRAY, *General Manager, The Asphalt Institute*

The article in the April issue of AMERICAN HIGHWAYS, by General Anderson, of Virginia, dealing with the current shortage of highway engineers, should indeed make everyone stop and think. We have been all aware that it was difficult to obtain competent men in sufficient numbers to permit preparation of plans and the direction of construction at the desired rate, but to some extent this condition was assumed to be of temporary nature and at least partly related to the disruption of war. The statistics presented indicate very clearly, however, that the shortage is not temporary, but on the contrary has been developing for some time and is only now becoming evident in its real proportions.

In talking to a lawyer friend of mine about the matter, he expressed considerable curiosity as why such a shortage had occurred. On every hand he had seen great activity with huge equipment and he had just assumed that highway engineering must be very well paid work. As a matter of fact when I mentioned the starting salaries in many States he was still of the opinion that lawyers began for less, and furthermore that they had put in three or four years more college work than most engineers had done. Well, that conversation started me to make a little more study of the situation, and as suggested in General Anderson's article, I asked myself whether or not under present day conditions I would enter the highway field of engineering. Knowing what I do about the business, I still believe that I would, but if I only knew what the average student in college knows I am afraid that I would be looking for opportunities elsewhere just as the record indicates.

With regard to my own college, while I knew from previous talks with the Dean of Engineering that the highway courses were not particularly popular, nevertheless I was surprised that not a single graduate in 1948 planned to become a highway engineer. And yet in times past this college has graduated many outstanding engineers who thave been quite successful in this branch of engineering. Of course I must admit that with $280 per month being the minimum wage accepted by last year's graduates, it was a little difficult to persuade a man to start in a highway department at $200 per month or even the lesser rate paid in some states.

However, I am also certain that a low salary is not the basic reason for not entering highway work. Not only are highway engineer students few in number but civil engineering majors constitute only about 15 per cent of the present graduating classes. In my own college, only 5 per cent are civil engineers, as contrasted with an entirely different situation 25 years ago. Recently there were two good openings in our organization and I requested the College Placement Service to recommend some fellow alumni. Not a single one was available who had the needed background of experience.

Reference has been made to the fact that highway departments lose men because they seek greener pastures. That is true, and I think it is not only to be expected but in addition it is desirable, provided we can have every year a new group of educated young men entering public work to serve at least a number of years and learn what it is all about. Not every engineer by temperament to be a good administrator in the higher brackets of public service, nor are there sufficient positions to take care of all the qualified men as they develop in capacity with the years. The very fact that industry and contractors supplying the highway field are able continually to employ trained engineers, is a proper encouragement to the many who find after their apprentice period that their talents run in that direction.

Not only that, but in the long run such transfers force laggard legislatures to a proper appreciation of the necessity for retention of trained men in public work and that they cannot expect to continue to be served on a philanthropic basis. Recently, in making a new addition to our staff, I asked the State Engineer if he would have any objections. He was definite in saying that he was distressed to lose the man, but on the other hand he thought his resignation might help to bring home to his Legislature the need for salary adjustments. I am glad to say that, in this instance, some increases have been recently made.

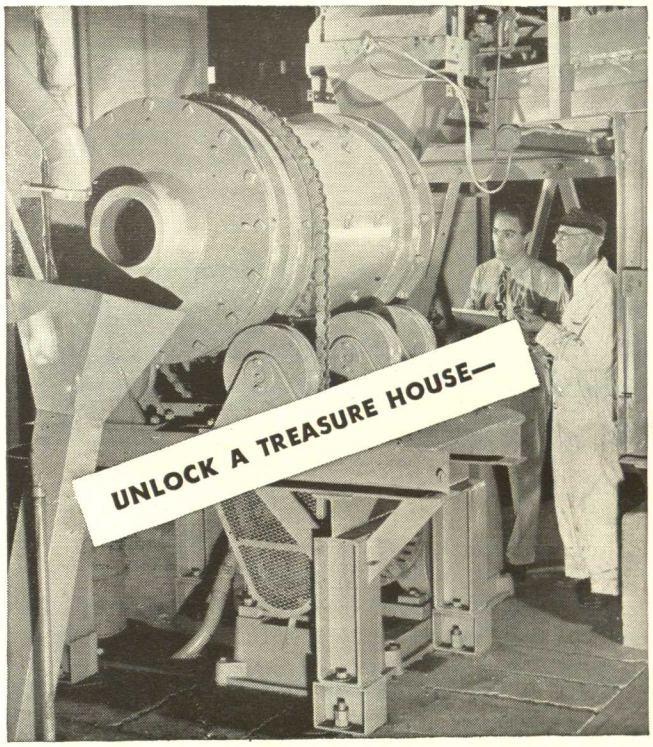
In addition to salary increases, there is another adjustment that must be accomplished in order that men will be induced to make highway engineering in public service a career. I refer to the political handicaps under which many highway departments are obliged to operate, and which have grown with the years.

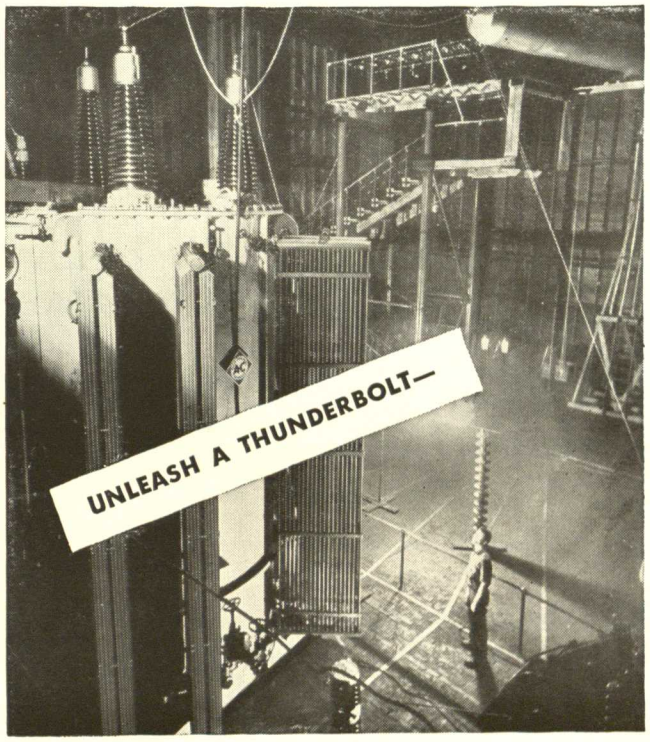
The young engineer is not unaware of this situation, and he does not propose to enter a kind of work where, as soon as he advances to a reasonably good job, say district engineer, he runs the risk of being demoted or fired every time the State has a new governor. Now in making this comment I know that there are many States where civil service protects against discharge, but in some of these States it also militates against advancement, and the young engineer is familiar with that situation too and therefore looks elsewhere for a career.

It is too bad that in some way the public cannot be educated to the waste involved in the constant turnover in public work brought about purely by political changes. For a highway department alone it runs to millions of dollars. Just suppose a railroad or an industrial corporation fired or demoted all its key engineers every two or four years, not because they weren't capable, but just because they didn't belong to some party or because politico Bill Smith couldn't run them? They wouldn't last long, because that kind of an unstable employment condition could not produce results. If we do not establish our public service on a level above petty politics, we can not hope to continue to attract the kind of engineers needed, similar to the ones who built the present system, and who are largely maintaining it today.

We, as an engineer group, whether in public work or on the industry side of the fence, are largely to blame for this condition and it is high time that we did something about it. The so-called American way of life is dependent very largely upon engineers and engineering, and it will only require the right kind of action to gain for engineers the recognition that their contribution to the welfare of society merits. When we complain about the fact that graduate engineers do not enter highway work, we should remember that it wasn't too many years ago that we were graduates and that it has been in our hands to protect our position and see to it that other groups did not usurp perogatives that properly belong to us.

OPEN: New Fields to Explore!





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COMMERCIAL RADAR

Here's good news for you former navy radarmen! The fishing fleet is turning to the new equipment.

Typical example is the experience of the tuna boat, Normandie, which was able to operate with war-surplus radar when other ships were fog-bound. It has made bait fishing possible in dense fog as well as entering and leaving the harbor on schedule. Trials are being made to locate by radar swarms of birds that indicate the presence of fish.

New commercial-type radar is being installed on many boats which will reduce maintenance greatly. Antenna dome of this new installation looks like a round cheesebox and contains some of the equipment immediately below it, thus eliminating much of the bulkiness of wartime sets.

SIDE TRACKED . . . .

Bookstore Salesman: "Young man, you need this book. It will do half your college work for you."

Engineer: "Fine, give me two."

★ ★ ★

It's all right to tell a girl that she has pretty legs, but, don't compliment her too highly.—Hi Ya'll.

A fellow we know has a broken arm that he received for fighting for a woman's honor. It seemed that she wanted to keep it.

★ ★ ★

Caller: It your mother engaged?

Little Boy: I think she's married.

★ ★ ★

Marriage is like a hot bath . . . By the time you get used to it, it's not so hot.

★ ★ ★

Do you know what good clean fun is?

No. What good is it?

★ ★ ★

First little pig entered bar, climbed on stool and ordered a beer, couldn't finish it, so left.

Second little pig—same.

Third little pig, the smallest of the three entered bar, had difficulty climbing on stool but did and ordered 2 beers. The bartender was astonished and asked him, "How come, since your brothers couldn't finish even one beer?"

"Oh," was the reply, "I'M a little pig that went wee wee wee all the way home."

★ ★ ★

She was only an architect's daughter, but she had designs on everybody.

★ ★ ★

He: Why wait 'till we get home to tell me whether you'll marry me or not?

She: I'm scared. This is the very same spot father proposed to my mother.

He: What about it?

She: Well, on the way home, the horse ran away and father was killed.

★ ★ ★

Jean: "I'd love to go to the Engineer's ball.

Bob: That's the way to get there.

★ ★ ★

"Is my face dirty or is it my imagination?"

"Your face is clean, but I don't know about your imagination."

★ ★ ★

She: Do you want to stop the car and eat, Sweetheart?

He: No, Pet!

★ ★ ★

Upper Crust: A lot of crumbs held together by their own dough.

★ ★ ★

Sign in the Engineering Library: "Low conversation permitted."

★ ★ ★

There was a young lady named Banker
Who slept while the ship was at anchor.
She woke in dismay
When she heard the mate say,
"Now hoist the topsheet and spanker."

★ ★ ★

Kiss.

Interval.

She: I'll bet you're a bugler in the R.O.T.C.

Then there was the absent-minded fly that couldn't remember what it did with its specks.

★ ★ ★

She was only a gear maker's daughter, but — she could outstrip them all.

★ ★ ★

Fran: Would you think it was Telepathy if we were thinking the same thing?

Dick: No. Just plain good luck.

Well built gay-deceivers
May turn to retrievers—
Strong men of uncommon restraint;
But you risk disillusion
And utter confusion
For though they look real, they ain't.

★ ★ ★

Demure young thing: What kind of an officer are you?

Officer: I'm a Naval Surgeon.

D.Y.T.: Dear, how you Doctors do specialize.