

SEMINAR WEEK-END

FURTHER REPORTS ON MARCH PROCEEDINGS

"Inflation on a Balanced Budget"

PROF. PHILIP S. FOGG

Reported by *Robert V. Carey*, '32

By means of a graphic analysis, Professor Fogg demonstrated the tremendous growth in Federal expenditures since the World War. Prior to the War, Federal expenditures amounted to between \$750,000,000 and \$800,000,000 per annum, financed largely by customs and liquor taxes.

The tremendous outlays necessitated by the War jumped expenditures to approximately 13 billion dollars in 1918 and 19 billion in 1919, necessitating the borrowing of 25 billion dollars. As a result of the War, Federal expenditures during the 'twenties assumed a new high level of between 3½ and 4 billion dollars a year.

The emergency spending undertaken by the Roosevelt administration as a means to combat the depression resulted in the borrowing of huge sums of money and a consequent rise in Federal expenditure to a new high level of 7 to 9 billion dollars a year.

Professor Fogg pointed out that this program would result in a permanent level of Federal expenditures of at least 7 billions dollars per annum below which expenses probably could not be reduced. The only method of balancing the budget would be to raise the income of the Federal government to a level commensurate with outlays. He further stated that an unbalanced budget cannot continue indefinitely without drastic price inflation. However, barring another war, Professor Fogg stated that, in his opinion, means would eventually be found to raise the Federal income.

Aeronautics Seminar

Reported by *Harry H. Canterbury*, '06

Papers presented as follows:

1. Louis G. Dunn—on the design of rocket motors with respect to investigating their thermal efficiency. Object—obtaining scientific data at great heights, possibly 200,000 feet.
2. Frank J. Malina—on monocoque construction and analysis of stresses of the skin and strengthening members.
3. W. L. Howland—monocoque construction analysis. In small structures, factors are well known but large planes now being built require extensive research analysis.
4. Lt. Beardsley, U.S.N.—Studies on impact with relation to failure of landing gear. Repetitive impact testing machine now being designed. This is a vertical drop type machine.
5. Robert S. Schairer—profile and drag measurements. Lantern slides to illustrate the apparatus and curves obtained.

(Continued on page 11)

equipment. With the installation and maintenance of many miles of pipeline, surveys and mapping work are essential. It is also necessary to secure rights-of-way and permits to lay lines in streets and other public property. These men are getting a taste of all this work rather than being confined to any one particular duty.

Similarly employed in the design engineering department is Robert T. Bard, '35. He is primarily engaged in making maps and studying the layout of pipeline systems in relation to the topography of the country they traverse.

Charles H. Wilcox, '15, is chief steam engineer. He superintends the operation of the boiler plant as steam is used continuously to operate huge gas compressors, and during the winter season steam must be kept available at all times for use in the generators to manufacture gas in case of shortage or damage to the huge transmission lines bringing gas from the oil fields.

Engaged in the research laboratory is Rudolph G. Holman, '34, where he is working on numerous technical problems. Proper pressures, specific gravity and specific heat are important items to be calibrated exactly in determining the characteristics of natural gas in its behavior in transmission and distribution systems.

In other departments are still other Tech men. In the land and tax department are Charles F. Humphrey, '26, who is franchise engineer, and Howard R. Preston, '23, office engineer. The work of these men relates to recording and valuation of Company property for franchise, rate making and taxation requirements.

In the general agents office, Austin Strong, '30, and George Pickett, '33, are office engineers. They are engaged in job classification and cost and time accounting of the many standardized procedures of employees in many different departments where such studies may develop better ways to do the job.

Twenty-seven Cal-Tech men in one organization bespeak the recognition by the Gas Company of the value of a technical training in college. Not only technicians, but other employees are better qualified to handle their jobs when their background has taught them to think and act logically. Opportunity with a gas utility is wide for engineers, as evidenced by the positions attained by the men mentioned above, and Southern California Gas Company will undoubtedly list even greater numbers of Cal-Tech graduates as time goes on.

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STUDY FOSSILS

Systematic study at the Institute of fossil fish of the Pacific Coast will be made possible by a grant of funds recently made by the Geographical Society of America. The work will be supervised by Dr. Chester Stock, professor of paleontology, and will use fossils already collected and awaiting study, in addition to securing further material.

SEMINARS

(Continued from page 8)

Problems of turbulence of the boundary layer, intimately connected with problems of drag.

6. Irving L. Ashkenas—the problem of removal of the boundary layer from upper surface of wing, by suction, to increase lift coefficient.

7. Peter V. Serrell—a new design for mounting models in wind tunnel study, to give direct readings on all the forces.

Remarks by Dr. Arthur L. Klein—that the primary requirement of design is the lightest weight for the required strength. Discussion was conducted by Dr. Klein.

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Civil Engineering Seminar

Reported by *William W. Aultman, '27*

In the Civil Engineering Seminar three papers were presented on recent research and developments in that field. Professor Franklin Thomas discussed the chemistry of water softening, the relative hardness of Southern California water supplies to other supplies in the United States, and then briefly described the plans of the Metropolitan Water District (of which Professor Thomas is Pasadena representative and vice chairman of the Board) for softening Colorado River water.

Professor Fred J. Converse next described and illustrated with slides, loading tests which were made on a full scale model of a Lamella roof. These tests were under the supervision of Professor Converse and Dr. von Karman and were made by Ed Seaver, '21 and Ben Benioff, '22 and five other Tech men.

The last talk was by Dr. Robert Knapp who presented and described two very interesting motion pictures; one on the wave action of high velocity fluid flows in flumes; and the other reporting model tests on density current studies of suspended material in stratified flow.

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Physics Seminar

Reported by *Fred J. Ewing, '27*

The physics seminar was led by Professor E. C. Watson.

Professor I. S. Bowen discussed his new "image slicer." Hitherto in stellar spectroscopy only 2 to 10% of the light focused by a telescope has been available for spectra because the diameter of the star image greatly exceeds the permissible width of the spectroscopy slit. Professor Bowen reflects the circular image along a path, parallel to the slit face and converging over the slit, and then reflects successive strips of the image into the slit by means of a number of very small mirrors. By means of his device a five-fold increase in speed can be obtained.

Professor A. Goetz discussed his recent work on biological effects at low temperatures. By very rapid cooling, yeast cells may be brought to liquid air temperature without killing

them. By studying the mortality rate for various speeds of cooling, a constant indicative of vitality can be obtained.

Professor John Strong discussed his new radiation pyrometer. By multiple reflection from quartz crystals a narrow band may be isolated, having a wave length in the far infrared, for which black bodies as "incandescent" at atmospheric or subatmospheric temperatures.

Professor W. V. Houston discussed various methods for electromagnetically and electrostatically focussing electron beams. Their application to microscopy was illustrated by showing several pictures taken with an electron-microscope.

Professor W. R. Smythe discussed his recent work on isotopes which served to identify a new isotope as the source of potassium radioactivity.

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"Human Engineering"

In introducing his subject of psychology as applied to studies of intelligence, aptitude and personality, Professor Robert T. Ross described the means whereby valid tests and groupings of individuals are devised and evolved. He pointed out the merits and possibilities of such work and reported indicative and significant current progress. In the field of personality studies, one of the most difficult of psychological investigations, it is believed that meritorious accomplishments can be made in human engineering.

Dr. Ross, '27, followed his undergraduate studies of physics and mathematics with work at Pomona College, U.S.C. and Yale University in education, psychology and medicine, and is now a popular professor of psychology in Stanford University—combined with lectures at the Institute, special research at Pasadena Community Theatre, and clinical studies.

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Other Seminars

Among the most interesting of the seminar sessions, the following are grouped in brief solely because, somehow, our reportorial aspirations failed to materialize. These are:

Mechanical Engineering Seminar. Discussion of work in the hydraulic machinery laboratory and the development and tests of models for Grand Coulee pumps, by Prof. Daugherty. A discussion of the effects of speed of loading upon strength of materials, by Prof. Donald S. Clark.

Humanities Seminar, introduced by Prof. Clinton K. Judy. A discussion of contemporary American literature was provided by Prof. MacMinn and mimeographed lists of recommended reading were distributed. Mr. A. B. Young, lecturer and chairman of the State Relief Administration, spoke on relief and welfare.

The Sunday morning program was opened by Theodore G. Soares, professor of Ethics, who conducted a highly interesting chapel session.

"Recent Developments in Television," by Prof. Stuart Mackeown, involved a discussion of commercial and technical aspects of new television developments.