

. OF INTEREST

ATOM SMASHING

Atom smashing will be of great interest not only to physicists, but also the medical profession, according to **Dr. Robley D. Evans, '28**, now on the M.I.T. teaching staff.

"Since artificial radioactive isotopes of all the stable chemical elements are now available," he explained, "the domain of the new techniques of radioactive tracers is the re-investigation of all problems in all fields of science and technology in which greater accuracy would be useful.

"Ordinarily the method has approximately a million times the sensitivity of the best microchemical methods. It also has the tremendous and unique advantage of marking individual batches of any given chemical. For example, the thyroid gland normally contains a great deal of iodine, but if a subject is given an injection of one milligram of additional radioactive iodine, then the arrival of any given fraction of this injected iodine in the thyroid can be accurately determined without any interference from the overwhelmingly greater iodine already present in the gland before the experiment.

"This technique is opening a new and promising field of research and medicine. Already extensive investigations of the biochemical utilization of iodine in the formation of the hormones of the thyroid are being carried out in a co-operative project in which physicists and medical scientists are co-operating at the Massachusetts Institute of Technology."

NEWS NOTES

Development of the electron microscope has been one of the most important scientific advances of the past year. At the Institute, research on an instrument having a magnification of 7,000 diameters has been carried on by Hugh Bradner, under the direction of Professor William V. Houston.

As a giant natural memorial to the late Dr. George Ellery Hale, one of the founders of the Palomar Observatory, a Sierra Nevada mountain peak, more than 13,000 feet high and within three miles of Mt. Whitney, has been named in his honor.

Once again Dr. Irving P. Krick, the Institute's long range weather forecaster, has been named one of the ten outstanding young men of the United States by the U. S. Junior Chamber of Commerce.

Two Tech scientists, Dr. Ian Campbell, associate professor of petrology, and Dr. Horace J. Fraser, have been honored by their election to fellowship in the Geological Society of America.

Federal soil conservation officials recently inspected the Institute's laboratories, and after watching demonstrations, expressed themselves as being tremendously impressed. Especial interest was shown in the experimental flume, where study of the sediment carrying power of water is being conducted.

Stanley G. Stroud, veteran guard, was awarded the Wheaton Trophy as the feature of the annual Caltech Winter Athletic Banquet, held at the Pasadena Athletic Club. Stroud, a three year letterman, was named on the All-Conference second team at the close of the past football season.

TUITION RAISED

The 1940-41 California Institute Catalogue, which has just come from the press, contains, besides the usual minor routine corrections, several changes which will be of interest to the alumni.

The section formerly called "Extra-Curricular Opportunities" has been completely rearranged and rewritten under the supervision of the Board of Directors of the Student Body. This section, under a new title, "Student Life," gives a much more accurate and detailed description of student body organization, the Student Houses and the Throop Club, the athletic program, and undergraduate societies and clubs.

In the section "Expenses," announcement is made of a change in the tuition rate which will affect only those students newly entering the Institute next September and after.

Institute authorities explained that the change was necessitated by the fact that the average rate of return on invested funds has been dropping steadily for the past several years. Privately endowed institutions all over the country have been faced with the same difficulty, which has in general been increased by the falling off of gifts of funds for educational purposes. During the past few years there has been a steady tendency toward increasing the tuition fees of privately endowed colleges and universities. The Institute has been reluctant to follow this trend, but it has become apparent that if the tuition fee were not increased, there would be the prospect of having to curtail some of the Institute's program of instruction and research. It should be pointed out that the fee of \$360, which goes into effect for new students next fall, is considerably lower than the tuition charge at other scientific and engineering institutions of the same rank.

Realizing that many of the students at present enrolled in the Institute have planned their educational financing on the basis of the present tuition charge of \$300 a year, the Board of Trustees ruled that students now enrolled at the Institute can continue at this rate as long as they are continuously in residence and working toward a definite degree.

The new Catalogue also contains the announcement of a slight increase for next year in the charge for board and room in the Student Houses. When the Student Houses were opened, the charge was calculated to include a sum for upkeep, renovation, repairs, and the necessary replacement of furniture and other equipment. Experience has shown that that sum is not sufficient to provide for such expenses.

The Trustees stated that it is not the Institute's intention to make a profit on the Student Houses. They were agreed, however, that the charges should equal the expenses; that the rate should be set so that the Student Houses would not incur a deficit, which would involve drawing on the Institute's income from tuition or other sources. Therefore, the increase of \$17 per year in the charge for board and room is necessary if the Student Houses are to break even.

The new Catalogue records the largest enrollment in the history of the Institute — 618 undergraduates and 322 graduate students — a total of 940.

U.H.F. For Aeronautics

Use of ultra high frequency radio waves for airplane navigation is the newest contribution of science toward increasing the safety of aviation, Dr. William H. Pickering, assistant professor of electrical engineering at Caltech, informed a recent Sigma Xi luncheon at the Athenaeum.

These ultra short waves, now coming into use, and with some phases progressing rapidly experimentally, are important to aviation because:

1. They virtually are free of static.
2. They provide a freedom from false courses.
3. They are not subject to defraction, such as the longer radio waves now in general use in flying.

The physical dimensions of the transmitters and antennas for ultra short wave broadcasting are such that, if practical from an aviation viewpoint, could be easily installed on a front lawn.

Dr. Pickering reviewed progress that has been made in the application of radio signals to the problem of blind landing, disclosing that many ingenious advances already have been made.

Electro-Photography

Patent attorney and inventor — this is the dual role of **Chester F. Carlson, '30**, following his recent admission to the bar. As an employe of a firm of patent attorneys in Manhattan, Carlson has aided in safeguarding the interests of many inventors. Now, as a patent attorney, he finds himself protecting his own interests as an inventor.

He has just been granted a patent for a new method of photography that has been widely acclaimed in scientific and industrial circles and may become an important factor in the nation's defense program. By Carlson's method of photography, an image is recorded electrically instead of chemically and prints can be produced immediately without the usual development. One part of the process is exactly the same as the old stunt of rubbing a fountain pen on one's coat sleeve and picking up bits of paper with the electrical charge produced.

In Carlson's process, the camera lens forms a light image, in the usual way. This is not on the customary plat or film, but on a material that is "photo-emissive," that is, it gives off electrons where the light falls. Immediately behind this is a sheet of some film, such as cellophane, and then a metal electrode, connected to an electrical circuit so as to draw the electrons to the cellophane, which then becomes charged in the electron-bombarded areas.

After exposure, the film is drawn into another chamber, where it is sprayed with ink from an atomizer or dusted with a fine powder. This sticks to the charged areas, and the picture appears. For protection and to make an opaque print the film is fastened to a sheet of paper or a card. The system is especially adapted to reproducing drawings, typewriting, etc., but it also can be used for X-ray pictures and other kinds of photography. In such applications the advantage would be that a permanent print could be obtained almost immediately.

Carlson has been working on the process for three or four years during the time he was studying for admission to the bar. He believes that his method may become important in the defense program through use in X-raying soldiers' lungs or X-ray metals to disclose defects.

Traffic Safety Device

What decidedly strikes the observer of American conditions, is the fact of an extraordinary permeation of daily life with the accomplishments of a highly developed technic. There is hardly a field of the far reaching American civilization which does not have to thank the spirit of progressive technic for many improvements and perfections.

Singularly it affects the observer to be obliged to establish the fact at the same time, the simplest things and conditions are often not encompassed in these technical accomplishments; that, surprisingly, their practical developments have been overlooked. It is astounding, for example, that in the United States certain regulations for the control of automobile traffic have not been established, which, for instance have long been functioning in Central Europe, by virtue of official decree. These regulations lend to European automobile traffic much greater safety than exists in the United States.

In different European countries, before any passenger automobile or truck is permitted to operate, the following official regulation must be met: The conveyance must carry on the right as well as on the left side a red signal-arm, which can easily be operated from the switchboard, and which serves to indicate **unmistakably** to every driver when a left or right hand turn is to be made, or when a changeover from one lane to another is desired, as well as when one desires to go straight ahead. This apparatus **always indicates clearly** which direction is to be taken. There is not an automobile, in Europe, which is not equipped with such signal arms, which contribute to the safety of automobile travel. These are turned out serially by the automobile manufacturers and are delivered with the automobiles.

Such signal-arms, about 8-10 inches long, rest, when the automobile is following a straight line, in a slit or narrow groove, one of which is built in each side of the car. They are made of a metal frame, which is covered with red, transparent celluloid and in their hollow interior a red signal lamp is attached. As soon as the driver wishes to change his course, he conveniently turns a switch lever on the switchboard, either right or left. Correspondingly, the right or the left signal-arm immediately assumes a horizontal position and remains thus until the automobile again follows a straight line. While the red color has its advantage during the day, its value is greatly enhanced through the red signal lamp when used at night, so that it is impossible to misjudge the driver's intent as to the direction he wishes to turn.

On trucks these signal-arms are double size. Besides, they do not only remain in horizontal position when so placed by the action of the driver, but during the time the car is going around a curve, they make a slow up-and-down motion, similar to the movement of a red crossing wig-wag signal, so that the attention of every traffic participant or autoist is attracted to them and there can be no doubt at all as to the direction the driver wishes to take.

The advantages of this kind of mechanical direction-indicator for the regulation of automobile traffic are so obvious that it must be surprising to the observer of American conditions that they have not as yet been introduced in the United States, and besides that they are not as yet re-

NEW GENERATOR

Dr. C. W. Potapenko of the Institute's Physics Department recently announced development of a generator which can produce electric pulses of extremely short duration — down to nearly one-millionth of a second.

Dr. Potapenko not long ago produced the shortest radio waves ever achieved, one centimeter. He used a tiny radio tube no larger than a house fly.

Dr. Potapenko also determined that when bacteria in the human body are bombarded with ultra short electro-magnetic waves, it is the heat and not the waves which kill the bacteria.

BEQUEST

A \$1,000,000 trust fund to be eventually divided between Stanford, the University of California and California Institute of Technology was established under the will of the late Miss Lee L. Jacks, on file for probate at Monterey.

The will provides that income from the fund shall go to four surviving sisters of the pioneer family until death and then be shared equally between the three schools.

quired by law. For how impractical and above all how **inadequate** and dangerous in traffic is here the manipulation of the signals announcing the change of direction. The horizontally raised left arm of the driver indicates a turn to the left, the more or less upright raised left arm indicates a turn to the right. Aside from the fact that at night one is never sure of the direction indicated by such an unilluminated arm, so that by such misunderstanding a serious traffic accident may arise at any time, it is certainly not comfortable in winter to drive with an open window and to stretch one's arm out into the cold. (There are, indeed, States in which, contrary to the climate of the Golden State or Florida, bad winter weather is had!). Furthermore, this practice leads to the habit of steering the car with but **one hand**, while it should be made a rule that both hands rest on the steering wheel in order to insure the greatest traffic security. Also the non-illuminated imitation-hands which are attached to the left side of American buses and trucks are very inadequate with regard to a clear and unmistakable direction-indication and the recognition of the intent of the driver, since an automobile taking a right curve naturally attracts attention to its right side. It is, therefore, psychologically false to try to attract the attention of the following automobiles to the left side. It remains an undeniable fact that lighted, red signal-arms, attached to both sides of the automobile, unexpectedly fulfill their purpose while signals by means of the more or less careless raising of an unilluminated arm, or the use of an unilluminated imitation-hand attached to the left side of the automobile remain very inadequate.

It is the hope of the writer that the above remarks may serve to interest authorities sufficiently to install or cause to be installed on both sides of automobiles mechanically operated red-illuminated signal-arms and to require their use by law and thus increase traffic safety. The long experience which the European countries have had with them prove that traffic safety can be greatly increased through their use.

Dr. Hugo Gabriel,
The Athenaeum.

HOBSON HONORED

Jesse E. Hobson, Ph.D., '35, central station engineer of the Westinghouse Electric Manufacturing Co., East Pittsburgh, was named by Eta Kappa Nu, electrical engineering honor society as the outstanding young electrical engineer for 1940. The presentation was made at a dinner held at the Philadelphia Engineerin Club here in connection with the winter convention of the American Institute of Electrical Engineers. Donald G. Fink, managing editor of the magazine "Electronics", New York, and Stuart G. Hight of the Bell Telephone Laboratories, New York, were given honorable mention.

The Eta Kappa Nu Award is made annually to engineers not more than ten years out of college and not more than 35 years of age to recognize "meritorious service in the interests of their fellow men." It is felt that the careers of outstanding men who are yet in their early thirties will act as valuable guides for undergraduates and inspire new graduates to take up their professional development without delay. The selections were made by a jury of prominent engineers, headed by P. H. Chase, chief engineer of the Philadelphia Electric Company, R. E. Hellmund, chief engineer of the Westinghouse Electric and Manufacturing Company, R. W. Sorensen, president of the American Institute of Electrical Engineers and professor of electrical engineering, California Institute of Technology, F. E. Brooks, chief engineer, Bronx-Westchester Division, New York Telephone Company, and George P. Sawyer of the Cerro de Pasco Copper Corporation.

Dr. Hobson, winner of the award, has been with the Westinghouse Company since the spring of 1937, and for the past three years has been central station engineer in charge of the consulting service provided for customers' engineers in the coordination of central station equipment and in the solution of analytical problems related to system performance and operation. He has published a number of papers dealing with power system analysis and has given lectures on power system performance. He also is known as an able teacher, and has given graduate courses in symmetrical components at the University of Pittsburgh and Northwestern University.

Previous to his present connection Dr. Hobson taught mathematics and was assistant to the Dean of Earlham College and instructor in electrical engineering at Armour Institute of Technology. He was born at Marshall, Indiana, on May 2, 1911, and was graduated from Purdue University in 1932. He obtained a Tau Beta Pi fellowship which enabled him to secure his master's degree, also from Purdue. The following year he was graduate assistant and teaching fellow at California Institute of Technology, being rewarded in 1935 with a doctorate degree, magnum cum laude. He is a member of Triangle, Sigma Xi, Sigma Delta Chi, Tau Beta Pi and Eta Kappa Nu, the American Institute of Electrical Engineers, and the Purdue Club of Pittsburgh.

DEFENSE COURSES

All Alumni interested in taking some of the Institute's Engineering Defense Training Courses in Production Engineering, Explosives, Tool Design, etc., should contact Professor Franklin Thomas at once. New courses will start about the middle of May. Courses are at night, and no tuition is charged.

PAULING RECEIVES MEDAL

(Continued from page 15)

'The Nature of the Chemical Bond.'

"Pauling's continual preoccupation with geometry has brought him into conflict with another geometer among chemists, Miss Dorothy Wrinch, and has resulted in several papers dealing with the structure of proteins."

A new structural chemistry has gone through the first stages of its development during the past twenty years, Dr. Pauling declared, describing two general methods of attack.

"The first," he said "is the accurate experimental determination, by the analysis of band spectra and of x-ray and electron diffraction patterns, of the nuclear configurations of molecules and crystals. This has provided a great deal of information about the ways in which atoms are bonded together to produce substances with the great observed variety of chemical and physical properties.

"The second general method is the development of the theory of the chemical bond and the electronic structure of molecules and crystals, giving an insight into the detailed nature of the forces involved in interatomic interactions.

"After years of development the older structural chemistry has become so reliable that the organic chemist can usually write with confidence the structural formula of the substance produced by a given reaction. The new structural chemistry has not yet developed to this stage, but we may look forward to the time when the chemist can take the specifications of desired physical, chemical, or especially physiological properties, interpret them in terms of the constituent atoms, the interatomic distances and bond angles, and topological character of the structure, and deduce from these the nature of the molecule to be synthesized which will show these properties."

Dr. Pauling, who is now working on the problems of immunology in an effort to determine exactly the structure of antibodies and antitoxins, was born in Portland, Oregon, on February 28, 1901, and received the bachelor of science degree in 1922 from Oregon State College. He won a teaching fellowship at the California Institute of Technology and was awarded the Ph.D. degree by the Institute in 1925.

He was a National Research Fellow in 1925-26, and in the latter year was awarded a Guggenheim Fellowship, which was renewed in 1927. He studied with Professor Arnold Sommerfeld in Munich, with Niels Bohr in Copenhagen, and with Erwin Schroedinger in Zurich.

Dr. Pauling became assistant professor at California Institute of Technology in 1927, associate professor in 1929, professor in 1931, and chairman of the division and director of the Gates and Crellin Laboratories of Chemistry at the Institute in 1937. He lectured in chemistry and physics at the University of California each Spring from 1929 to 1933, and at the Massachusetts Institute of Technology in 1932. He was George Fisher Baker Non-Resident Lecturer in Chemistry at Cornell University in 1937-38.

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