

sion in 1923 and professor of plant physiology in 1925. Professor Lipman's researches on micro-organisms concerned in nitrogen-fixation and nitrification in arid and semi-arid soils grew out of his work with Professor Hilgard and were followed in later years by pioneer investigations on the necessity of certain micro-elements essential for plant nutrition, demonstrating that copper and zinc are necessary for the higher plants.

Having discovered that bacteria could survive many years in desiccated soils, Professor Lipman was impelled to study some fundamental problems in longevity which others, lacking his courage, had declined to investigate. He found that many specimens of geologically old sedimentary and even metamorphic rocks contained small numbers of bacteria consisting mainly of spore-bearing rods. Similar examinations made of igneous rocks showed them to be entirely free from any living forms. Since the length of time during which micro-organisms have survived in many geological specimens can not be determined with certainty due to the possible contamination by ground waters and other means, Professor Lipman also investigated the occurrence of micro-organisms in old materials, such as herbarium specimens, bottled soil samples and bricks from the interior of pre-Inca pyramids in Peru which could be assumed to have been free from outside contamination. His results provided convincing evidence that the resting forms of some types of bacteria can survive in a dry condition for hundreds and probably thousands of years and that cells of the blue-green alga, *Nostoc commune*, may remain viable for at least 88 years. Other micro-organisms such as *Azotobacter chroococcum* can survive in a desiccated condition only a few years.

Other noteworthy contributions which Professor Lipman made in the field of micro-biology are the demonstrations of symbiosis between green algae and nitrogen-fixing bacteria and the isolation of a new type of sulfur-oxidizing bacterium, *Thiobacillus coprolyticus*.

He was interested in the problems of life in an environment which putatively existed when planetary conditions were emerging from a cosmos consisting mainly of rock fragments and water.

His career as dean of the graduate division gave Professor Lipman an opportunity to uphold his high

ideals of liberal education, through personal conferences with each candidate for the doctorate. During the twenty-one years that he served in that office he raised measurably the standards of graduate study in this university.

Furthermore, he was genuinely interested in the broad international field of education, and cordially welcomed foreign students who came to the University of California. He was a member of the board of directors of International House in Berkeley, president of the California Chapter of the American-Scandinavian Foundation in 1941 and a member of the advisory committee appointed in 1941 by the Department of State to provide facilities for foreign students in those tumultuous times. For many years he was a member of the advisory board of the John Simon Guggenheim Memorial Foundation, which grants funds to scholars for research or for other creative work. As a result of his intimate knowledge of such organizations and acquaintance with various universities, Professor Lipman was able to expedite the progress of many a promising young student in California and elsewhere.

Lipman's breadth of view in science was demonstrated not only by his membership in professional societies at home and abroad but by his service on the editorial boards of the *Journal of Bacteriology*, of *Plant Physiology*, of *Soil Science*, of the University of California Publications in Agricultural Sciences and of the committee on the organization of the Sixth Pan-Pacific Science Congress, which convened in Berkeley in 1939.

Personally attractive, a genial conversationalist, well poised socially, blessed with a sense of humor and with a gift for innate friendliness, he was esteemed wherever he went.

Professor Lipman believed implicitly in the power of education to liberate the human intellect from the shackles of ignorance, provincialism and fanaticism. He insisted that higher education and graduate study should confer upon the student not only special skills, but a broad, tolerant attitude and appreciation of human cultures. He observed keenly, worked intensively, conquered obstacles and advanced science in a way which exemplified his own high ideals.

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## SCIENTIFIC EVENTS

### THE INDUSTRIAL DEVELOPMENT OF INDIA

THE industrial development of India after the war was discussed on October 16 by the five Indian scientists who recently arrived in England to make contact

with scientific, industrial and agricultural research organizations.

*The Times*, London, reports that the visitors were present at a conference at the headquarters of the Royal Society, Burlington House, presided over by

Professor A. V. Hill, M.P., and explained the object of their visit. During their stay of six weeks they planned to visit Edinburgh, Glasgow, Leeds, Manchester, Sheffield, the potteries, the universities and a number of the most important industrial plants of Great Britain. The members of the mission are:

Sir Shanti Bhatnagar, F.R.S., director of Scientific and Industrial Research, India; Sir J. Chandra Ghosh, director of the Indian Institute of Science, Bangalore; Professor S. K. Mitra (Physics) and Professor J. N. Mukherjee (Chemistry), University of Calcutta, and Dr. Nazir Ahmad, director of the Cotton Technological Laboratory, Bombay.

Professor Hill said that India would probably need to spend £1,000,000,000 in obtaining capital equipment for her industries, and without it she could not start on any serious industrial development.

The mission has authority to place orders for equipment both in Great Britain and in America, which it will visit at the end of the year, and preliminary orders amount to many lakhs of rupees.

Members of the mission explained at the conference

that the development of India needed long-term planning and involved many branches of industrial activity. Many of the industries contemplated depended on the development of electricity. For instance, radio offered a tremendous field, and though there were already demonstration farms, they could do with multiplying at least one hundred times. Hundreds of young Indian students were ready to come to England as soon as transport was available and conditions were suitable for training in scientific and technological subjects.

In a joint statement the visitors expressed satisfaction that the Government of India was considering the possibility of opening on a permanent basis central scientific offices for mutual cooperation both in London and Washington, and they hoped that shortly it might be possible to have such an office also in Moscow. The war had made authorities in every country conscious of the value of scientific research. Though the expenditure from public funds on scientific research in India was now very meager, comprehensive plans for the establishment of well-equipped national research laboratories on various branches of pure and applied science, public health and agriculture were being prepared.

The members of the mission were entertained at a reception by the Royal Society at Burlington House. Sir Henry Dale, president of the society, received the guests, who included Mr. Attlee, Lord President of the Council, Sir John Anderson, Chancellor of the Exchequer, R. A. Butler, Minister of Education, and about two hundred scientists and representatives of the Dominions and allied nations.

## THE INSTITUTE OF GEOPHYSICAL TECHNOLOGY AT ST. LOUIS UNIVERSITY

AN Institute of Geophysical Technology has been established at St. Louis University, as an autonomous school under the deanship of Dr. James B. Macelwane, S.J. It is said to constitute a distinct departure in the field of technological education; to be unique in plan and organization, and to fill a need that has been widely felt, particularly by the petroleum industry. Its curricula and objectives were planned in consultation with men distinguished in the geophysical profession.

The institute is organized on three distinct levels. The two years of the lower division are devoted to a single fundamental curriculum in the basic sciences and in engineering. In the upper division specialized curricula are offered leading to the bachelor's degree in the fields of petroleum geophysics, mining geophysics, seismological engineering, geological engineering, radio communications engineering, applied electronics and professional meteorology. On the graduate level the institute sponsors research and advanced study leading to the master's and doctor's degrees in these fields under the auspices of the Graduate School of the University.

Headquarters are established in two fireproof buildings at the geographical center of the City of St. Louis with unusually favorable transportation facilities leading to all parts of the metropolitan area.

The institute opened with a freshman registration of forty students and a sprinkling of upper-class men. Among the faculty so far appointed are the Rev. Dr. Victor J. Blum, S.J., assistant dean; the Rev. George J. Brunner, S.J.; the Rev. James I. Shannon, S.J.; the Rev. Martin G. Walasin, S.J.; and Drs. Victor T. Allen, Ross R. Heinrich, Edward J. Walter, Alfred H. Weber and Miss Florence Robertson.

It is planned to work in close cooperation with industry both in the development of outstanding personnel and in the solution of research problems which transcend the scope and scientific facilities of company laboratories.

## THE DEPARTMENT OF GEOLOGY AND PALEONTOLOGY OF THE AMERICAN MUSEUM OF NATURAL HISTORY

It is planned to establish a new department of geology and paleontology in the American Museum of Natural History, similar in scope and organization to the departments of geology maintained by colleges and universities.

Dr. George Gaylord Simpson, curator of fossil mammals and for the past seventeen years a member of the paleontological staff, has been appointed chair-