bituminous surfaces; Factors to be considered in correlation of soil and pavement conditions; Design of guard rail based upon extensive research in Pennsylvania; Properties of bituminous materials for surface treated roads; Safety on highways as affected by rural or urban conditions, degree of improvement of roadway, light or heavy traffic, increasing volume of traffic; Effect of width of roadway and various physical conditions upon carrying capacity; The Maryland aerial traffic survey between Washington and Baltimore; Methods used in promoting the financing of state highway systems; Sound economic principles in financing road improvements; Research work of the National Safety Council. All persons interested in any phase of highway development are invited to attend.

WE learn from *Industrial and Engineering Chemistry* that the offer of the Ontario provincial government to contribute a million dollars for research, if Ontario industries subscribed an equal sum, has been accepted. Some twenty-five individuals and firms have contributed one million dollars to the fund so that the Ontario Research Foundation is now assured.

COLONEL THEODORE ROOSEVELT and Kermit Roosevelt will leave on a zoological expedition for the Field Museum of Natural History on November 10. The plan is to explore the region lying northward of Indo-China, along the gorges of the Moking River and abutting the borders of Burma, Siam and Yunnan. A second party, under the leadership of Harold Coolidge, Jr., of Boston, will leave later. He will be accompanied by Dr. Josselyn Van Tyne, assistant curator of birds at the museum of zoology of the University of Michigan; Dr. Ralph E. Wheeler, of Cambridge, Mass., who will be medical officer and assistant naturalist, and Russell W. Hendree, of Brooklyn, recently returned from three years' work in South America as a zoologist. Funds for the expedition were largely donated by William V. Kelley, the president of the Miehle Printing Press and Manufacturing Company, of Chicago, and in consequence the expedition has been named the William V. Kelley-Roosevelt expedition to Eastern Asia of the Field Museum. The first part of the expedition, under the Roosevelts, will sail from New York to India. There they will assemble equipment and proceed to the Yunnan border. The Coolidge division will sail on December 22 from Vancouver.

THE dean of the University of California Medical School and the director of the extension division of the university are making arrangements to give a course of ten public lectures in San Francisco in which the history of medical science will be discussed by members of the medical profession in San Francisco. The topics will include the ideals of the profession, problems of public health, outstanding features of medicine to-day and types of medical service rendered to the community.

ON October 17 a meeting and discussion on "Linear Measurements" was held in the Engineering Societies Building in New York City, under the joint auspices of the Museums of the Peaceful Arts and the machine shop practice division of the American Society of Mechanical Engineers. Dr. George K. Burgess, director of the Bureau of Standards, was the chairman of the meeting. Two papers were presented, one by Professor James A. Hall, of Brown University, on "The Development of Measuring Devices, Primarily Manual," and the other by Professor Earle Buckingham, of the Massachusetts Institute of Technology, on "The Development of Automatic Measuring Devices and Use of Optical Methods." There was a discussion after the papers participated in by representatives of the Bureau of Standards, the Bausch and Lomb Optical Company, Mr. Eric Oberg and others. In connection with the meeting a special exhibit of measuring devices had been installed at the museum, to which the audience adjourned. These devices were loaned by the Brown and Sharpe Manufacturing Company, Pratt and Whitney Company, Bausch and Lomb Optical Company, L. S. Starrett Company, John Bath and Company and the Bureau of Standards. This exhibit will be on view at the museum for at least a month.

UNIVERSITY AND EDUCATIONAL NOTES

PRINCETON UNIVERSITY has received a gift of $60,000 from Mr. and Mrs. Ellis B. Earle, of Newark, which completes the $2,000,000 campaign fund for advanced instruction and research in the physical and biological sciences. With the $2,000,000 goes automatically a conditional gift of $1,000,000 from the General Education Board.

AT the ceremonies connected with the dedication of the chapel of the University of Chicago, Mr. John D. Rockefeller, Jr., is reported to have said: "As president of the Laura Spelman Rockefeller Memorial I am authorized to offer to the university an endowment fund [of $1,000,000] to be known as the Laura Spelman Rockefeller Memorial fund, to be used to promote the religious idealism of the students of the university, through the broadest and most liberal devel-

opment of the spiritual forces centering in and radiating from this chapel."

DR. ALEXANDER G. RUTHVEN, professor of zoology and director of the museum of the University of Michigan, has taken up the work of dean of the school of business administration of the University of Michigan.

DR. KARL SAX has been appointed associate professor of plant cytology at Harvard University. He has been since 1920 biologist in charge of plant breeding at the Maine Agricultural Experiment Station.

PROFESSOR GEORGE ZEBROWSKI, associate in biology at Villa Nova College, has resigned to assume direction of the science department at Villa Maria College.

DR. LEON K. JONES, associate in research (plant pathology) in the New York State Agricultural Station, has been appointed assistant professor of plant pathology and plant pathologist in the Agricultural College of the University of Washington.

DR. ALBERT B. NEWMAN, research engineer of the General Chemical Company, New York City, has been appointed head of the department of chemical engineering at the Cooper Union.

DR. ROBERT RANULPH MARETT has been elected rector of Exeter College, Oxford, in succession to Dr. L. R. Farnell. Dr. Marett is known for his contributions to anthropology and has been president of the anthropological section of the British Association.

DISCUSSION

THE ISOLATION OF A BACTERIOLYTIC PRINCIPLE FROM THE ROOT NODULES OF THE LEGUMINOSEAE

GERRETSEN, Gryns, Sack and Söhngen[1] reported the isolation of a bacteriophage from the root nodules of bean, clover, lupine and other legumes. According to this report the bacteriophage was effective against most strains of the bacteria isolated from the same plant species.

Attempts by the author to secure a bacteriophage active against the organisms of the root nodules of leguminous plants, using the technic of the above investigators, were unsuccessful. In this work the filtrates from the broth cultures, which had been inoculated with the crushed nodules, were tested against proven laboratory strains of the bacteria. In no case was there any evidence of lysis even after a large number of serial passages.

[1] Gerretsen, Gryns, Sack and Söhngen, *Cent. Bakt. Abt.* II, 60: p. 311, 1923.

Recently a successful attempt was made to secure a bacteriolytic agent active against this group of organisms. In this case the filtrate from a broth culture inoculated with several crushed red clover nodules, taken from the same plant, was added to broth cultures of a strain isolated from these nodules. This strain has been tested and found to produce root nodules on red clover plants.

After three serial transfers a lytic principle was demonstrated which was active only against this strain of the organism. Complete lysis of young broth cultures is secured in about 24 hours after the addition of the lytic agent. Growth of the homologous organism on agar is inhibited by the addition of this agent.

So far, attempts to produce lysis of other strains of the red clover nodule bacteria by means of this lytic agent have been unsuccessful, even after several serial passages.

The specificity of this lytic agent is quite interesting in view of the general lack of specificity reported by other workers.

E. R. HITCHNER

UNIVERSITY OF WISCONSIN

SOME EFFECTS ON PISUM SATIVUM OF A LACK OF CALCIUM IN THE NUTRIENT SOLUTION

IT has long been known that the addition of calcium to the soil frequently has a beneficial effect in the growing of crops. In addition to neutralizing the acid in the soil, several other functions have been ascribed to it. The aim of this study has been to determine the effect of calcium, not as to its rôle in the soil nor at the entrance to the plant, but in its effect on certain anatomical structures of the plant. In this investigation, Canada field peas (*Pisum sativum* L.) were grown in sand cultures in the greenhouse and the nutrient solutions were varied in the amount of calcium. Plants were grown for periods of five weeks and of ten weeks. To some plants starved of calcium for five weeks, there was added the complete nutrient solution and the growth was noted over a subsequent period of five weeks.

Observations were recorded as to the external aspects of stems and roots. Green weight and dry weight determinations were made on one half of the plants. After these plants were pulverized, they were tested for calcium according to McCrudden's method. Prepared sections of stems and roots were studied microscopially for diversity in appearance. These were compared with similar sections from plants grown in the soil under the usual garden conditions. Areas of tissues in cross-section were