has been issued in an illustrated bulletin. Courses are offered in botany, geology and zoology. The professorial staff this year includes a representative from Columbia University; Dr. I. H. Blake, of the University of Nebraska; Dr. George D. Fuller, of the University of Chicago, and five men from the University of Wyoming—Drs. S. H. Knight, director, Aven Nelson, R. H. Beckwith, W. G. Solheim and H. D. Thomas. The camp is situated in the heart of the Medicine Bow National Forest, at an altitude of 9,500 feet. The buildings consist of a lounge-room, dining room and kitchen, lecture rooms, laboratories and furnished cabins for faculty and students. The *Camp Bulletin* may be had upon request, from Dean C. R. Maxwell, director of the summer school of the university.

THE new pharmacy building of Howard College, at Birmingham, Ala., has been completed and is ready for occupancy. It is three stories high and houses the student laboratories of pharmacology, pharmacognosy, manufacturing and dispensing pharmacy. The medical, dental and pharmaceutical alumni of the institution contributed the funds which made this development possible.

AT a meeting of the directors of the American Chemical Society, in Kansas City, a report by the business manager was submitted showing decided progress in 1936: the election of 1,671 new members for 1936 as of April 10; a paid membership in excess of 16,500 as of April 10 and a total membership, paid and unpaid, of 18,127 as of that date; a distinct increase in the receipts for membership dues and subscriptions, and an increase of approximately 20 per cent. in advertising pages in *Industrial and Engineering Chemistry* for 1936 over the same date in 1935.

A SENATE bill providing for the construction of a vessel for research work on Pacific Ocean fisheries has been vetoed by President Roosevelt with a statement that it called for "a wholly unnecessary expense." The measure would have authorized the Department of Commerce to have the vessel built for $500,000. "The Bureau of Fisheries," the President is reported to have said, "can take some out-of-date naval or coastguard ship, . . . fit her out at very low cost and maintain her usefully for many years to come."

THE United States Geological Survey announces the publication of Bulletin 865, "The Geology of the Monument Valley-Navajo Mountain Region," which presents geologic and topographic maps, cross sections, diagrams, half-tone illustrations and text descriptive of an area south of the San Juan River in southernmost Utah that includes within its limits the Rainbow Natural Bridge, Navajo Mountain, Monument Valley and ruins of the habitations of prehistoric cliff-dwelling tribes of the region. The mapping was done on a scale of 1 mile to the inch with plane table and telescopic alidade and thus affords reliable geographic information for a considerable area of which previously only exploratory maps had been available. Of more strictly technical interest to geologists are the data contained in the report on the folding of the rocks, the oil and gas possibilities of the region, and the hypothesis of the doming of the strata about Navaho Mountain by a deeply buried laccolithic intrusion.

Nature states that at the annual meeting of the Parliamentary Science Committee held at the House of Commons under the presidency of Sir Arnold Wilson on December 5, the following officers were elected: *President,* The Right Hon. the Earl of Dudley; *Chairman,* Sir Arnold Wilson, M.P.; *Vice-Chairman,* Professor B. W. Holman; *Deputy-Chairman,* Alan E. L. Chorlton, M.P.; *Hon. Secretary and Treasurer,* H. W. J. Stone. The honorary secretary's annual report discloses that during the 1934–35 session, questions were asked in Parliament concerning agricultural and horticultural research, water supplies, the International Locust Conference, milk pasteurization, aeronautical engines, the gas grid scheme, the possibility of constructing earthquake-proof buildings in India, the research powers of the agricultural marketing boards, technical education and grants for industrial and agricultural research. Members of the committee took an active part in the debates on the Herring Industry Bill and the Metropolitan Water Board General Powers Bill. Looking to the future, the committee contemplates consideration in the near future among other things of such widely diverse subjects as the endowment of research, the finance of industrial research, income tax exemption on industrial research, patent legislation reform and the remission of death duties on bequests for research.

DISCUSSION

FURTHER EVIDENCE FOR A LUNAR EFFECT ON THE IONOSPHERE FROM RADIO MEASUREMENTS

THE possibility of the occurrence of lunar tides in the ionosphere has been discussed in connection with earlier reports of a correlation between field intensity measurements and the hour angle and declination of the moon.[1] To minimize the difficulty of a possible confusion between the lunar period and the period of solar rotation of 27.3 days, measurements have been made of field intensities from distant broadcasting

[1] *Transactions of the American Geophysical Union,* National Research Council, 1932, 1933; *Terrestrial Magnetism and Atmospheric Electricity,* June, 1934.

stations covering periods of 6 to 9 hours' duration nightly. In this way there are large changes in the lunar hour angle for each night's observation, while solar activity remains practically constant during this interval. Furthermore, the results of measurements here presented were made during the last sun-spot minimum when the sun-spot numbers were near the zero value. It is thus believed that the effect of solar rotation in the present results has been for the most part eliminated.

A curve plotted with radio intensities in microvolts against lunar hour angle indicates that for the transmission between WBBM Chicago and Delaware, Ohio, there is a marked increase in field intensity strengths with the hour angle 95°. Similar reductions of measurements between KFI Los Angeles and Delaware, Ohio, reveal a pronounced maximum of field intensities at hour angle of the moon 150°. The amplitude of the intensity range is surprisingly large. Since these measurements are based on a period of low solar activity and include observations extending over large ranges of hour angle of the moon, it would appear that we have confirming evidence for some sort of a lunar tide in the ionosphere for which no adequate explanation can yet be given.

Through the courtesy of Professor H. R. Mimno data gathered at the Cruft Laboratory during 1933–1934 have become available for testing any lunar effects on the percentage of E-layer reflections based on a frequency of 3492.5 kc. About 10,000 hours of observations were included in the material. During this time there were reflections from the E-layer on approximately 250 days during the period. There was an increase in the percentage of time of reflection from the E-layer of from 12 per cent., when the moon and the sun were in close proximity, to about 22 per cent., when the differences in hour angle between the sun and the moon was 15 hours. Assuming that part of this effect may be seasonal, the difference in the observed percentages from the expected percentages based on Professor Mimno's trend curve reveals a nearly 8 per cent. increase in reflections from the E-layer as the difference between the hour angle of the sun and moon increases from 0 hours to 14 hours. Corresponding decrease in the percentage of reflections accompanies the change in hour angle difference from 14 hours to 24 hours. These results may, therefore, be interpreted as indicating that when the moon is opposite the sun there is a tendency for an increase in the ionic density on the night half of the earth's atmosphere, thus favoring increased numbers of reflections from the E-layer. When the moon is in proximity to the sun such a slight effect as it may have is probably lost in the solar effect on the day half of the earth's atmosphere.

The apparent and very appreciable change in the percentage of reflections of the E-layer with the changing position of the moon appears to add corroborating evidence for electronic tides in the atmosphere which are in agreement with deductions based on the measurements of field intensities already mentioned.

There has long been known a change in the magnetic characteristics of the earth's field which correlates with the lunar hour angle and declination. Since variations in the induced magnetism within the earth would follow changes in the electron density of the upper atmosphere, the lunar period in magnetic variation appears to give independent evidence for the existence of tides in the ionosphere.

Acknowledgment is again made of aid received from the Rumford Fund of the American Academy of Arts and Science used in acquiring the recording equipment, and also to grants from the American Association for the Advancement of Science and the American Philosophical Society for aid in pursuit of investigation of cosmic-terrestrial relationships of which the present investigation forms a part. A more complete publication and discussion of these results will appear elsewhere at a later date.

HARLAN T. STETSON
HARVARD UNIVERSITY

THE "BROWN" SNOWFALL IN NEW HAMPSHIRE AND VERMONT

THE Bureau of Chemistry and Soils received several samples of dust in the recent fall of "brown" snow (February 24, 1936) from observers in New Hampshire and Vermont. A sample from Wells River, Vermont, was large enough to permit a mechanical analysis and chemical analysis of the dust of colloidal dimensions. This sample was largely silt and much coarser than the smaller samples obtained from Keene and Peterboro, New Hampshire. The colloidal matter from the Wells River sample yielded the following analysis:

SiO_2	48.9 per cent.
Al_2O_3	20.4 " "
Fe_2O_3	6.1 " "
CaO	5.4 " "
MgO	3.2 " "
Ignition loss	16.0 " "

It has been repeatedly shown that the ratio of silica to alumina plus iron oxide is a characteristic feature of the composition of the soil colloids of the great groups. This ratio varies from somewhat above 4 in the western soil colloids to less than 1 in the lateritic soils of the south. It is therefore useful in determining the origin of the material in dust storms. The analysis shows a ratio of 3.3 and also a relatively high content of lime and magnesia. All the samples showed the