forming drugs required annually by the various nations for legitimate purposes, and the third to collect information for a conference among various European states having navigable inland waterways, for the purpose of coordinating and strengthening sanitary control, without interfering with the normal functions of the waterways. A report was made of research work conducted in laboratories scattered all over the world during the last eighteen months, aiming at an international standardization of serums. A similar program was proposed in regard to insulin, digitalis and pituitary extract. Public health courses are being conducted for public health officials in Warsaw, Kharkov and Moscow under the auspices of the health organization of the league, and, by an arrangement with the Soviet Russian delegation at the Genoa conference, the members of the health committee, together with a delegate from the central health authorities of Soviet Russia, constitute a special international commission for discussing the anti-epidemic campaign as it affects Russia.

THE Hancock Life Insurance Company, Boston, has made an additional gift of $20,000 to the Harvard Cancer Commission; $5,000 to be used for purchase and installation of a diagnostic apparatus and $15,000 to be placed in the permanent fund. The insurance company previously gave $30,000 toward the building of the Huntington Hospital, which is devoted exclusively to cancer cases. The new gift will be used in the biophysical laboratory, which is also under the direction of the commission.

THE Langenbeck-Virchow Haus, built for the headquarters of the German Surgical Society and the Berlin Medical Society, has been rented to the Siemens and Halske firm for a period of ten years, with the provision that the societies shall continue to have the use of the building for meetings.

DR. KLEIWEG DE ZWAAN, of the University of Amsterdam, has instituted a triennial prize of 2,500 francs to be awarded for research in anthropology.

UNIVERSITY AND EDUCATIONAL NOTES

MRS. NORMAN BRIDGE, wife of Dr. Norman Bridge, professor emeritus of Rush Medical College, has subscribed $100,000 to the fund provided by Mr. Frederick H. Rawson for the Rawson Memorial Laboratory to be built in connection with the medical work of the University of Chicago on the West Side of Chicago. The fund donated by Mrs. Bridge will be used to provide the Norman Bridge Pathological Laboratories which are to occupy the fifth floor of the Rawson Memorial Laboratory.

DR. GEORGE SCATCHARD, associate professor of chemistry at Amherst College, has resigned, being the tenth Amherst college teacher and the fourth alumnus of the college to withdraw from the faculty because of the dismissal of Dr. Meiklejohn. Professor Scatchard explains his resignation in the following statement to President Olds: "After the loss which the college has sustained, it no longer seems possible to accomplish here the purposes for which I came to Amherst."

AT the University of Chicago, Dr. Harvey Carr has been promoted to a professorship of psychology; Dr. Arno Benedict Luckhardt to a professorship in physiology, and Dr. Fred Conrad Koch to a professorship in physiological chemistry.

DR. JOSEPH W. ELLIS, formerly of the University of California at Berkeley, has been appointed instructor in physics in the University of California, Southern Branch.

PROFESSOR JOHN SMITH DEXTER has been appointed associate professor of biology at the University of Porto Rico.

DR. THOMAS JONES MACKIE, professor of bacteriology at the University of Capetown, has been appointed Robert Irvine professor of bacteriology in succession to the late Professor James Ritchie.

DR. P. J. DANIELL has been appointed to the Town Trust chair of mathematics at the University of Sheffield.

DISCUSSION AND CORRESPONDENCE

NOTE REGARDING THE ANNUAL VARIATION OF ATMOSPHERIC POTENTIAL-GRADIENT

MY attention has been called to Dr. Sanford's article in SCIENCE of May 25, 1923, pages 616–618, in which he attempts to account theoretically for the annual variation of the atmospheric potential-gradient. Every student of atmospheric electricity will welcome any suggestion for the solution of some of the outstanding questions of atmospheric electricity, but evidently Dr. Sanford did not have before him the latest observational facts, and so his theory is based on erroneous premises.

In connection with various studies during the past two years on the interrelations of terrestrial magnetism and atmospheric electricity, I have had occasion to examine every available series of observations concerning the atmospheric potential-gradient, made during the past 40 years, from the Arctic to the Antarctic regions. A different type of annual variation is found than that premised by Dr. Sanford. The

latter states that "this gradient should accordingly be greater in winter than in summer, and it should vary in some manner with the altitude of the sun." He then attempts to reproduce theoretically the annual variation of the potential gradient, on the basis that it *"must vary as the sine of the angle of the sun's declination from the vertical at any given place."* He accordingly obtains a type of annual variation of the potential gradient varying from place to place, and of opposite character for two corresponding parallels in the temperate zones, north and south, which does not correspond with observational facts. However, it should be noted first that what Dr. Sanford calls in Figs. 1 to 4 the "Solar Declination" is not the sun's declination as used in astronomy, but the *sun's zenith distance* at apparent noon. No curve, the ordinates of which vary with the sine of the sun's declination, would be reversed in passing from the North Hemisphere into the South Hemisphere at the same time of year.

The outstanding fact disclosed by the annual variation of the atmospheric potential-gradient is that it is not chiefly a local but primarily a worldwide phenomenon and, hence, does not vary according to the sine of the sun's zenith distance at apparent noon at any given place. The available data reveal the following general types: Type *a*—from the Arctic regions to about parallel 33° North and from about 40° South to the Antarctic regions, the maximum potential-gradient occurs near the December solstice and the minimum near the June solstice; type *b*—in the region from about 33° North to 40° South, or over about half of the earth's surface in the lower latitudes, the majority of the stations show a reversed annual variation to that of type *a*, hence, maximum potential-gradient near June solstice and minimum near December solstice; type *c*—in region for *b*, or between *a* and *b*, there are certain stations showing a mixed type of *a* and *b*. On the average, from the Arctic to the Antarctic, the annual range of the potential-gradient is about 60 per cent. of the average potential-gradient for the year; the data in the North Hemisphere seemingly indicate that the range decreases as the region for type *b* is approached.

It turns out that Dr. Sanford was so unfortunate as to select for comparison with his computed curve in Fig. 3 a station, Melbourne, Australia, which falls in the region of type chiefly *b*. At a station in greater southerly latitude than Melbourne, for example, at Cape Evans (77°.6 South; 166°.4 East of Greenwich), where Dr. Simpson, while connected with the Scott Antarctic Expedition, obtained a year's series of observations from 1911 to 1912, the same type (*a*) of annual variation of the potential-gradient is found as for a station in the same latitude north. It is accordingly incorrect to describe the annual variation of the potential-gradient as varying with the season. The variation is of the same type at the same time of year in moderate and high latitudes north and south of the equator, namely, the maximum gradient occurring near the December solstice and the minimum gradient near the June solstice.

Dr. Sanford would be unable by his theory to explain the annual variation of the atmospheric potential-gradient at the station, Helwan, Egypt (latitude 29°.9 North; longitude 31°.3 East of Greenwich), where eight years of observations, 1907–1914, show that the minimum gradient occurred in December and the maximum in July. Helwan falls in the region of type *b*; Dr. Sanford's theory would prescribe an annual variation for this station reversed from that actually observed. There are some indications that the bounding parallels between regions of types *a* and *b* will be found to be magnetic parallels, rather than geographic ones.

The main facts of the annual variation of the atmospheric potential-gradient could apparently be explained by a system of vertical electric currents similar to those which are caused by the translatory motion of an electrically-charged sphere through the ether; for example, the charged earth during its orbital motion about the sun. This hypothesis is at present under investigation.

Fortunately, before long we shall have available additional data in the region of reversed type *b*. The Department of Terrestrial Magnetism has at present two observatories which could hardly be more favorably situated for important contributions to our knowledge concerning terrestrial magnetism, atmospheric electricity and earth-currents in equatorial regions; these observatories are: Watheroo, Western Australia (latitude 30°19′ S; longitude 115°53′ E), and Huancayo, Peru (latitude 12°03′ S; longitude 75°20′ W).

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CASTS VS. CYLINDROIDS

AFTER examining a large number of specimens of casts and mucin from urine under the ordinary microscope and then under the modern dark field microscope (ultra-microscope), it seems to us that dark field examination will probably prove to be a quick and certain method for distinguishing between the two, especially in doubtful cases.

The new method of examination has, so far, revealed marked differences in the ultra-structure of these entities, the mucin showing a faint and extremely fine reticulated ultramicroscopic structure, whereas casts show a much brighter and coarser structure, which is visible even in hyaline casts.