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.

We are continuing this work, and hope to report later, giving photomicrographs, and showing as well the appearance of casts and mucin in the dark field, after they have been acted on by reagents, stains, etc.

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THE STANDARD POUND

IN the letter of Mr. Alexander McAdie, published in SCIENCE on February 23 ultimo, under the heading "The Depreciation of the Pound," Mr. McAdie states that the provisions of the Corn Sales Act of 1921, effective January 1, 1923, and prescribing that sales of grain, seeds and potatoes in Great Britain shall be by weight only and in terms of the *hundred-weight of 112 pounds,* have the effect of reducing or depreciating the pound from 7,000 to 6,250 grains weight. This is upon the gratuitous assumption that the absolute weight of a hundred pounds or of 700,000 grains is by the Act to be divided into 112 parts to produce a new or "depreciated pound" of 6,250 grains weight. If one were to indulge in assumptions as to the effect of the Act, it would be more legitimate to argue or conclude that the effect of the Act is to divide the absolute weight of 112 pounds or 784,000 grains which constitute the English hundred-weight, into 100 parts to produce an appreciated or enlarged pound of 7,840 grains. But there is neither need nor excuse to indulge in assumptions as to the English *hundred-weight,* because the *hundred-weight,* as specified in the Act of 1921, and as otherwise defined by law, and as long established by custom, consists of 112 standard pounds of 7,000 grains, and is divided into 8 stone of 14 standard pounds. The Act merely declares and confirms the custom of England and establishes uniformity of practice throughout the realm. It imparts nothing new as to the value of the standard pound or as to its division into 7,000 grains, as legally recognized and established in both the United Kingdom and the United States.

The English use and will, under the Act of 1921, continue to use precisely the same pound as the Americans. We, however, use a *hundred* of 100 standard pounds, whereas the English use a *hundred-weight* of 112 pounds. The Englishman wants to divide his *hundred-weight* into 8 equal parts. He can not divide the cental of 100 pounds into 8 equal parts, and he therefore persists in using the *hundred-weight* of 112 pounds, which he can divide into 8 equal parts, each of which he calls a stone. But he nevertheless uses the same standard pound which is used in the commerce of the United States, and certainly no American would deny him the privilege or right to use the *hundred-weight* of 112 pounds, if for reasons which satisfy him, he finds it preferable or convenient to do so, just as the Englishman has no objection to the use of the cental of 100 pounds in Canada, in the British Dominions and in the foreign trade of the Empire.

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APPLIED SCIENCE AND SCIENCE APPLIED

"To be an industrial psychologist one must first of all be a psychologist." "Hardly more than one or two men are earning a livelihood in industry to-day as *psychologists*" (W. V. Bingham). These sentences appear in a modest advertisement of "psychology as a life work" in SCIENCE for April 13.[1] The writer of them believes that "industrial psychology" offers to men with psychological training and possessed of certain assets a career among "fascinating practical problems." The "three outstanding assets for a career" are named by him as "a sound training in scientific method," genuine interest in "all sorts of people and the personality to deal effectively with them," and, finally, "superior practical judgment, especially where money values are concerned." When these assets produce an "output of cash value to industry" they may be expected to bring proportionate "financial rewards." It is exceptional, however—as it appears—for an industrial psychologist to earn a living *as a psychologist.*

In the same article "educational psychology" is declared to show "an increasing demand for experts in psychological and educational measurements." Here "the most necessary qualifications are listed as "general scientific ability, knowledge of educational practice, industry, adaptability and good sense" (E. L. Thorndike). Again, "clinical psychology," which offers to suitable persons opportunities "not surpassed financially," etc., is said to demand acquaintance with the facts of disease and of treatment as well as the "physician's mental attitude" (S. I. Franz). And, in more general terms, "for those who possess the requisite qualities and training there is no limit [in "applied psychology"] to public service and financial rewards" (R. Dodge).

Does this announcement by "experts" persuade the reader that there are "applied psychologies"? Does it not rather call attention to the well-attested fact that scientific knowledge and training may be found to be useful (provided the individual meets certain other requirements) in many practical tasks far removed, in spirit, problem and point of view, from psychology or from any other single science? The article makes it abundantly evident that, where these

[1] SCIENCE, 1923, lvii, no. 1476, pp. 429–431.