in New York City, has been appointed professor of mining in Yale University to succeed Professor James F. McClelland who resigned in 1919.

At the New York Post-Graduate Medical School and Hospital, the laboratory of pathological chemistry, formerly a division of the department of laboratories, has been made an independent department and the name changed to the department of biochemistry. The personnel consists of Victor C. Myers, Ph.D., professor and director; Cameron V. Bailey, M.D., and John A. Killian, Ph.D., assistant professors; Hilda M. Croll, M.A., associate and Herbert W. Schmitz, M.D., assistant.

DISCUSSION AND CORRESPONDENCE

THE FUTILITY OF THE HUMAN YOLK SAC

In the current issue of the *Anatomical Record,* Professor Arey publishes a brief but very interesting contribution (No. 90) from the Anatomical Laboratory of Northwestern University. He describes a human chorion containing two embryos, of 11.5 and 12 mm. respectively, one of which has a yolk sac, and the other has none—that is, none was found, and sections of the umbilical cord showed no trace of a yolk stalk. Hence the broad conclusion is drawn that "the human yolk sac is a vestige unessential to growth or differentiation (including vasculogenesis)." It is stated that one of these embryos "received all, or essentially all, the cells destined to form a yolk sac" and that "the total absence of a yolk sac in one embryo, which is otherwise normal in every way, further demonstrates conclusively that this organ is not essential to the growth of an embryo or to the proper differentiation of its parts; indeed, the embryo in question is slightly larger than its twin."

Since from the days of Wolff the yolk sac has been regarded as the source of the intestinal tract, and in young human embryos is seen to be the organ from which the allantoic duct and the digestive tube proceed, the startling nature of this conclusion becomes apparent. But it is universally recognized that the yolk sac does its work in early stages, and though the sac usually persists as a functionless rudiment until birth, its duct normally becomes parted through atrophy in embryos younger than the one under consideration. Does Dr. Arey's case indicate anything more than the precocious obliteration of the stalk of an organ no less essential than the placenta, likewise cast off after its very vital functions have been performed?

If the question is raised, Where then is the yolk sac in Dr. Arey's case? his own studies furnish a plausible answer, since in another specimen he has described a single sac with two stalks, each leading to a separate embryo. Under such circumstances, the early obliteration of one of the stalks would give rise to the conditions observed in the second case, and this possibility must be eliminated before accepting the proposed conclusion. In reading the account of a human embryo without a yolk sac, we recall Bentham's incredulous comment, "I am very glad, my dear sir, that *you* saw that, for had I seen it myself, I wouldn't have believed it."

Frederic T. Lewis
Harvard Medical School,
Boston, Massachusetts

DEFLECTION OF STREAMS BY EARTH ROTATION

The recent note by Professor Jennings suggesting that the steeper valley sides on the right of the south-flowing streams on Long Island may be due in some manner to wind action instead of to the deflective effect of the earth's rotation is a welcome contribution to an old problem. In spite of Gilbert's apparent acceptance of the earth's rotation in explanation of the unsymmetrical cross-section of those valleys, the small size of their streams has always stood in the way of it, all the more since Bowman showed, on the basis of accurate maps of the lower Mississippi, that even that great river shifted its course to the east or left, apparently under the control of the wind, and not to the west or right, as it should if the earth's rotation were in control.[1]

[1] Science, XX, 1904, 273-277.

It is, however, interesting to note that the remarkably well defined right-handed or eastward shifting of many radial streams that flow down the gentle slope of the great alluvial fan, known as the plateau of Lannemezan, at the northern base of the Pyrenees—beautifully shown on the 1:80,000 map of France, sheets 216, 217, 227, 228, 229, 239, 240, and 241—has been explained by Marchand and Fabre[2] not as a consequence of the earth's rotation but as a result of stronger action of rain driven by westerly winds; so that here it is the valley sides facing against the wind that are the steeper, while on Long Island the steeper valley sides face with the winds. It is difficult to understand just how either explanation works, but in any case the relation of the steep valley sides and the prevailing winds is unlike in the two examples.

W. M. DAVIS

CAMBRIDGE, MASS.,
APRIL 2, 1922

POSSIBLE CAUSE OF THE RED COLOR OF POTASH SALTS

THE red color of certain potash and ordinary salt deposits has been observed in many parts of the world, for example, in the Indian, German, Alsatian and Spanish potash deposits, in Nova Scotia, west Texas and doubtless in other places that the writer has not heard of. The same, though a less intense coloration has been observed by the writer in the surface salt and strong brine standing in the trenches and in pools along the margin of the salt ponds where solar salt is made along the shore of San Francisco Bay, California. It has been noted at Searles Lake in the same state. I am told that the same red color exists also in the solar salt ponds on Turks Island. It is undoubtedly of common occurrence in many places where solar evaporation results in producing salt, either naturally or artificially.

The red color associated with certain potash minerals is so common that it has come almost to be regarded as a means of identifying certain of them, for example, the mineral carnallite in the German deposits. There is however, as chemists well know, nothing inherent in the composition of carnallite ($KCl.MgCl_2.6H_2O$) to cause this red tint and indeed the normal color of the pure double salt should be the same as that of ordinary white rock salt.

There has been a great diversity of opinion as to the origin of the red color in solar salt and bitterns where solar evaporation is in progress. That it is not necessarily due to the presence of iron appears evident from the observations of George Lunge, the expert on sulphuric acid manufacture. Lunge[1] states that:

> The red color exhibited by many alkaline salt lakes, which is often also apparent in the salt deposits, is ascribed by Payen[2] to the presence of small crustaceans, *Artemia Salina* Leach (*Cancer salinus* Linné), which appear in large masses when the water has attained a density of 1.16, and which are of a gray or greenish color; on further concentration to a specific gravity of 1.21, they die and form a red froth at the surface. . . . I, for my part, must decline to accept the assumption that the red color is regularly caused by the presence of *Artemia* or other animal organisms, if it is ever due to that cause; for the samples of red water which I had myself taken from the lakes of the Wade Atrun have preserved that color during the many years I have kept those samples. The red filtrate shows nothing under the miscroscope; the color is at once discharged by adding nitric acid or hypochloride and hydrochloric acid and is evidently caused by organic substances present in solution. There is no iron present.

Recent studies made in the U. S. Bureau of Fisheries, Department of Commerce, connected with the reddening of salt fish are of interest and importance in this connection. They are also of economic value in view of the considerable annual losses to the fish industry caused by salt fish developing a red color when stored under moist conditions. The Bureau investigations, which were conducted by W. W. Browne[3],

[2] Les érosions torrentielles et subaériennes sur les plateaux des Hautes Pyrénées. *C. R. Congr. Soc. savantes,* 1900.

[1] Lunge, Geo., *Sulphuric Acid and Alkali,* Vol. 2, pt. 1, p. 58, 1909.

[2] Payen, Anselme, *Annales chim. et phys.,* 2d ser., Vol. 65, p. 156, 1837.

[3] Bureau of Fisheries, Document 896, 1920, pp. 27-28.