

and irregular as that of *Apus* in many parts of the world.

From the accumulated records one can not but be convinced that *Craspedacusta* and its alternative generation are much more common and widely distributed in the fresh waters of the eastern and eastern central United States, at least, than heretofore believed, and that continued and careful examination of particular bodies of water over a period of years will prove this to be the case.

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THE MAGNETO-OPTICAL EFFECT AND THE ZODIACAL LIGHT

IN SCIENCE for October 21, 1927 (Vol. 56, page 376), Dr. Elihu Thomson publishes a new hypothesis to explain the zodiacal light. Some years ago he noticed that the particles of iron from the smoke of an arc were oriented by a magnetic field, so as to reflect light strongly in certain directions. He suggests that the zodiacal light may be due to particles of iron oriented by the earth's magnetic field.

The zodiacal light is a faint illumination seen in the west just after twilight, or in the east just before dawn. It is always centered on the ecliptic, or plane of the earth's orbit, being brightest just above the haze which nearly always dims anything seen near the horizon. The brighter portions of the zodiacal light are distinctly more brilliant than the milky way. Spectroscopic tests indicate that it is simply sunlight, and it is fifteen or twenty per cent. polarized, as would be expected after reflection.

The generally accepted hypothesis may be summed up in Moulton's words "It is universally agreed that the zodiacal light is due to a great swarm of small bodies, or particles, revolving around the sun near the plane of the earth's orbit. These small bodies are in reality planetesimals which have not been swept up by the planets, . . ." The new Russell-Dugan-Stewart text on astronomy presents this hypothesis with the introductory statement "The observations make it almost certain that . . ."

Although ordinarily not seen to extend more than ninety degrees from the sun, tests at Mt. Wilson have shown that some illumination extends over the entire sky. Keen eyes can, under the best conditions, discern a faint patch of light at the point on the ecliptic directly opposite the sun. This is known as the gegenschein. The swarm of small bodies must extend in appreciable numbers well beyond the earth's orbit. Particles opposite the sun would be seen at the "full" phase, like the full moon. The gegenschein is further explained by the fact that the combined

attraction of the earth and sun tends to concentrate such particles in a sort of dynamic whirlpool about a point nearly a million miles outside the earth's orbit.

The fact that iron lines are conspicuous in the solar spectrum, and that iron is an important constituent of meteorites, suggests that iron particles may be numerous among those reflecting to us the zodiacal light, but the following observational evidence indicates that Dr. Thomson's effect is unimportant.

(1) The zodiacal light is most conspicuous just outside of twilight, perhaps 30 degrees to 40 degrees from the sun, and ordinarily fades into invisibility before 90 degrees is reached. The Thomson effect would produce the glow at 90° to 150° from the sun.

(2) The zodiacal light is always seen along the ecliptic, or plane of the earth's orbit. The orbits of all the major planets are nearly in this plane. The Thomson effect depends on the earth's magnetic field, and so, in general, would not follow the ecliptic.

(3) As the earth's shadow extends to more than three times the distance of the moon, the gegenschein, or glow at the point opposite the sun, must be produced by particles which are presumably too distant to be oriented by the earth's magnetic field. Particles as near as the moon would, in that direction, be within the shadow of the earth and, therefore, invisible.

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THE INDIGENOUS NATIVE POPULATION OF ALGERIA IN 1926¹

IN a recent book² the indigenous native population of Algeria was studied in considerable detail, as the only example known to me of a human population which had virtually completed an entire logistic cycle of growth within the period of census taking. To the counts of this population made by the French between the years 1851 and 1921 inclusive, there was fitted, by least squares, the logistic curve

$$y = 2.238 + \frac{3.141}{1 + e^{1.2059 - 0.4232x}} \quad (i)$$

with the results shown in Table 1 for the years 1881 to 1921 inclusive, during which period the observed figures may be regarded as substantially reliable.

There have now come to hand³ the results of the 1926 census of Algeria. It appears that the indige-

¹ From the Institute for Biological Research of The Johns Hopkins University.

² Pearl, R. *The Biology of Population Growth*. New York (Alfred A. Knopf), 1925. Pp. xiv + 260.

³ *Jour. Soc. Stat. de Paris*, November, 1927, p. 291.

TABLE 1
OBSERVED INDIGENOUS NATIVE POPULATION OF ALGERIA
AND FITTED LOGISTIC CURVE

| Year | Observed populations | Calculated populations from logistic curve | Percentage deviations of calculated from observed values |
|------|----------------------|--------------------------------------------|----------------------------------------------------------|
| 1881 | 2,842,497 | 2,962,000 | + 4.05 |
| 1886 | 3,287,217 | 3,224,000 | — 1.95 |
| 1891 | 3,577,063 | 3,529,000 | — 1.36 |
| 1896 | 3,781,098 | 3,859,000 | + 2.02 |
| 1901 | 4,098,355 | 4,184,000 | + 2.06 |
| 1906 | 4,477,788 | 4,478,000 | ± 0 |
| 1911 | 4,740,526 | 4,723,000 | — 0.38 |
| 1921 | 4,924,938 | 5,060,000 | + 2.67 |

nous native population in that year was in total, 5,192,426.

The logistic curve shown in equation (i) was calculated on the basis of the data up to and including 1921. Extrapolating that curve it gives for the expected or probable magnitude of the indigenous native population in 1926 the value 5,162,000. This underestimates the population actually observed in 1926 by 30,426. This is a percentage error of only -0.59 per cent. To miss by just over one half a man in each hundred counted is certainly not a serious discrepancy. Probably few demographic experts would care to assert that the error made in counting a population, however highly civilized, is less than six tenths of one per cent.

The chief point of general significance in this result is that it makes still more valid the case of the native population of Algeria as an example of a human population following the logistic curve in its growth.

In closing I should like again to emphasize, as has been done repeatedly in what I have written on population growth, that the data in hand permit no prediction as to whether the native population of Algeria (or any other population) will in the future continue to follow its past logistic curve in its growth. All that the logistic theory of population growth is capable of saying on the point is that this result is to be expected only if the same forces, economic, social, geographical and possibly other, which have influenced the birth and death rates during the past history of the population continue to operate unaltered in the future, but not otherwise. If any or all of these factors undergo any considerable alteration in the future the course of population growth may be expected to depart from the particular logistic curve which it has followed hitherto.

RAYMOND PEARL

SCIENTIFIC BOOKS

Recent Advances in Haematology. A. PINEY, M.D.,
P. Blakiston's Son & Co., Philadelphia, Pa, 1927.

THE author of this welcome and timely book, dealing largely with clinical hematology, very properly bases his interpretations of blood pathology on the data of normal blood development and those of the normal histology of the several hemal formative organs, yolk sac, liver, spleen, lymph nodes and bone marrow. This is an approach to an understanding of the leucemias and primary anemias that seems to offer the most promising results. In future a still more adequate attack will be made by way of the evolutionary history of blood and the hemopoietic tissues. Information already at hand emphasizes the vastly greater genetic significance of the lymphocyte than is now generally accorded this hemal outcast. For a work of this sort, properly a fairly inclusive digest, the discussions and interpretations seem dominated unduly by a personal working hypothesis, namely, the assumption of the exclusively entodermal origin of the earliest embryonic red blood cells and the occasional anomalous persistence of this entodermal blood primordium in postnatal life.

The book includes 249 pages of text, subdivided into 14 chapters. Chapter I gives an account of the reticulo-endothelial system. In Chapter II the blood forming function of this system is discussed. Chapter III on "Leukaemia," and Chapter IV on pernicious anaemia, constitute in our opinion the most interesting portions of the book. Chapters V and VI deal with leukaemoid blood pictures and reactions, Chapter VII with reticulo-endotheliosis, Chapter XI with Gaucher's disease and Chapter XII with Banti's disease. There is an important appendix of 11 pages on hematological technique and a selected bibliography of 73 titles, with author's comments. In addition the book contains four plates of very excellent colored illustrations, 23 in number, and 18 text figures.

As regards the colored illustrations the reviewer, while admitting their artistic beauty and detailed accuracy, feels compelled to point out certain disconcerting omissions and seemingly forced interpretations. In the first place, one feels greatly handicapped in estimating the value of these illustrations as supporting the text by reason of the lack of any designation of either absolute or relative magnification. This is all the more serious in view of the great significance ascribed by Piney to his so-called megaloblast. In the next place one is not convinced on the basis of the illustrations that the so-called promonocyte is more closely related to the myeloblast