

banded structure many of the "bands" are represented by what appear to be rows of granules across the chromosome, and in some cases faint longitudinal lines appear to connect granules in successive bands, giving the impression of strings of beads, as described by Koltzoff. This is particularly true where a chromosome has been stretched. Careful study of the finer structure in such cases indicates that these lines represent the walls of "alveolar" spaces, and that the structure, in fixed material, is in reality honeycomb-like, as indicated schematically in figure 1, *B*. In the clearest cases we have examined, the lines are not continuous, but forked, following the walls of the (often hexagonal) "alveoli." In some cases the alveoli appear to be elongated in a more or less diagonal direction, suggesting that the chromosome is twisted. In others the honeycomb structure is comparatively uniform and lines may be traced diagonally in both directions (clockwise and counterclockwise) from a given point as indicated schematically in figure 1, *C*.

In our material each region in the chromosome appears to have a definite type of protoplasmic structure which usually extends through the chromosome transversely at that level. The type may change abruptly in passing from one region to another. At some places the protoplasm appears to be essentially homogeneous, while at others the appearance of fine or coarse alveolation is evident, suggesting that qualitative chemical differences are associated with the morphological differences.

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#### DEMONSTRATION OF THE EXISTENCE OF TWO FORMS OF VITAMIN D IN FISH LIVER OILS

SINCE the discovery that the vitamin D of irradiated ergosterol is different from that of cod liver oil, the latter form has sometimes been distinguished by such terms as "natural vitamin D" or "fish oil vitamin D." The implication that the vitamin D naturally occurring in different fish oils is always the same qualitatively has been put to test, with the surprising observation that fish oils differ qualitatively as well as quantitatively in their vitamin D content.

To distinguish the two forms in fish oil we employed essentially the same procedure that was used in 1930 to differentiate between cod liver oil and irradiated ergosterol, *i.e.*, the administration to chickens of materials previously assayed with rats. A precision method of assay with chickens, which will be described elsewhere, was developed to measure the response of this species with accuracy comparable to that attained in the critical method with rats.

The first experiment was done with oil extracted

from the livers of halibut, *Hippoglossus hippoglossus*. This was assayed with rats, and diluted with maize oil. The dilution was administered to chickens in parallel with cod liver oil of the same potency. Rat unit for rat unit, the halibut liver oil induced slightly less calcification in the chickens than did cod liver oil, but the difference was perhaps no greater than the errors of assay. We were left with the suspicion that a greater difference might be observed in other oils.

Compared with certain liver oils, cod liver oil is a weak source of vitamin D, containing usually about 100 international units per gm. Halibut liver oil contains on the average about 1,200 I. U. per gm, but even this is weak in comparison with several other fish oils that we have examined. One of the more potent liver oils is that of the bluefin tuna, *Thunnus thynnus*, which contains on the average 40,000 I. U. of vitamin D per gm. A pure specimen of this oil was assayed with rats, diluted and administered to chickens as before. Rat unit for rat unit, it was only one sixth as effective as cod liver oil. Similarly, the unsaponifiable fraction of the tuna liver oil was found to be one seventh as effective, rat unit for rat unit, as the unsaponifiable fraction of cod liver oil.

The effectiveness ratio which was thus found to be 1:6 or 1:7 is several times greater than the probable error of the assays. One must therefore conclude that the vitamin D of bluefin tuna liver oil and the vitamin D of cod liver oil are different substances (or different mixtures of substances), one rat unit of the former having only 15 per cent. of the antirachitic effectiveness of one rat unit of the latter *for the chicken*. A detailed account of these experiments will be published elsewhere, together with data on additional liver oils.

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#### BOOKS RECEIVED

- DALY, REGINALD A. *The Changing World of the Ice Age*. Pp. xx+271. 149 figures. Yale University Press. \$5.00.
- HENDERSON, YANDELL. *A New Deal in Liquor: A Plea for Dilution*. Pp. 239. Doubleday, Doran. \$2.00.
- HOPKINS, ARTHUR J. *Alchemy, Child of Greek Philosophy*. Pp. xi+262. Illustrated. Columbia University. \$3.50.
- MARTIN, THOMAS, Editor. *Faraday's Diary*. Vol. V. Pp. xiii+416. Illustrated. G. Bell and Sons, London. £ 12-12-0 net for set of seven volumes.
- NAMIAS, JEROME. *Subsidence within the Atmosphere*. Pp. 61. 63 figures. Harvard University Press.
- SÉGUY, E. *Dipteras (Brachyceres)*. Pp. 832. 27 plates. 903 figures. Faune de France. Lechavalier.
- ZECHMEISTER, L. *Carotinoide*. Pp. xii+338. Illustrated. Julius Springer, Berlin.

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# The Science Press Printing Company

An article entitled "The Journal *Science* and the American Association for the Advancement of Science," printed in the issue of the journal for October 8, 1926, contains the following paragraphs :

In this connection acknowledgment should be made to the printers, The New Era Printing Company of Lancaster, Pa., and especially to Mr. Andrew Hershey. In 1893 they were printers of a local newspaper and of local job work. They offered terms much lower than any city printers and maintained the same rates for SCIENCE for twenty-five years. They proved themselves to be excellent printers and in 1920 were printing some fifty scientific journals. After one partner had died and the other two had advanced in years, the business was sold to a promoter, not himself interested in printing. Charges were greatly increased and the printing became less efficient.

Efforts were made to purchase the printing plant with cooperative ownership by the scientific journals that it printed, but these failed, partly because the \$300,000 asked included at least \$100,000 for the good will in large measure given to the business by SCIENCE, and partly owing to the difficulties of ownership by the societies and institutions that controlled the journals. When the Carnegie Institution was established in 1902, the editor of SCIENCE proposed the organization by it of an office for scientific printing and engraving which could have been made self-supporting, and, as in the case of the Oxford and Cambridge presses, would have rendered valuable service by assured continuity and expertness in scientific printing; but the plan was not adopted.

SCIENCE and the other journals of The Science Press were for a time printed in Utica, N. Y. In 1923 The Science Press Printing Company was incorporated with its office at Lancaster and with the cooperation of Mr. A. E. Urban as general manager and of those compositors, pressmen and proofreaders who had given that city distinction as a center for scientific printing. This company is now responsible for printing SCIENCE and a considerable number of other scientific journals, monographs and books.

As stated in this quotation The Science Press Printing Company was established to print SCIENCE and the other publications of The Science Press, including *The Scientific Monthly*, *The American Naturalist*, *School and Society*, and the Biographical Directories of "American Men of Science" and "Leaders in Education." The composition and press work of these publications show the high standards that are maintained. In order to bring them out efficiently and promptly—for example, the entire contents of an issue of SCIENCE can be put in type in one day and each week during 1933 about 14,000 copies of SCIENCE were printed, bound and mailed in a little more than one day—it has been necessary to have a shop of considerable capacity and to take in other work. The press now prints some thirty scientific and educational journals and series, and has printed many books and monographs.

It may be regarded as a real contribution to science that there should be a plant in which the workers are trained to deal with scientific material. Innumerable commendations of the accuracy of the proofs have been received; to quote only one, the late Professor E. S. Morse wrote to the editor of SCIENCE: "I corrected my first proof a year before you were born and the one I returned yesterday was the first one in my long experience that needed no correction."

It is also an advantage for scientific men to have relations with a company that maintains the same rates for the same kind of work under the same conditions. High pressure selling and competitive bidding—among the causes of the present economic depression which the codes promoted by President Roosevelt are intended to abolish—are thus unnecessary. A scientific man may assume that work entrusted to the press will be done at a cost as low as is consistent with high standards of work and the best conditions of employment for the workers. This is less than the cost of equally good work in large cities where wages and rents are much higher, but it is not so low as for inferior printing or where the welfare of workers is disregarded.

While the press must use efforts to obtain work when the capacity of the shop requires it, its object has been to make it as great an advantage for the scientific man to have work done by it as it is for it to do the work. This policy has succeeded, for employees have not on the average been idle as much as one day a year since the press was established; no employee has been laid off (up to October, 1934) even during the economic depression; wages were decreased by 10 per

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