problematical. The excessive bleeding and the faulty tooth structure are correlated with a lack of the proper function of certain cells. In this chapter, incidentally, we are told the best vitamin story of the year. It would seem that when Szent-Györgyi first isolated and analyzed vitamin C, he came to the conclusion that it was a sugar, but he failed to identify its exact nature; so he gave it the tentative name "Ignose." The editor of the journal to which Szent-Györgyi sent his article "suspected a flavor of levity" and requested the Hungarian to suggest another name. "God-knows," came the prompt reply.

Harris contrasts the action of vitamin D with that of the parathyroids by pointing out that whereas the former helps to keep sufficient calcium and/or phosphorus in the blood by improving their assimilation from the food, the parathyroids draw the calcium out of the bones. In hypervitaminosis there is an excess absorption of calcium and phosphorus, with a consequent excess of Ca and P in blood, and an ultimate over-calcification in the newly forming bone.

The Germans still persist in calling rickets *die englische Krankheit;* which is time that the English people return the compliment by referring to a far more virulent disease now rampant in Germany as *die hitlerische Krankheit.*

The author claims that xerophthalmia, due to a lack of vitamin A, is so common in Ceylon that two thirds of the cases of blindness in children are due directly to it. The night-blindness in grown-ups (common in Newfoundland, Labrador, China, Brazil, etc.) is associated with a lack of this vitamin. The "visual purple," a pigment found in the retina of the eye, is necessary for proper eyesight. A lack of vitamin A in the diet causes this pigment to disappear and to reappear again when vitamin A is supplied. Harris is of the opinion, however, that the most important function of this vitamin is to prevent the cells of the mucous membrane from degenerating. In the absence of vitamin A the cells undergo a metaplasia and the mucous membranes become "dried up." These properties of vitamin A (and, of course, of β-carotene) are related to the "peculiar double-bond system presumed to be present in the molecules of both carotene and vitamin A."

The so-called "anti-infective" property of vitamin A, around which fortunes are being built by unscrupulous promoters, is very properly blasted. Harris's colleague, Dr. Moore, has even shown that people might die from all kinds of infectious diseases despite ample vitamin A reserves!

The relation of sterility in man to vitamin E is still a closed book. Even rat and mice experiments should afford little comfort to Hitler or Mussolini. Extra quantities of vitamin E do *not* increase the fertility beyond the normal limits, despite C.H.A.'s jingle:

> We'll double the birth-rate yet, my dears
> If we all eat vitamin E.
> We can blast the hopes of Maria Stopes
> By taking it with our tea.

The concluding portions of the book are devoted to practical dietetics. Harris very modestly implies that he probably knows more about proper diet than the mother "who ought to know something about babies, her having buried seven." The value of instinct as a guide comes in for some pertinent criticism. When you are rickety or anemic, instinct will hardly lead you to sources of vitamin D or iron. Harris does admit (based on his own experiments) that animals are sometimes able to learn to choose the right food. "The essential is that the food must produce a noticeable immediate effect (or reward) which the animal can experience, and that the food must possess some distinctive odor or taste or appearance by which the animal can recognize it again next time."

Without giving elaborate (and meaningless) specific directions, Harris suggests that the "ideal diet" must include a varied diet; it must contain a daily protein dish (meat, fish, eggs or cheese), it must contain daily fresh fruit or salad (vitamin C), and it must not be milk-sparing. The "ideal infant diet" should be built around milk, supplemented by vitamins D and C (orange juice) and iron.

Such advice can be heeded by the "middle" and "upper" classes. Often, with the best of intentions and with no lack of intelligence, the "lower" classes, with their limited means, find themselves in a hopeless situation. "The fault," writes Harris, very justly, "is not with science, but in the existing maladjustment of our social organization."

Sir John Orr, in an address before the British Association some months ago, claimed that one half of Britain's population could not afford an adequate diet. This nation represents a flower of Western civilization. We can but surmise conditions in China and India.

The scientist points the way, the politician talks nonsense, and the world is where it is.

BENJAMIN HARROW

STRUCTURAL GEOLOGY

Structural Geology, with special reference to economic deposits. By BOHUSLAV STOČES and CHARLES HENRY WHITE.

THE authors of this work are mining engineers and have approached their subject from the point of view of applied geology. This is implied in the subtitle and is expressly stated in the preface. A geologist,

looking for discussion of the subject indicated by the major title, "Structural Geology," has therefore no ground for disappointment if he finds but scant consideration given the topics usually comprised under that head.

The treatment in this volume of four hundred and odd pages is purely descriptive. This being the method, approximately two thirds of the space is given to illustrations, which are well selected and well reproduced, and but one third or less to the very brief text.

Primary structures of sedimentary and igneous rocks are described in the first 100 pages. Stratification, interbedding, reefs, talus, placers, glacial drift and "characteristics of sedimentary mineral deposits" are curiously associated with elementary illustrations of structures. The important subject in quotation marks above is dismissed in two thirds of a page of text. Under igneous rocks we find a brief list of intrusive and extrusive forms, supplemented by 10 pages of description and 30 pages of illustration. The text and illustrations relating to orogenic movements occupy 4 pages. Next comes a chapter on folding, 62 pages, and another on faulting, 91 pages, in which the structures are described in considerable detail, but not analyzed as to possible conditions of stress and strain. The omission of any discussion of mechanical principles as applied to rock deformation is in the opinion of the reviewer to be regretted by engineers, since it is of vital importance in mining operations.

We have now reached the last third of the volume. In the few pages given to partings in rock masses joints and cleavage are used as synonymous terms. The confusion of thought suggests the almost forgotten controversy between Van Hise and Becker. Under the heading "Veins" two major classes are distinguished, namely "endokinetic" and "exokinetic." The subject is treated in 7 pages of text with 33 of illustrations. The latter part of the work comprises an account of structures in folded and faulted regions, with emphasis on European interpretations and some repetition of earlier chapters. The remaining items are: Igneous activity and mineralization, 1 page; surveying and mapping, 16 pages including illustrations, geophysical methods, 21 pages; influence of structure on mining, 17 pages; glossary, bibliography and index.

The writers of this book are eminent in their profession, both in teaching and practice. Their careers have been long and successful. But their contemporary in reviewing their work is reminded of the geologic dogmas of past decades, before the masters of geology in America challenged them and aroused the critical and progressive spirit of inquiry that characterizes our scientific attitude to-day. Having consulted a number of teachers in eastern and western universities the reviewer believes that he expresses a consensus of opinion in saying that the text is inadequate and elementary, but some of the illustrations will be found to have significant value for those who seek examples, especially of ore deposits.

BAILEY WILLIS

SPECIAL ARTICLES

BRAIN POTENTIALS DURING HYPNOSIS

IN a previous communication we have distinguished three types of waves (rhythmic electrical potentials) which could be recorded from electrodes placed on the head of a normal adult person.[1] For convenience of description and because of their characteristic appearance, we have named them as follows: (a) "Trains." These appear as trains of waves lasting from 1 to 30 seconds. Their frequency for each individual appears to be relatively characteristic, usually about 10 per second. They were first described by Berger[2] and are called by Adrian[3] the Berger rhythm. (b) "Spindles." These appear only during deep sleep, usually last less than a second, and are not nearly as numerous as the trains. Their usual frequency is about 14 per second. (c) "Random." These are irregular potential waves with no characteristic frequency appearing during sleep.

When a person is going to sleep the trains persist for some time, but become less and less frequent when drowsing, gradually changing over to the random type. After some time the spindles usually begin to appear. The spindles are so characteristic of some individuals that their occurrence has been accepted as an objective criterion of deep sleep. If the subject is disturbed, the spindles immediately cease and the trains usually appear at once.

In order to compare hypnosis with sleep, one of our subjects was studied under hypnosis. He was brought to the laboratory by Dr. David Slight, of McGill University, Montreal. The subject had been hypnotized many times before. He was first tested awake and during normal sleep and showed characteristically normal trains of 9.9 per second and spindles of 12.5 per second frequency. After Dr. Slight had induced the hypnotic state, a sustained condition of cataleptic rigidity ensued. Nevertheless, the trains characteristic

[1] Loomis, Harvey and Hobart, SCIENCE, 81: 597, 1935; 82: 198, 1935.
[2] Berger, *Arch. f. Psychiat. u. Neur.*, 1929–35.
[3] Adrian and Mâtthews, *Brain*, 57: 355, 1934; Adrian and Yamizawa, *Brain*, 58: 323, 1935.