

Book Reviews

The Biology of Human Starvation, 2 vols. Ancel Keys *et al.* Minneapolis: Univ. Minnesota Press; London: Geoffrey Cumberlege, Oxford Univ. Press, 1950. 1,385 pp. \$24.00 the set.

This is largely a report concerning the influence of a six-month's semistarvation experiment on 32 healthy young men with an average age of 25 years. The subjects were volunteers from the camps or groups of conscientious objectors in World War II. The food restriction resulted in a loss of about 25% body weight at the end of the period. This study, which has become known as the University of Minnesota Experiment, might be said to be a revised and enlarged, or World War II edition, of the Carnegie Nutrition Laboratory study of the effect of undernutrition on young men which was stimulated by World War I.

A great deal of valuable data on the morphologic, biochemical, physiological, and psychological aspects of semistarvation and rehabilitation was secured in the Minnesota experiment with techniques developed since World War I, but the over-all results are in some respects disappointing. The semistarvation diet used undoubtedly produced conditions like those produced by semistarvation in Europe in World War II, but the value of the study might have been considerably increased by using two or more types of restricted diets. At least the salt intake could or should have been on different levels. Some of the subjects questioned the competence of the experimenters to plan adequate dietary rehabilitation. In the absence of knowledge based on previous experience, it would have seemed wiser to depend partly on instinct by allowing half of the subjects relatively free choice after a day or two of controlled food increase. On the basis of known facts, the statement that the fat content of a rehabilitation diet is unimportant (p. 1057) is not justified. Moreover, the claim that hunger disappears after a few days of total starvation (p. 829) is contrary to our findings.

No attempt was made in the Minnesota experiment to make a detailed study of hunger and appetite, but it was found that hunger definitely increases with semistarvation and in the early stages of rehabilitation. An important discovery was the finding that the amount of interstitial fluid remains relatively constant in spite of a loss of about 25% body weight and the development of edema in some of the subjects, but the question remains whether this would also be found with other types of restricted diets. The proportion of body fat was found to rise above the pre-semistarvation level during dietary rehabilitation, and the question raised here is whether complete dietary rehabilitation can be secured in any way without the development of a transient excessive fat deposit or a complication with poststarvation edema.

The authors seem to overemphasize the differences between the results of nutrition studies made on animals and on man. Animal experiments have, however, contributed greatly to our present knowledge of foods and

nutrition, and it is highly probable that many of the unsolved problems of human starvation will be clarified by animal studies. The attitudes developed by some of the subjects in the Minnesota experiment also indicate that it might be extremely difficult to obtain a group of human guinea pigs for such studies in peacetime.

As stated in the authors' foreword, one of their objectives was to present a critical analysis of all the world's knowledge concerning the biology of human starvation. With a flow of important new literature coming out of Europe, this proved to be practically impossible. These two volumes will nevertheless long serve as the chief source of information concerning human semistarvation, a chronic state of millions of people in many lands.

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A Geography of Europe. Jean Gottmann. New York: Holt, 1950. 688 pp. \$5.00.

Readers of SCIENCE who have been wanting to get a better grasp on the geographic, economic, and political realities of present-day Europe would do well to double-star this volume. Although written primarily as a textbook, it will undoubtedly satisfy the needs of other serious students who feel that America's destiny is somehow enmeshed with that of our European cousins.

The appearance of a new textbook in regional geography is always an event of importance to college and university teachers. Particularly so is the publication of this first book on the geography of Europe to make its appearance since World War II. It is a worthy successor to the half dozen or so prewar texts on Europe published in the United States, two of which, like this one, were written by European-trained geographers. Even though the author of a book on the geography of an entire continent must of necessity depend largely on secondary materials, the organization, point of view, and treatment of detail are all benefited by careful training in, and wide observation of, the area being described. The excellent bibliography is indicative of the author's familiarity with French, Italian, German, and Scandinavian source materials as well as the best of the literature in English. Bibliographies are always easy to criticize, but this reviewer cannot refrain from wondering why a two-volume work on "*Hochbulturien*" is included when there is no mention of such standard German works as the *Handbuch der Geographischen Wissenschaft* or the European volumes in the *Enzyklopedie der Erdkunde* series.

After devoting 90 pages to the general features of Europe, in which he presents with sweeping strokes the physical and cultural-economic patterns of the continent as a whole, Gottmann analyzes the geographic "personality" of the individual countries. He groups these countries as belonging to four large regions: Western