as Chapter II dealing with the seasons, time and map projection, could have been omitted from a text in economic geography without serious loss.

In the opinion of the reviewer, the outstanding praiseworthy feature of the text is the organization of the treatment of agriculture on the basis of topical discussion of the production of climatically delimited regions rather than by political subdivisions or on a purely topical basis. This type of treatment, which might have been extended to other sections, has certain manifest advantages.

The style is simple and within the understanding of the students who will use the text; much of the material is presented in very interesting fashion; the illustrations, maps and graphs are both numerous and good; the text obviously fulfils adequately the objectives the authors had in mind in its preparation. The authors have both had years of successful experience, the results of which appear in this highly effective presentation of the field of economic geography in a new and attractively printed text due to meet merited approval.

Economic Geography. By R. H. WHITBECK and V. C. FINCH. Third edition. x and 550 pp.; maps, diagrams, illustrations, index. 9 by 5¾ inches. McGraw-Hill Book Company, New York, 1935.

IN the third and latest edition of this well and favorably known text in economic geography for beginning college students the subject-matter is organized on a "topical regional basis," as in the earlier editions, with political units as "regions" and with major emphasis on those areas of North America with English-speaking populations. Both the treatment of subject-matter employed and the greater importance of these areas to American students make this desirable, but there is no valid equivalent justification for the greater emphasis accorded to Latin America than to Asia.

Revision has involved but slight change in the text; even the pagination is essentially the same as in the first two editions: a flattering commentary on the earlier editions which have been tried and found satisfactory over a period of more than ten years. The most important difference between this edition and its predecessors is that outdated maps have been redrawn or graphs based on recent data have been substituted for maps which have outlived their usefulness for instructional purposes. These new maps and graphs measure up to the high standards of the text, though some are open to the criticism that there is no method of determining the date of the statistical material upon which they are based, *e.g.*, Fig. 8.

The first edition was a welcome addition to the list of college texts in economic geography; the third is a worthy successor to the first. Though there may be some slight differences of opinion as to the desirability of the organization of the subject-matter on a "topical regional basis" with political units as "regions," there should be general agreement that the authors have succeeded in writing a logically organized, readable, teachable and excellently illustrated text.

DARRELL HAUG DAVIS
UNIVERSITY OF MINNESOTA

FORESTRY

The Theory and Practice of Silviculture. By F. S. BAKER. 502 pp., 1934. McGraw-Hill Book Company, Inc., New York.

IF any proof be needed that forestry in this country is gradually emerging from empirical gropings and slavish imitations of European practice, Professor Baker's book gives ample evidence of it. Silviculture is nothing else than applied ecology and must rest upon plant physiology, soil physics and biology in general.

In western Europe, there are only about a half dozen commercial tree species, growing under a fairly uniform climate, with which the forester has to deal; forest practice has grown up there as a slow evolutionary process and has become, like agriculture, a part of the everyday life of the people. The scientific problems are therefore comparatively simple, and the scientific reasons for this or that practice are not very urgently needed.

In this country, where foresters have to deal with several hundred commercial species of trees, spread over a continent with a climate ranging from semi-tropical to arctic, from humid to arid, with an enormous variety of soil conditions, and a lack of historic and economic precedence in forest culture, forest practice must be built from the ground up—a practice suited to the needs of every locality and species. This requires ingenuity and freedom from any fixed European moulds, possible only when the scientific reasons for this or that step are clearly understood.

Professor Baker attempts, and in my opinion admirably succeeds, to combine in one volume both the different forest practices in the several forest regions of this country and the scientific background for such practices. He lays the scientific foundation for an indigenous silviculture, and shows that forest management can succeed only when it is firmly grounded in natural sciences. Although the book is divided into five chapters, it really falls, on the basis of the topics treated, roughly into two almost equal parts. Of the 459 pages of the text proper, some 264 pages are devoted to plant physiology, soils and ecology, as they apply to the life of the forest, and the remainder to the discussion of the different silvicultural systems.

In a book of such scope, one may find, according

to his own personal interest or particular hobby, some topics treated too briefly, while others at greater length than they would seem to deserve. For instance, too much emphasis, it seems to me, has been laid on soil nitrification—a process which, under our climatic conditions, is not very important because of the small amount of raw humus prevalent in our soils. A discussion of a soil classification, as it is related to forests, mechanical and structural composition of the soil, and its flora and fauna, would be more serviceable in explaining the success or failure of forest plantations, and the differences in composition and growth of forest stands, than the nitrogen and mineral cycles of the soil. However, a writer of a text-book is necessarily limited by the state of knowledge in the different fields, and soil nitrification in the past has received greater attention than other soil relationships.

On the whole, the book is an outstanding contribution to our too scanty scientific forestry literature. Its thorough scientific and analytical approach to the present-day practices, its lucid style and its interesting method of presentation make it stimulating and readable. It should, therefore, be of distinct service in the classroom and helpful to the practicing forester who is confronted with silvicultural problems for which there is no empirical knowledge.

RAPHAEL ZON

U. S. FOREST SERVICE

SPECIAL ARTICLES

DIFFERENTIATION OF THE ANTI-DERMATITIS FACTOR[1]

WE demonstrated some time ago that if vitamin B carriers are exposed to ultra-violet irradiation at least one member of the vitamin B complex is destroyed, and all rats that receive the irradiated preparations sufficiently long develop a severe dermatitis and succumb. The basal diet, No. 1669, is made up of casein 20, sucrose 71, salts 4, cod liver oil 2, cellulose 3, and presumably is deficient in all members of the vitamin B complex. The vitamin B carrier is a water extract of yeast, which is submitted to intense irradiation for a period of 10 hours. This is supplied separately in doses of 50 mg dry matter daily.

It soon became evident that the destructive action of ultra-violet irradiation can not be demonstrated if the experimental diet contains any considerable amount of corn-starch. Since it was unlikely that the dermatitis was healed or prevented by starch itself, it seemed probable that the active agent was a contaminant, and so the starch was extracted with alcohol. The extracted starch was found to be inactive, so the extract was concentrated and supplied to animals which had pronounced lesions. When supplied in daily doses of 100 mg healing followed promptly, so other oils were investigated also. Wheat-germ oil has approximately the same activity. Mazola and linseed oil were less effective, and cocoanut oil was almost entirely ineffective.

The fact that the alcohol extract of corn-starch prevents this type of dermatitis supports an earlier suggestion[2] that the preventive agent is not identical with vitamin G, as that term is commonly understood, and an attempt was made to establish this fact more definitely. It had been observed two years ago that dermatitis was healed by tikitiki, but the animals grew slowly and in 12 to 16 weeks they developed extensive denuded areas. It was also observed, as would be expected, that if the young rats are given tikitiki at the beginning of the experimental period as the sole source of the vitamin B complex they become denuded in the same way in about the same length of time. This condition is apparently identical with that described by Sherman and Sandels,[3] but, however that may be, the symptoms have at most only a superficial resemblance to our type of dermatitis. It was decided therefore to produce the two types of symptoms more or less simultaneously and to study their response to various curative agents.

A number of rats were denuded by the procedure described above, and then supplied with 100 mg of wheat-germ oil daily, but this supplement had not the slightest observable effect. The animals declined steadily and died in about the same time as the controls. In the meantime it had been announced that flavines are identical with vitamin G, so their[4] curative properties were investigated. Five of the denuded animals, in addition to the tikitiki, were given daily one drop, 1.0 mg organic matter, of the flavine preparation. They began growing rapidly, and in 2 weeks the denuded areas were completely covered with a new growth of fur. The animals were entirely normal in appearance, but insufficient time has elapsed to deter-

[1] Contribution from the Missouri Agricultural Experiment Station Journal Series No. 412. From the Departments of Animal Husbandry and Agricultural Chemistry, University of Missouri.

[2] A. G. Hogan and L. R. Richardson, *Jour. Nutrition*, 8: 385, 1934.

[3] H. C. Sherman and M. R. Sandels, *Jour. Nutrition*, 3: 395, 1931.

[4] We are greatly indebted to Dr. J. F. Stare, of Washington University, who supplied the material used in establishing the nutritional properties of flavines. More recently lacto-flavine prepared by Dr. Richardson has been found equally effective. See R. Kuhn, P. Gyorgy and Th. Wagner-Jauregg, *Ber.*, 66: 1037, 1933.