

The reviewer does not wish to leave the impression that the cultivation of cells is now an easy matter and that there are no pitfalls. The newcomer to the technique would be well advised to get some practical experience in an established laboratory. As Dr. Paul explains, his book is based to a certain extent on the instruction material of the Tissue Culture Association Summer School, which has in recent years provided a basic training for a few hundred individuals in the United States. There is, as yet, no comparable scheme in Europe.

I. LESLIE

MEASUREMENT OF VALUES

The Measurement of Values

By L. L. Thurstone. Pp. viii + 322. (Chicago: University of Chicago Press; London: Cambridge University Press, 1959.) 56s. 6d. net.

PROF. THURSTONE, prior to his death in September 1955, was the world's greatest living psychometrist. Psychologists, ever since leaving the philosophical fold, regarded the topic of values as out of bounds. Most philosophers would probably be horrified at the idea of 'measuring' values. In recent years, however, many scientists have realized that the concept of values is essential to science and that the greatest problem of the modern world is how to bridge the gap between technical knowledge and skill on one hand and knowledge of humanistic values on the other. Some, however, regard the problem as insoluble or meaningless, forgetting that absolute laws are found neither in science nor in humanism. During the last thirty years of his life Thurstone developed scientific methods which bid fair to bring social, moral and aesthetic values within the realm of experimental psychology. He has ignored those interminable logical arguments concerning values.

Human values are essentially subjective. It was therefore necessary to establish a subjective metric, and a subjective unit of measurement which must satisfy the logical requirements of measurement as distinct from rank order. This objective was reached by Thurstone by means of his law of comparative judgement which dates from 1927. Weber's law is concerned solely with physical measurements. On the other hand, Fechner's law states the logarithmic relation between the subjective continuum and the physical stimulus continuum. But Thurstone's law of comparative judgement is completely independent of any physical stimulus magnitudes. It involves a new concept in psychophysics, namely, the discriminial error.

The book has a preface by his widow, Mrs. Thelma Gwinn Thurstone, herself a psychologist. There is a selection of twenty-seven papers which have appeared in various journals.

Part I of the book is an essay on "Psychology as a Quantitative Rational Science" where psychological concepts and strict mathematical formulation are emphasized. Part II deals with "Subjective Measurement". Part III with "Attitude Measurement". Thurstone and his students were pioneers in researches on attitudes which are well known to psychologists everywhere. They include such topics as prohibition, militarism-pacifism, and motion pictures.

In the study of social attitudes the cognitive and the affective appraisals may be entirely independent. For example, a group of people might dislike democracy but an examination might show that they

did not know what they were talking about. It is here pertinent to mention the views of the late Prof. Flugel in his classic work on "Man, Morals and Society" (Chapters 1 and 16, 1948) where the tendency to change from orectic (moral) judgment to cognitive (psychological) judgement is one of the marks of moral progress. It is true that the late Prof. Reichenbach, the logical empiricist, in his "Modern Philosophy of Science" (1959) held that only a non-cognitive theory of ethics supplies an adequate explication of ethical utterances. Prof. Flugel, however, did not hold that orexis is supplanted by cognition. Orexis still in the last resort supplies the goal at which we aim; cognition only guides us concerning the steps we must take to achieve that goal.

It only remains to add that Prof. Thurstone's book will long remain essential for all students of values.

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CACTI

Die Cactaceae

Handbuch der Kakteenkunde. Von Curt Backeberg. Band 1: Einleitung und Beschreibung der Peireskioideae und Opuntioideae. Pp. xvi + 638 + 35 tafeln. 74 DM. Band 2: Cereoideae (Hylocereae—Cereae (Austrocereinae)). Pp. xvii—xxiv + 639—1360 + 72 tafeln. 87 DM. (Jena: Gustav Fischer Verlag, 1958 and 1959.)

THE first two volumes of this new 'handbook' to the Cactaceae provide a taxonomic treatment of the entire subfamilies Peireskioideae and Opuntioideae and reach the end of the 'subtribe' Austrocereinae of the 'semitribe' Austrocereae of the tribe Cereae, within the third and last subfamily Cereoideae. In the opening key to the higher categories of the family the author recognizes a total of 220 genera, as contrasted with the 124 genera of Britton and Rose's comprehensive "Cactaceae" (1919-23) and the 41 genera of Alwin Berger's handbook to cultivated species, "Kakteen" (1929), in which *Rhipsalis*, *Cereus* and *Echinocactus* were treated in a broad sense with a large number of subgenera.

Botanical exploration in South America, especially in Peru, eastern Bolivia and north-eastern Brazil, has yielded many new species to add to Britton and Rose's work, and it is good to have a new treatment with keys, descriptions and copious illustrations, some of them coloured. Herr Backeberg has 57 species of *Tephrocactus*, 213 of *Opuntia*, 60 of *Rhipsalis*. The elaborate system of categories in his classification of genera will not please everyone: we are given, in descending order, *Unterfamilie*, *Tribus*, *Semitribus*, *Subtribus*, *Sippe*, *Untersippe*, *Gattung*, *Untergattung*, *Subsektion* and *Untersektion*.

The first volume begins with introductory chapters on the history of the Cactaceae in art and literature, on their uses by native tribes or in medical science, on classification, and on the maintenance of living collections. In discussing cultivation, methods of grafting, etc., the author does not descend to the level of the small amateur grower, flat-dweller or floral decorator, but keeps strictly to the botanical and horticultural point of view. This vast work, misnamed 'Handbuch', may well be open, like all big revisions, to much taxonomic criticism and, if only for that reason, will be indispensable to all serious students of Cactaceae.

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