astonishing variety of products of the firms of Ernst Leitz and Carl Zeiss. The author, who is a member of the Zeiss organization, explains that this limitation to German manufacturers was necessary under present conditions in order not to delay publication. It is to be hoped that his intention to add instruments of other origin in future editions will materialize. The pictorial representation of the subject matter has been carried out so carefully and completely that it should serve to compensate the language difficulties which some may have, the book being, of course, in German. Measuring microscopes, collimators, contour projectors, comparators, gage block interferometers, and apparently all such instruments as would be expected in a text of this kind have found their place. One wonders if industry really makes full use of the potentialities of all this equipment. Finally there is a noteworthy section on surface profile determinations, with comparative photographic documentation of results using the profile microscope, the quenched total reflection microscope, and the interference microscope.

The book will serve the student as a reference or even as a text, and it will provide the instrument maker or process engineer with a guide to the solution of many problems in precision measurements.

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Trace elements in food. G. W. Monier-Williams. New York: John Wiley, 1949. Pp. viii + 511. $6.00.

The title *Trace elements* has a variety of connotations for different groups. The nutritionist has in mind primarily iron, iodine, copper, manganese, cobalt and zinc. Agriculturists add boron to this group and dentists add fluorine. The toxicologist, while not unmindful of a possible excess of some of the elements named, centers his main interest on the remaining ones. But the health officer and the food chemist must deal with the gamut of elements, since all are encountered in foods, in more or less quantity, sometime or other.

Monier-Williams' *Trace elements in foods* is written primarily from the standpoint of the food chemist. There are 28 chapters, each dealing with a single element except for the last few chapters, which cover several closely related elements. The book is primarily an abstract of the papers to which it refers—about 1,600 in all. In the case of each element half of the discussion deals with the source and amounts in foods, nature or condition of occurrence, function if any, nutritional requirement, availability, assimilability, tolerance, toxicity, retention, excretion etc. The other half of the discussion is devoted to methods of analysis. Its thoroughness in this field should make it a useful book for every food chemist.

The author discusses briefly the philosophy of regulatory measures. He states: "Agreement [between what is clearly toxic and what is undoubtedly harmless] is not likely to be reached without far more complete knowledge of human physiology than we possess at present. Meanwhile, any preference must be on the side of the consumer." But he weakens that statement by another. "It can be urged that where exhaustive animal experiments have shown no sign of injury of any kind, there is no reason to fear any adverse effect on man and no justification for imposing limits and prohibitions which may harass traders and impede progress without conferring any apparent benefit on the consumer." The different reactions of different species and the various susceptibilities of individuals, particularly invalids, within a species justify greater caution than this implies. The "harassing of traders and impeding of progress" have often been overemphasized. One can cite the former wide use of sodium benzoate in ketchup. Now it is outlawed by the federal definition and standard that industry itself largely formulated. Preservatives in milk, a most perishable food, were outlawed when knowledge was very limited as to what could be accomplished by a combination of pasteurization and refrigeration, and facilities for applying them were even more limited. This prohibition was a challenge to the dairy industry. Today the distribution of milk is on a very high level indeed. Abolition of the use of the violently reactive chemicals now being used in the flour and bread industries might be expected to have an equally salutary effect.

At least part of the medical profession was confident that lithium chloride could be used as a seasoning agent to supplant sodium chloride for patients requiring a low sodium intake. Not a single voice was raised against it until a few deaths were reported. Lithium at one time was regarded as an important ingredient of certain so-called health waters. Incidentally, Monier-Williams' discussion of lithium is very brief. The episode mentioned occurred too recently for him to have included it.

Some other omissions are less easily excused. The author states that a tree may be fed manganese through a hole bored in the trunk. He fails to point out the more and more common practice of feeding plants through their leaves. Important commercial applications of the technique are spraying pineapples with iron and citrus trees with manganese, copper, and zinc.

Through an error, the author states that normally 1½ to 1¾ lb of tin is used to coat a base box of steel in making tinplate. In this country 3 percent of hot-dipped plate contains 1½ lb and 97 percent contains only 1.25 lb. The ability of the canning industry thus to spread the limited supply of tin during the war is what made it possible to keep up the supplies of food to both civilians and the military forces.

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