TSWETT'S ADSORPTION ANALYSIS

Principles and Practice of Chromatography
By Prof. L. Zechmeister and Dr. L. Cholnoky.
Translated from the second and enlarged German
edition by A. L. Bacharach and F. A. Robinson.
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THE removal of coloured impurities from solutions by shaking with charcoal is the most familiar application of adsorption, and chemists have shown enterprise in improving the adsorbent by 'activation' and in finding new ways of using the material. In applying adsorption to analytical problems, however, it was left to a botanist, Prof. M. Tswett, to display initiative and imagination and present chemists with a device of great value. He allowed coloured solutions to percolate through a compressed column of adsorbent, and by using finely divided calcium carbonate instead of charcoal, he was able to follow visually the track of the pigments. Different coloured substances travelled down the column at different speeds and the resulting separation into coloured zones could be enhanced by 'developing the chromatogram', that is, by allowing sufficient of the pure solvent to pass down the column after the solution had all come into contact with the adsorbent.

The possibilities of the new method were recognized very slowly. Tswett's monograph entitled "Chromophylls in the Plant and Animal Worlds" (Warsaw, 1910) was published in Russian, but the neglect of his work was not really due to inaccessibility because it was described in several papers in well-known German journals during the period 1906-12. Even the encomiums of Willstätter and Stoll in 1910 and 1912 made little impression, and it was not until 1931, when Kuhn and his colleagues succeeded in isolating pure α - and β -carotene by the use of the method, that Tswett's procedure came into its own. Nor can it be said that the potentialities of the method were unforeseen, for Tswett had himself predicted on good evidence, so early as 1910, that 'carotene' could be separated in this way.

The neglect which is often the fate of a new device or technique arises more often than not from what is practicable in research rather than from dullness of mind. Three advances contributed to the new interest in Tswett's work; the first was Pregl's in the technique of micro-analysis, the second the discovery that carotene was somehow connected with vitamin A, and the

third was that the determination of the structure of carotene began to look feasible, Zechmeister having made a promising start. From 1931 onwards the successes of adsorption analysis have been so numerous that the method has become indispensable.

A monograph on the subject was produced a few years later and proved to be a model of its kind, and the need for an English translation was at once recognized by Mr. Bacharach in reviewing the first edition in NATURE (July 10, 1937). A second edition was soon called for (NATURE, April 8, 1939), and Mr. Bacharach has added to his many services to chemistry in producing this careful translation. If the English sometimes lacks the verve of the translators' own writings, it is meticulously accurate, apart from the title.

Chromatography, according to the dictionary, is the *description of colours*, and the word was used in 1731 and 1835 in the titles of treatises on colours and pigments. The title of Zechmeister and Cholnoky's volume, namely "The Chromatographic Adsorption Method", is perhaps a little cumbersome in English.

The book contains a full account of the many technical developments which have resulted from the wider application of the method and of the achievements to be credited to them. Each topic is dealt with in its proper setting, so that many fields of research are reviewed in an interesting way which adds greatly to the value of the work.

To carry out with one's hands a complete and flawless chromatographic separation is a difficult but satisfying achievement, and simple exercises can be devised which give students enjoyment and training in craftsmanship. Many perfectly developed chromatograms of leaf pigments were produced under the direction of Baly and Heilbron in 1922-23, and to-day the photographs recording those experiments tell their own story. A vast literature of research, however, lies in between, and it seems not unlikely that Tswett's method came into general use only when the time was ripe.

Zechmeister and Cholnoky in the preface to the second edition explain that they had intended to include a biography of Tswett, but they add that "trustworthy information about the active life of this pioneer has, however, not so far been available to us". It is to be hoped that circumstances will permit those who knew Tswett to provide a record of his life and work, for the debt we owe to him is great and increasing. R. A. MORTON.