

them the detail of their application. As the reviewer of J. S. Huxley's latest book recently stated in *The Times Literary Supplement* of April 12: "Naturally the science of theology needs restatement from time to time in the light of new facts." Where then is the tangible basis, except in the facts, which themselves are subject to constant revision? Faced with the spiritual morass of the present times it is hopeless to look for salvation

to the past. Parents and children cry for new subjects in the curriculum, while the Churches empty, not because the people have gone astray, but because the interpretation of knowledge fails to keep pace with its accumulation. Sir Richard Livingstone, who expresses a great admiration for Masaryk, would find this point elaborated far more ably if he would turn to Masaryk on "Thought and Life".

R. WEATHERALL.

## THE SPIRIT OF ANALYSIS

**A Text-Book of Qualitative Chemical Analysis**  
By Dr. Arthur I. Vogel. Second edition. Pp. xi+486. (London, New York and Toronto: Longmans, Green and Co., Ltd., 1941.) 10s. 6d.

**S**TUDENTS of chemistry usually begin their working lives with the study of qualitative analysis, carried out too often in crowded laboratories with inadequate equipment: it is the equivalent to "grubbing weeds from garden paths with broken dinner knives". Such education is supposed to make "better men than you or I" doubtless because of its practical basis, but to-day we are sufficiently enlightened to wed practice with theory from the beginning and to realize that the more one understands what one is doing the greater the interest in the task becomes.

The writer, like many others, began to learn analysis with an unknown substance before him and a set of tables full of horrible abbreviations which was followed meticulously. He learnt many facts but little manipulative skill and there was no time for reasoning. When Ostwald's famous and best book came into his hands a few years later it was a revelation; nearly everything had been missed during a dull period when chemistry had appeared unattractive. Manipulative skill, the first essential of a would-be researcher, had to be learnt during organic preparations.

The moral of all this is that qualitative analysis has a true spirit and it must be taught in such a manner as to cultivate this. The reviewer is evidently not alone in holding this view for it is the basis of Dr. Vogel's text-book, which has passed into a second edition in little over two years and has been praised by teachers and reviewers. The new edition contains many additions which add to its completeness and value, such as extended accounts of spectroscopic and of microqualitative analysis and of spot tests, all of which are proving helpful in days when the chemist ventures greatly with the smallest possible quantities of materials.

Analytical chemistry, though the oldest branch, and forming a profession of its own with proprietary rights and a society of high standing, is yet neglected academically. There is no professorial chair in the subject in England, as the President of the Institute of Chemistry has just emphasized, announcing at the same time that the subject now forms a branch in which candidates for the associateship of the Institute can be examined. We have emphasized the importance of skill at the bench and it is much more so in these days when work is on the microscale in relation to the natural substances which are being studied. The many Englishmen who worked in Germany forty years ago, often with the aid of an 1851 Exhibition, were almost without exception far more skilled in bench dexterity than the German students whose education in analysis had been on similar lines. In passing, it is interesting to note that nearly all the young men who to-day appear as authors of outstanding researches or books of merit are on record as holders of one or other of the various research fellowships now available. There is much evidence that these are fulfilling their purpose.

There is no point in any detailed reference to Dr. Vogel's pages—practice and theory are so intermixed that one can open the book almost anywhere and read a few pages or paragraphs with interest. The subject is shown to have a soul, a purpose as well as a body—the manipulations take on the guise of an art and a craft instead of being mechanical operations. We have the feeling we would like to begin chemistry all over again.

One last word—these necessities, for they are far more than ideals, mean bigger and better laboratories and perhaps smaller classes. Governing bodies must be educated that laboratories are more useful than lecture theatres, and that theory may be taught at the bench though practice is not learned by listening to lectures alone.

E. F. ARMSTRONG.