and educational activities. Any system of grant to the new Commonwealth Institute should be placed on a quinquennial basis. The scheme advocated in this report will be prejudiced from the start if those responsible for its execution only know from year to year what amount of money they can count upon from official sources, and are limited to budgeting expenditure on a rigid annual basis. There is no surer means of ensuring waste of public money than to adopt such a practice where research, cultural and educational activities are concerned. Nothing will indicate more clearly the sincerity of its belief in the value of promoting Commonwealth understanding and relations than the way in which the Government responds to this particular recommendation of the Committee; and on its main thesis, should the Government decide not to adopt the scheme, a reasoned statement and no mere *non possumus* is demanded by this carefully argued report.

ATOMIC COLLISION PROCESSES

Electronic and Ionic Impact Phenomena

By Prof. H. S. W. Massey and E. H. S. Burhop. (International Series of Monographs on Physics.) Pp. xviii+670. (Oxford: Clarendon Press; London: Oxford University Press, 1952.) 70*s*. net.

IN this volume, Prof. H. S. W. Massey and Dr. E. H. S. Burhop have provided an extremely complete compendium of results on the collisions of electrons and atoms. High-energy collisions and neutron collisions are deliberately omitted; but such problems as inter-atomic collisions, continuous X-ray production, and the collisions of electrons and atoms with solid surfaces are included, together with the more basic problems of the elastic and radiative collisions of electrons with atoms and molecules. The subjects are treated from an essentially experimental point of view, although considerable theoretical material is also included.

These topics were in the forefront of physical research in the 1920's and '30's. Indeed, a good deal of the material is that which did so much to help conventional spectroscopy to establish the quantum theory of atoms and atomic processes to its present state of completeness. Nowadays research on these subjects is out of fashion. We tend to think that if we took the trouble to work out the answers, we could explain the results of any fundamental atomic experiment. It is open to question whether such an attitude is sound. Among all the detail about the fundamental collision processes, not everything by any means has been satisfactorily explained. The book shows that there are a good many loose ends to be cleared up by some tidy-minded person. It will do a great service if such work is encouraged, for, in this field, good experimental work in atomic physics can be carried out comparatively cheaply. Such research is also an excellent training in accurate thinking on problems which are often basically simple.

I worked on electron collision problems in the late 1920's and early '30's, and it is a great pleasure to see work which I had almost forgotten (on the polarization of radiation excited in a gas at low pressure by a directed stream of electrons, and other problems of light-excitation) faithfully recorded in the volume. The work, though seeming elegant at the time, did not prove to be of any far-reaching importance, and is mentioned here merely as illustrating the by-ways into which the authors have strayed. In the context of the book, experiments of this type are seen in proper proportion as a part of the whole subject.

The work, besides presenting the fundamentals of a large part of atomic physics, also forms the basic raw material of applied work in gas discharges, in ionospheric problems and in astrophysics. The authors have been in the forefront of research in some of these subjects. This is probably the reason why they have taken the trouble to put all the scattered experimental results on collision problems into so comprehensive a form. Others may now have the benefit of their labours, and I am sure the book will be of great value to all those doing research in these applied fields. H. W. B. SKINNER

THIRD EUROPEAN BREWERY CONVENTION

European Brewery Convention

Proceedings of the Congress, Brighton, 1951. Pp. x+352. (New York and Amsterdam: Elsevier Publishing Co., Inc.; London: Cleaver-Hume Press, Ltd., 1951.) 45*s*.

IT is the custom at the European Brewery Conventions to have one or more major themes for discussion: at the first Convention, which was held in Scheveningen, the subjects were of a general character; but at the second, which took place in Lucerne, the two highly important brewing problems of proteins in beer and the production of sterile beer by means other than pasteurization were the principal matters discussed. At the third Convention, which was held in Brighton in 1951 and the proceedings of which are here under review, the two main subjects chosen for discussion were: primary fermentation in the brewery, with special regard to the flocculation of yeast; and various aspects of the economic functioning of a brewery. The quality of the various papers read at Brighton was, on the whole, of a high standard, and some of the discussions animated and vigorous.

The subject of yeast flocculation is one of the utmost importance to brewers. In either top- or bottom-fermentation systems, unless a yeast is of a good flocculating type—that is, purges itself from the wort—the brewer may well be confronted with a number of harassing anxieties. This is especially the case with the brewing of draught beers with top-fermentation yeasts. If a yeast does not flocculate well, an unduly large and undesirable amount may be left in suspension in the beer, and thereby cause difficulty in fining and subsequent 'frets' in cask. So far as bottled ales are concerned, this question of yeast flocculation is not of such paramount importance, because the beer is submitted to a drastic process of filtration. Even so, when a poorly flocculating yeast is used for the fermentation of bottled beers, heavy 'bottoms' in the storage tanks can lead to serious losses.

The whole question of flocculation is bound up with the physical behaviour of a yeast in the fermentation vessel, whether the yeast be a top or bottom strain. Thus, a yeast which tends to come