graphic emulsion to cosmic rays, first at high mountain altitudes and later from balloons. This technique at Bristol, and cloud-chamber investigations from Manchester, have been responsible for the great majority of the important discoveries in nuclear processes of high energy since the Second World War. A number of new types of particle of short life have been discovered, all but one of them in Britain. By a study of their modes of decay, complexity is beginning to give way to order in the phenomena disclosed.

The great machines of the world, absorbing millions of pounds of money, are now studying under controlled conditions the properties of π-mesons discovered by tracks in a photographic emulsion exposed to cosmic rays at mountain altitude. Meanwhile, with the aid of balloons, particles of energy two thousand times greater than anything so far attainable in a laboratory are under observation. It is therefore important to regard this work as part of the larger programme, so that funds, relatively small in amount, continue to be available for its prosecution and extension.

THE ADVANCING FRONT OF CHEMISTRY

THE pace of scientific, social and economic changes in modern times is unprecedentedly rapid. Thus, as Prof. W. Wardlaw points out in his presidential address to Section B (Chemistry), it is easy to understand why the pace of the science of chemistry is growing ever faster and faster. In the past quarter of a century, the number of investigators in both pure and applied chemistry has increased enormously, while research itself is more adequately financed and to some extent better organized than ever before. It is tempting but not very profitable to try to imagine what will have been accomplished, say, fifty years hence, if this acceleration continues. Chemists may well consider that the pace of advance may be such that no human mind will be able to correlate into any significant whole the enormous accumulation of chemical facts. Yet man's curiosity about the universe and his own complex self will most probably increase, and the astonishing growth of the science of chemistry will continue. At intervals during the past half-century prophets have confidently predicted the demise of inorganic chemistry and even of organic chemistry. Chemistry, however, has confounded the prophets by its amazing vitality.

The award of the Nobel Prize for Chemistry for 1951 to McMillan and Seaborg directed the attention of the whole scientific world to the most spectacular advance made in chemistry for a long time: the extension of the Periodic System from element 92 (uranium) to element 98 (californium). Particularly important in this work was the development of ultramicrochemical methods of analysis, which enabled the chemistry of the trans-uranium elements, usually available in millionths of a gram, to be investigated. The combined discoveries of the physicist McMillan and the chemist Seaborg and their associates have opened whole new fields for the investigator interested in the realm of inorganic chemistry.

Chemistry already has made an indispensable contribution to atomic energy research and development, and chemists will fill a major role in establishing nuclear power as a benefit to humanity. The next phase in the development of atomic power probably depends more on new materials than on any discovery in nuclear physics or improvement in atomic technology. This extension of technological interest in new materials, all over the world, is bound to emphasize the need for broadening our knowledge of both the familiar and unfamiliar elements and compounds. It is surprising how little we know about many of the chemical elements, even the metals. We know still less about certain elements which lie midway between the metals and the non-metals, the so-called metalloids. A host of new researches has been set in motion primarily by the needs of the atomic energy programme. However, the results will be the starting-point of new developments in every phase of industry. In the United States, there is a great revival of interest in inorganic chemistry, and in Britain there are signs that its value and importance are being increasingly realized.

During the past decade, most people have had an uneasy feeling that all is not well with their food. As we all know, the food processor has chemicals for every need—preservatives, emulsifiers, colouring agents, etc. Some idea of the magnitude of this problem of chemicals in food can be obtained from the report of the Delaney Committee set up in June 1950 by the United States Congress. The Committee heard the striking evidence from the officers of the Food and Drug Administration that 704 extraneous substances were thought to be in use. Of these, only 428 were considered harmless as normally employed, leaving 276 of which the safety was open to question. There is little doubt that the wide publicity which this subject is receiving will call for planned administrative action in the United Kingdom.

GEOLOGICAL RESEARCH AND ITS APPLICATIONS

FOR his presidential address to Section C (Geology), Dr. J. E. Richey takes as his subject "Some Aspects of Geological Research and their Practical Application". Quoting a remark made by Henri Poincaré in "La Science et l'hypothèse" that "Science is built of facts, as a house is built of stones; but an accumulation of facts is no more a science than a heap of stones is a house", Dr. Richey has selected a number of classic examples of geological research as illustrations of the methods employed in building the 'geological house'. The investigations chosen are mainly from Great Britain and range from those of James Hutton and William Smith to the present day. From an analysis of these and of the criteria used in each case, a definite pattern of evidence which led to the particular conclusion can be adduced. Dr. Richey sets out the various types of proof-pattern made use of under the following headings: anomalies in observed data; similarity and dissimilarity of occurrences; analogy; repetitive evidence; geometrical patterns of evidence; and intersection of different lines of evidence. Examples of each type of proof-pattern are given.

Dr. Richey then deals with practical applications of geology. It is especially emphasized that economic geology is not a subject apart from pure geology but is simply geology applied to a variety of objectives containing an economic purpose. Particular subdivisions considered are coalfield research, the search for oil, the location of ore deposits, and civil engineering problems. In each case one or more examples are given in illustration of the main patterns of evidence involved. These include the discovery of