CHEMISTRY AT THE MID-CENTURY

IN his presidential address to Section B (Chemistry), Sir Cyril Hinshelwood points out that a century ago there was a great wave of intellectual optimism, more recently succeeded by disillusion and pessimism from which recovery is to-day far from complete. At this moment there may be profit in taking stock of the realities of the situation and in examining against the general background some particular themes of interest to the science of chemistry.

The great chemical events of the past century have been the evolution of views about the basic substratum of things, the perfection of the arts of synthetic chemistry, and the growth of knowledge about the laws of energy and of the intimate mechanism of chemical changes. Now after a long and eventful approach the chemist stands face to face with the problem of life itself.

Early ideas about atoms and the manner of their union were naive. They have gradually become more sophisticated and more abstract, and now chemical valency must be interpreted in terms of electrons with properties quite unlike anything known to ordinary observation. Behind this there seems to lie some deep mystery relating the possibility of detection with the very existence of the entities postulated in physical theories, and in a glass darkly one seems to see here some connexion with the mind–matter problem itself. The present situation is unsatisfying to many; but it should not be concluded too readily that the limit of knowledge, or taking long views, even of the power of human understanding is yet reached.

Much of chemistry is of a more workaday character and unconcerned with these deep questions. Structural chemistry, now in the early stages of becoming a mathematical science, has not only revealed the underlying atomic patterns of things but also enabled the chemist to weave designs of his own choosing. The deeper understanding of mechanisms has not only led to understanding but also to control.

It has often been questioned whether the powers of chemistry are used for good or evil ends. To this an emphatic answer may be given: chemistry has, in fact, conferred vastly more benefit than harm on mankind; and men of science are in no way responsible for the abuse of their discoveries by others. The desire to inhibit scientific discovery rests, moreover, upon an utter lack of faith in human destiny.

The detailed understanding of what happens in chemical changes has revealed a picture surpassing in wonder that conceived by the poetic imagination of Lucretius. It is now being extended to the events occurring in living cells. The selective influencing of cell processes opens the door to the great field of chemotherapy, though generations may pass before all the promise of this is fulfilled.

As the cell discloses its secrets there will emerge the possibility of deep-seated intervention of man into the fashioning of his own biological future, and those of little faith may raise more vigorous cries than ever.

Men of science at the mid-century are faced with difficult problems, both scientific and human. If in face of hopes and fears they seek a policy, they will do well simply to follow the advice of Candide: "Il faut cultiver son jardin". If they do this unconcernedly, their own garden will not fail to go on producing its fruits.

GEOLOGY AND MILITARY STRATEGY

THE relation between geology and the movements of armies forms the theme of the presidential address to Section C (Geology) by Prof. W. B. R. King. Military operations in north-west Europe during the past two hundred and fifty years have illustrated as well as in any part of the world that the ability of a commander to move, feed and supply a large army at will is one of the prime necessities of a campaign, for this leads up to the successful deployment for the actual battle. The first of these necessities clearly depends on the general topographical lay-out of the country viewed in a broad way, while the details of the battle are often influenced by local geological controls.

Belgium, between the Meuse-Sambre and the rivers draining towards the Scheldt, has often been a 'corridor of invasion' between east and west, and many of the great battles from the time of Marlborough onwards have been for the control of this 'corridor'. The early battles of 1914 and 1940 were clearly influenced by the presence of this natural east–west throughway. The line taken up by the Allies in May 1940, based on the Scheldt estuary–River Dyle–Meuse valley above Namur, left only a short stretch of line without a natural defensive river position. That the Germans were able to turn this line by advancing through the difficult Ardennes country does not say that the line chosen was not a good one. Other defensive lines in northern France are essentially river lines, like that of the Somme running across what is, on the whole, open country.

When the general geological pattern of north-west Europe is considered, it is clear that the oft-repeated pattern of military operations can be co-ordinated with the physical geography of the area and this is clearly controlled by its geological history.

North-west Europe can be divided into five main areas: (1) the low-lying area of the north with wide sluggish rivers and large areas actually below sea-level; (2) the Chalk and high-standing Tertiary areas of Belgium and northern France with relatively few natural barriers; (3) the Palæozoic and igneous rocks of the Ardennes and surrounding Bunter Sandstone outcrops, a wooded area of high relief with deeply incised valleys; (4) the Paris Basin consisting of an outer zone of marked dip and scarp topography, a middle zone, that of the Chalk, an area of open country of well-drained flat surfaces and an inner zone of dissected wooded hills; (5) the Palæozoic area of Brittany and west Normandy with its strong east–west 'grain'.

Clearly, of these divisions, (2) and the centre zone of (4) are those most suited to easy movement of large armies, and historically it is in these areas that the main military operations have taken place. But besides the controls due to the solid geology, the area as a whole was in the periglacial zone during the Pleistocene Ice Age. This has had great influence on the physical features. The effect of a lowered sea-level due to abstraction of oceanic waters to form the ice-caps has been to cause a temporary rejuvenation of all the valley systems, particularly in their seaward portions. These overdeepened valleys were drowned on the recovery of sea-level to near its former position. This resulted in either large estuaries or, as occurred in most cases, valleys filled with recent unconsolidated sediments including peats.

It is these deposits which make so many of the river lines such strong defensive positions, for the