Atomic Energy and the Future

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5-10 per cent. This is a worthwhile advance, but it is not revolutionary.

The great advantages which atomic fuel has over all others is its small weight, its ability to function without oxygen, and the absence of noxious combunstion gases. Power plants could be operated in confined spaces, for example, below the surface of the earth or even beyond the limits of the atmosphere.

This is, however, by no means the whole of the peacetime story of atomic energy; in fact, the production of power by means of atomic fuel is one of the least interesting, and probably also one of the least important, roles which the control of nuclear fission brings to us. When an atom of U-235 or plutonium is torn asunder by the bombarding neutron, a great deal of energy is liberated as some of the matter of the atom is converted into heat; neutrons and a host of other particles are ejected. The neutrons may be instrumental in starting other nuclear fissions, but the other particles when they settle down after the excitement become ordinary atoms which are of course much lighter in weight than the original U-235 or plutonium atoms.

Dangerous When Excited

These lighter atoms, which we call "fission products," are extremely dangerous to life until they have really settled down; they are radioactive, and they emit, during their settling-down process, a number of radiations; the most harmful is the very short wave-length radiation which can penetrate matter and has an extremely disruptive effect upon human tissues. Directly then by collecting the fission products and by many other methods we now have a whole collection of excited atoms, some of which take a very long time before they settle down and cease to emit their radiations. These artificially radioactive atoms behave chemically exactly like their unexcited brothers, but they always reveal their whereabouts by the radiation which they emit. If they are used in extremely small quantities mixed up with vast proportions of ordinary atoms their radioactivity becomes useful as a sort of label. For example, if you eat a loaf of bread in which one cellulose molecule in every ten million contains a radioactive carbon atom it is quite an easy matter to trace the digestion and ultimate destination of the labelled atom by following the radiation source. In more specific circumstances it is possible to investigate bone formation, glandular activity and so on by merely following the labels around. Further, samples of these various kinds of radioactive atoms can now be made relatively cheaply, and each provides its own particular brand of radiation as it settles down.

Medical and Chemical Uses

Whereas previously we had only radium as our useful, naturally-occurring source of radiation, we can now choose from a very large number of different radioactive atoms to suit the particular purpose we have in mind. Already there is some evidence that biological systems are affected differently by the radiations emitted by the various fission products during their settling-down processes. These radiations which curb the usefulness of atomic fuel for power production, in that vast quantities of metal and other materials are required to shield the operators, thereby keeping the weight of the installation high—these radiations properly controlled and carefully selected may constitute one of the greatest therapeutic agents of tomorrow's medical practice.

In the chemical industries, too, there are already indications of their usefulness. We can anticipate considerable advances in the polymerisation processes now in use in the manufacture of plastics and rubber. Some success has already been achieved in this field. A large number of drugs and other physiologically active substances which are produced only in plants and animals will probably appear as by-products of chemical reactions induced by these new radiations. Already some viruses have been relieved of their virulence, and converted into innocuous producers of antibodies and this opens up vistas in which these carriers of disease and death may be made, under the influence of the specific radiation, to purge a human body of the torments which they themselves have caused.

THE END OF THE AXIS
BBC Documentaries from ZB's

LISTENERS who settle down on Sunday evenings with their receiving-sets tuned to the Commercial stations will notice some reorganisation in the programmes from September 12 onwards. The aim is to give the greatest possible variety, and BBC documentary features, plays, musical shows, 15-minute sessions by prominent New Zealand performers, the new *Mind Your I's and Q's* programme (see page 10), and other attractive items have been scheduled for Sunday night listening in the future.

Of the BBC documentary programmes the first will be *The Secret Correspondence of Hitler and Mussolini*, which will be heard on September 12 from 1ZB and 3ZB at 7.0 p.m., and 2ZB at 9.0 p.m.; on September 19 from 2ZA at 7.0 p.m., and on September 26 from 4ZB at 7.0 p.m. This programme was arranged for the BBC by H. R. Trevor-Roper (who carried out an extensive investigation into the mystery of Hitler's death) and Terence Tiller, and was produced by Laurence Gilliam.

The second production, *The Plot Against Hitler*, will be presented on September 19 from 1ZB, 2ZB, and 3ZB, on September 26 from 2ZA, and on October 3 from 4ZB. The script for this programme came from a number of sources, including diaries, police reports, and accounts of eyewitnesses. A third programme, *The Last Days of Hitler*, will be broadcast on September 26 from 1ZB, 2ZB, and 3ZB; on October 3 from 2ZA, and on October 10 from 4ZB.

Programmes to follow will include plays featuring Flora Robson, James Mason, and Fay Compton; a Conan Doyle thriller, the BBC show *Navy Mixture*, and a Peter Cheyney story.