base that night the aircraft was "D.I.'ed" (routine daily inspection) and the crew remained for the night at S——. In the morning the helicopter returned to base, refuelling at K——, as there were only 32 gallons (145 litres) of 100 octane remaining at S——."

Conclusion

There have been many similar sorties carried out in which the helicopter has undoubtedly saved life and limb. As further experience is gained the R.A.F. Casualty Air Evacuation Flight will no doubt be able to answer all the calls for casualty evacuation.

The helicopter is invaluable from the medical point of view and has again proved its worth in Korea, where the American Air Force has been picking up casualties from the front line. As these aircraft operate usually below 2,000 ft. (610 m.) there are no clinical contra-indications to flight. Any patient fit for movement by surface means can safely be evacuated. Designers in this country are now fully aware of the medical requirements in design in order that the aircraft may be used to the best effect for loading and carrying casualties. Even hooks in the cabin roof from which blood bottles may be hung have not been forgotten.

I wish to express my thanks to those officers of the Far East Air Force who have provided me with information and to the Director-General of Medical Services of the Royal Air Force for permission to publish this article.

NEWS FROM THE BRITISH ASSOCIATION MEETING

The one hundred and thirteenth annual meeting of the British Association was held in Edinburgh from August 8 to 15. It was a special occasion in several respects. Being held in the Festival year, it was in part a centenary meeting, the centenary of the Great Exhibition. On that account there was more of stocktaking than usual and, as an extension from that, of extrapolation into the future. Secondly, the Association had the Duke of Edinburgh as its president, as in 1859 was Prince Albert, whose suggestion had led to the Great Exhibition. And finally the meeting was three weeks earlier than usual on account of the Edinburgh Festival.

The president's address was on "The British Contribution to Science and Technology in the Past Hundred Years." Among his examples were the birth of modern surgery in Scotland with Simpson's discovery of the use of chloroform as an anaesthetic and Lister's antiseptic technique; the work of Manson as the father of tropical medicine; and the leading part taken by the British Commonwealth in the promotion of public and personal health services. He spoke also of some omissions: the screw micrometer, invented in Britain but produced earlier in Germany and the United States; the silicone* group of materials developed in Russia and the United States from basic work by Professor F. S. Kipping, of Nottingham; and, from Navy experience, of "apparatus . . . used operationally exactly as the inventor put it together, with all the resulting disadvantages in maintenance and efficient operation." He drew the conclusion that where scientific principles are known by all nations the advantages lie in the good design of equipment for practical use.

Among those who looked to the future, Sir CLAUDE GIBB, president of the Section of Engineering, felt little doubt that within the next fifty years the gas-turbine motor-car would be used to the exclusion of all others. The remaining problem was the efficient recovery of heat from the exhaust gases. He suggested also that large-scale railway electrification might well be hastened by the application of atomic energy, since to justify the high initial cost generation of electricity would need to be substantial. In the use of materials, Dr. F. D. RICHARDSON (Imperial College, London) said that metals hitherto regarded only as alloying elements were becoming of interest as possible bases for new systems of alloys. An example was the relatively light metal titanium. It had a specific gravity of 4.5, excellent resistance to corrosion by chloride solutions, and a tensile strength greater than that of mild steel. Large quantities of titanium ores were available, and, if large-scale extraction could be improved, a new and important industry would almost certainly grow up and would help to relieve other shortages.

*Organosilicon compounds with a wide variety of properties, the combination of heat-resistance and high electrical insulation being two of the most useful. See, for example, Hardy, D. V. N., *Endeavour*, 1947, **6**, 29.

Chemistry and Medicine

Sir CYRIL HINSHELWOOD (Oxford), in his presidential address to the Section of Chemistry, referred to the present dimly appearing discernment of chemical processes in the cell, with chemotherapy dependent on their selective influencing, and the possibility of deep-seated chemical intervention into processes which were now normally inviolate. What was dimly appearing included the mutually aided autosynthesis of protein and nucleic acid, changes in the proportions of enzymatic material in response to the changed reaction velocities imposed by various environments, and discontinuous modifications in the molecular pattern caused by radiations or the accidents of abnormal cell division. The division of the cell itself was imposed by a physico-chemical influence known as the scale-effect, and occurred without doubt in response to a physico-chemical stimulus. The growth of chemotherapy must be long and difficult, because as yet the rational chemical basis for much that was known was incomplete. Chemically induced mutations of cells were already known in a crude fashion, the influence of drugs on personality already exercised medicine and the law, and the day might well come when a conscious moulding of individuals and even of races would present problems of fearful fascination.

Recent work on the adrenocortical hormones was reviewed, with special reference to cortisone, by Professor G. F. MARRIAN (Edinburgh). As an addition to published information,† he stated that an announcement of the total synthesis of cortisone on the laboratory scale would soon be made. This was the opening contribution to a symposium on "Organic Chemistry in the Service of Medicine." The following speakers were Dr. F. L. ROSE (I.C.I., Ltd.) on antimalarials, and Dr. R. V. PITT-RIVERS (National Institute for Medical Research) on recent work on the thyroid gland.

Underdeveloped Areas

A full day was devoted by the Section of Geography to the types of surveys needed in underdeveloped areas, particularly in the Tropics. Professor L. DUDLEY STAMP (London) suggested that the examples of the groundnuts scheme in East Africa and the abortive poultry scheme in the Gambia showed that, apart from possible mismanagement, there was inadequate knowledge on which to base development schemes. A first step must be to record the existing use of land and to try to discover the reasons for its use or non-use. The World Land-Use Survey was a recently established voluntary organization under the auspices of the International Geographical Union. It was carrying out pilot surveys in parts of Nyasaland, the Gold Coast, Nigeria, Libya, Kenya, and Somaliland, including experiments on the use of material from surveys undertaken for other purposes —air photographs in particular. Dr. A. S. THOMAS (Nature Conservancy) enlarged on the types of preliminary surveys needed. Attention must be paid not only to soils, animals, and plants, but to existing farming practices. In many parts of Africa the best soils were on the tops of hills, not in the bottoms of valleys—hill-top villages, enforced by mosquitoes, having led to soil-enrichment by plant-ashes and food residues. The low fertility of many equatorial soils was now becoming more generally recognized; and, in

†*British Medical Journal*, 1951, **2**, 406.

relation to livestock, treading by cattle led to such compaction of the soil, in the absence of frost to break it up, that rain cannot penetrate, with the result that stall-feeding and migration were used in hot countries. Sir GEOFFREY EVANS (Economic Botanist, Kew) referred to the value of plants as soil-indicators, and to human factors. Dr. H. GREENE (Adviser on Tropical Soils, Rothamsted) spoke on recent aids to soil surveys. He concluded by saying that there were too few technically competent men at work, that intense nationalism within many underdeveloped areas had been a growing obstacle, and that the British policy of encouraging the nationals of underdeveloped countries to take an active and responsible share in the work of development should be maintained.

Rain, Cloud, and Smoke

The Section of Physics, with a distinguished meteorologist, Sir DAVID BRUNT, as president, had a number of papers on meteorological subjects. Mr. B. J. MASON (Imperial College, London) discussed the physics of rain-formation, including its artificial stimulation. After experiments in a number of countries on the "seeding" of cumulus clouds with either solid carbon dioxide (carbon dioxide snow) or with silver iodide crystals, which in form resemble those of ice, he described as a very recent development the discovery that the most efficient method is to spray the underside of a growing cloud with water droplets. The size of the droplets found to be most effective is intermediate between the droplets in a non-raining cloud and those of the finest drizzle. Their effect was to start a coagulation process. From seeding experiments in many countries it had been concluded that for a good chance of success the cloud-top must be cooled already to $-7°$ C., compared with $-10°$ to $-13°$ C. for natural rain formation. He was sceptical of the idea that the rainfall pattern could be altered over large areas by such methods, but saw a possible economic value in the prevention of crop-damage by hail through the premature release of rain from would-be hail-clouds, of which he described the physical characteristics. Mr. I. C. BROWNE (Cambridge) described the use of radar to study clouds directly overhead. The variations of echo intensity with height represented variations in raindrop diameter and in the number of drops in a given volume, while they also indicated whether ice-particles were present. Mr. R. WILSON (Royal Observatory, Edinburgh) had used the 36-inch (0.9 m.) reflecting telescope at his observatory to study the "blue sun" of September 26, 1950—a phenomenon caused by a smoke layer at 30.000–40.000 ft. (9,140–12,190 m.) altitude from forest fires in Alberta, Canada, three days previously. The smoke from these fires drifted over North America, across the North Atlantic, and thence across Europe. The investigation showed that the particles in the smoke layer were not blue but transparent, and that the individual particles were identical in size and constitution, an effect which was unusual in nature and difficult to produce in the laboratory. They were thought to have been oil globules produced by the distillation of wood in the forest fire.

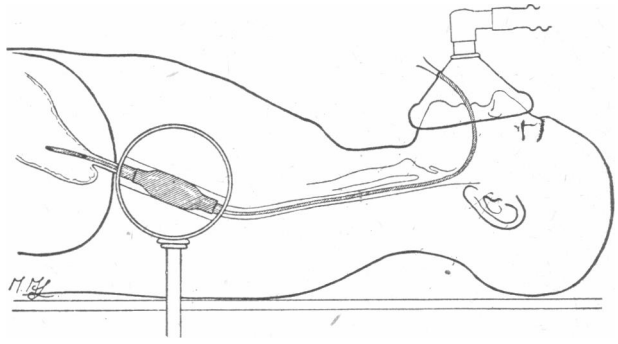
Extreme Environments

A joint session on life and work in extreme environmental conditions was held by the Sections of Physics and Physiology. Dr. O. G. EDHOLM (National Institute for Medical Research) gave a general account of physiological adjustments to temperature. Dr. F. MARSH (North-east Metropolitan Regional Hospital Board) described experiments on the response of the mammalian body at critical levels of hyperthermia, and Dr. N. H. MACKWORTH (Cambridge) on the performance of severely chilled hands. Signs of local acclimatization had been found in the hands of men who normally work outdoors in sub-arctic conditions, and further laboratory studies were being made. Dr. E. M. GLASER and Professor R. A. MCCANCE (Cambridge) gave a paper on body temperature and thermal balance. A balance between heat-production and heat-loss could be established under widely different conditions, with or without comfort, and at internal temperatures which might vary by as much as 3° C., and at skin temperatures which might vary very much more. Evidence of the connexion between working temperature and health efficiency and liability to accidents of workers was summarized by Dr. T. BEDFORD (London School of Hygiene and Tropical Medicine). A discussion on physiological problems of mining was opened by Dr. R. PASSMORE (Edinburgh) with a tribute to the pioneer work of Professor J. S. Haldane on the physiology of respiration and its practical applications to the safety of miners.

Preparations and Appliances

A CUFFED STOMACH TUBE

Professor R. R. MACINTOSH, Nuffield Professor of Anaesthetics in the University of Oxford, writes: Laryngeal spasm is not to blame for inadequate respiratory exchange after the use of curare, for the intrinsic muscles of the larynx are affected by the generalized paralysis and the airway through the cords remains free. If a mask is applied firmly to the face and air or other gases are pumped through it by squeezing the reservoir bag the lungs inflate easily; but with each squeeze of the bag a certain amount of gas is forced through the oesophagus into the stomach, which may become con-



siderably distended. In order to obviate this I pass a stomach tube surrounded by an inflatable rubber cuff similar to that on endotracheal tubes. This cuff prevents gastric contents tracking up between the oesophagus and the tube in the well-curarized patient in whom the cardiac sphincter is relaxed.

The rubber cuff is placed 7 in. (17.5 cm.) from the distal end of the stomach tube. When the patient's reflexes are depressed a laryngoscope is inserted and the tip of the tube, well greased, is directed into the oesophagus. The laryngoscope is withdrawn and the tube advanced until—in an average adult—the tip is 18 in. (45 cm.) from the teeth. The cuff now lies in the lower end of the oesophagus. The proximal end of the tube is passed through a slit in the anaesthetic mask, and the cuff is lightly inflated with some 10 c.cm. of air. The stomach tube plays a part in keeping the tongue away from the posterior pharyngeal wall, but a metal airway can be inserted if required. The lungs can now be inflated easily without gas passing into the stomach, and stomach contents cannot reach the larynx.

Writing in the July, 1951, issue of *Science Progress* (vol. 39, p. 459) Mr. K. W. Keohane, of the Anatomy Department at Bristol, describes how long phase-contrast microscopy took to establish itself as a useful scientific technique. It was introduced by Zernicke in Holland as long ago as 1934, and soon afterwards demonstrated to biologists by Burch in England. At the end of a week's work Burch felt that their reaction was, "If they saw the same things using Phase Contrast as they saw using other methods, then there was no advantage in it, whilst if they saw anything different then the method was wrong." Since 1945, however, the new microscope has become an important research tool. This article explains the underlying theory.