injector circulates the air from his helmet through an absorbent which removes carbon dioxide as fast as his breathing produces it. He is in constant telephonic communication with the organisation in the salvage ship above, which not only controls his decompression but also, through the agency of such devices as grabs and pneumatic tools, takes over an increasing share of the manual work to be done on the bottom. Expensive plant, once started, should run continuously, hence a succession of fresh divers is required who have to subordinate their procedure to the common plan of the team. The famous divers of the past, some of whose feats Sir Robert described, worked almost single-handed in far greater danger and discomfort; only the fittest mentally and physically could attempt the deeper work and these few acquired outstanding skill and experience. It may be that we shall not see their like again.

More than fifty years ago one of these men, Alexander Lambert, struggled through 1,000 feet of the wrecked and flooded Severn tunnel in complete darkness to close an iron door and enable the water to be pumped out. As it was impossible to drag such a great length of air pipe behind him, he used H. A. Fleuss's newly invented self-contained diving-dress, putting it on for the first time that day. This was the prototype of the now familiar type of breathing apparatus in which carbon dioxide is removed from the expired air by passing it over caustic alkali, and the oxygen consumed by the user is replaced from a high pressure cylinder. This system is in use in mine rescue and fire brigade smoke helmet apparatus all over the world to-day, but has perhaps been carried to the highest point of development and portability in the compact Davis Submarine Escape Apparatus, which now provides each member of the crew of all British (and many foreign) submarines with the means of breathing in suffocating gases or under water until the escape hatches can be opened, when it will waft him gently to the surface and support him there until help arrives.

The Future of Tropical Australia

By DR. L. DUDLEY STAMP

FOR more than a century the British Government, the colony of South Australia, and the Australian Commonwealth have attempted to develop the half million square miles contained within the Northern Territory. More than £17,000,000 has been expended in the effort, yet to-day the entire population consists of some 3,000 whites, 800 yellow persons, 900 half-castes and probably 20,000 aboriginals. The mining and cattle industries, once promising, have declined. The same state of affairs is found in the tropical parts of Western Australia, where the total non-aboriginal population is less than 2,000. It is only on the patches of richer soil along the coast of Queensland that the population of tropical Australia is relatively flourishing and increasing.

A few years ago, Prof. Griffith Taylor[1] was almost alone in declaring that only three per cent of tropical Australia—entirely in the coastal belt of Queensland with its well-distributed rainfall—was suitable for tropical agriculture and consequent close settlement. His views are gradually becoming generally accepted, but there is still a wide divergence of opinion on the reasons for the lack of settlement. Sir James Barrett in a recent article[2] says, "It is generally assumed that there is a medical, or rather physiological, reason for failure to settle parts of tropical Australia. So far as investigation goes there is nothing of the kind. The failure to settle some parts of tropical Australia and the successful settlement of other portions of the tropics is solely economic." In his consideration, he rightly divides tropical Australia into four regions: (1) the coastal districts of Queensland with good soil and abundant rainfall; (2) the western portion of Queensland suitable for grazing; (3) the Northern Territory; and (4) the northern portion of Western Australia similar in character to (3). He shows that in the last ten years the annual increase of population in tropical Queensland has been 2 per cent per annum, against 1·5 per cent for non-tropical Australia. He finds that birthrate, infantile and general death rates in tropical Queensland compare favourably with those of many non-tropical countries, are better than those of metropolitan non-tropical Australia and are little if at all inferior to those of Australia as a whole.

It is, as Sir James argues, unfair to consider the vital statistics for regions (3) and (4) because of the small size of the sample. Economic nationalism and State socialism are blamed for preventing more rapid development of tropical Australia—"it is certain that it is not the effect of the climate on Anglo-Saxons". On the other hand, R. W. Cilento, director of Australian tropical hygiene, considers that the Commonwealth is evolving a new type of person—the North Queenslander—who "moves slowly and conserves his muscular heat-producing energy in every possible way"[3], thus agreeing with results of experiments carried out by American physiologists recently[4]. The

vital statistics quoted by Sir James Barrett prove the efficient work of the medical services rather than the absence of climatic influence on life and habits.

In a thoughtful and well-documented study[5], A. Grenfell Price, of the University of Adelaide, has reviewed the attempts to settle and establish agricultural or other industries in the Northern Territory. The thorough work of this geographer has been recognised by the award to him of the Commandership of the Order of St. Michael and St. George and the doctorate of the University of Adelaide in 1933. He has summarised his views on the major problem in a paper entitled "Pioneer Reactions to a Poor Tropical Environment"[6], and concludes that "there is little hope for anything more than a sparse pastoral population in the greater part of the Australian tropics and that this population will show strong reactions to a poor and difficult tropical environment. There is, however, some possibility that Australians may permanently establish close settlement by white agriculturists in small and favourable areas, particularly on the east coast of Queensland".

Dr. Isaiah Bowman[7] suggests that, so far as the Northern Territory is concerned, it would be better to "give up this painful experiment on an incorrigible frontier and let the land revert to wilderness".

If the land has now been properly assessed, the real danger of 'an empty north' to the 'White Australia' policy disappears. Sir James Barrett points out the accessibility of the Northern Territory from densely peopled areas, such as Java, and argues that had conditions been suitable it would long ago have been colonised by Malays or Javanese. On the other hand, there was not, perhaps, sufficient economic pressure to necessitate the inhabitants of the East Indies seeking settlement in lands less attractive. The position to-day is somewhat different. There is a close correlation between climatic and soil conditions in the region around Darwin and in some of the poorer parts of peninsular India. Will the future alter the value of tropical Australia in the eyes of overcrowded India? Darwin is clearly destined to remain on a major world aerial route, and in this connexion at least the Northern Territory cannot remain entirely empty.

[1] See *inter alia*, "Australia, Physiographic and Economic", Oxford. Third edition, 1923, pp. 262–3.

[2] "Tropical Australia", *Aust. Quart.*, No. 21, 64–72, March 1934.

[3] Quoted by A. G. Price, *Amer. Geog. Rev.*, **23**, 371, July 1933.

[4] D. B. Dill and others, "Physical Performance in Relation to External Temperatures". Fatigue Laboratory, Harvard University, 1931.

[5] "The History and Problems of the Northern Territory, Australia". Adelaide, 1930.

[6] *Amer. Geog. Rev.*, **23**, 353–371, July 1933.

[7] "The Pioneer Fringe". New York, 1932, p. 186.

Obituary

SIR ALFRED EWING, K.C.B., F.R.S.

JAMES ALFRED EWING, like many Scots who have become distinguished in the fields of literature and science, was a son of the manse. He was born on March 27, 1855, in Dundee, where his father was a minister of what was then called the 'Free Church of Scotland', his father having 'come out' in the Disruption of 1843. In the autobiographical section of "An Engineer's Outlook", Sir Alfred described his father as a man who, with a superb physique, never missed a day's duty through illness, or shirked one for any reason; the same words might be applied to Sir Alfred himself. He seems to have owed much of his early education to his mother. As he so happily phrased it, "She gave us much of what other boys got at school, and did it in a way that made us associate a love of learning with our love of her".

From Dundee High School, Ewing proceeded in the early '70's to the University of Edinburgh, the first holder of an engineering scholarship in the gift of Dundee High School, and his career as a student was prophetic of the distinction he was to acquire in later life—the records of the Engineering Department show that during the session 1871–72 the prizeman in the class of engineering was James Alfred Ewing. It was his good fortune to be a student during the time when Tait and Fleeming Jenkin were at the zenith of their powers, and undoubtedly Ewing owed much of his zest for research to the inspiring influence of these two teachers. Through Jenkin he was brought into contact with Sir William Thomson (afterwards Lord Kelvin), and he took an active share in the early development of submarine telegraph cables, making in connexion with this work three cable-laying voyages to Brazil and the River Plate.

In 1878, on the nomination of Fleeming Jenkin, Ewing went to Japan as professor of mechanical engineering in the University of Tokyo, and there spent what he termed "five educative years". In the latter part of this service one of his duties was to undertake teaching in physics, and he there began his classical experiments on magnetism.

It was while in Tokyo that Ewing married his first wife, Miss Washington, a great-great-grand-niece of the first president of the American Republic. He had two children, born in Japan, by his first wife, who reached mature years before their mother's death. In 1911, shortly before he was appointed to the principalship of the University of Edinburgh, he married as his second wife a daughter of the late Prof. John Hopkinson, a past-president of the Institution of Electrical Engineers, by whom he had a son.

After five years service in Japan, Ewing decided