

Africa Scene of Nature's Greatest Effort

General Science

Africa may, as Darwin suggested, be the "scene of nature's greatest creative effort." This may be proven by future anthropological researches on the once "dark" continent, said Prof. Jan A. Hofmeyr, president of the South African Association for the Advancement of Science. He spoke on "Africa and Science" at the opening session of the Cape Town meeting of the British Association for the Advancement of Science and the South African Association.

"It would seem to be not without significance that Africa possesses in the chimpanzee and the gorilla those primate types which approach most nearly the form and structure of primitive man," he said. "To that must be added that in the Bushman, Pygmy, and negroid races Africa has at least two and possibly three early human stocks which are characteristically her own and belong to no other continent. No less striking is the fact that in Gibraltar, in Malta, and in Palestine, that is, at each and every one of the three portals into Africa from Europe and Asia in Pleistocene times, there have been discovered evidences of the presence of Neanderthal man. In Africa itself there was found at Broken Hill some nine years ago a skull with the most primitive or bestial facial form yet seen, and so closely akin to the

Neanderthal stock as to establish firmly the expectation of finding further compelling evidence of a long continued Neanderthaloid occupation of the African continent. The discovery at Taung on the one hand, which reaches out towards the unknown past, and the finds at Boskop and in the Tsitsikama on the other, which assist in linking up the period of Rhodesian man with the coming of the Bushfolk, open up to us, in conjunction with the aforementioned facts, a vista of anthropological continuity in Africa such as no other continent can offer. The recent investigations in the Great Rift Valley, near Elementeita in Kenya, and the fossil discoveries on the Springbok Flats, north of Pretoria, have again fixed the attention of the anthropologist on Africa."

Medical science and animal biology also have a big field in Africa.

"In the African continent," he continued, "there is no lack of opportunity to advance Science by physiological inquiries into animal structure, by the isolation of the parasites of human and animal diseases, and by the tracing of the life histories more especially of the minuter forms of animal life. 'Nowadays' in the words of Professor J. A. Thomson, 'the serpent that bites man's heel is in nine cases out of ten microscopic.' But scarcely less

important are the extensive facilities which Africa still offers for the study of the habits and behavior of the larger mammals."

Though the first extensive astronomical observations in South Africa were made as early as 1750, the Royal Observatory at the Cape was established in 1821 and Sir John Herschel made a famous series of observations between 1833 and 1838, it has been within the last few years that it has become an extensive astronomical center. Comparing the situation in 1905, when the Association first met in South Africa, with the present, Prof. Hofmeyr stated:

"The two Observatories of 1905, our visitors will find, have increased to six, including the Smithsonian Solar Observatory in South-West Africa, and the equipment of these institutions includes four great telescopes, with objectives of 27 inches, 26½ inches, 26 inches, and 24 inches, respectively, to which will shortly be added a 24-inch refractor and a 60-inch reflecting telescope—surely a remarkable astronomical equipment for so young a country. The stimulus of the 1905 visit, in which so many prominent European astronomers participated, has indeed borne rich fruit in the advancement of astronomical work in South Africa."

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"Impossible" Electron Movements

Physics

By the shifting of electrons in atoms in ways formerly thought impossible, cosmic mysteries such as the strange green lines in the spectrum of the northern lights are to be explained. So stated Lord Rayleigh, famous British physicist in his address as president of the section on physics and astronomy of the British Association for the Advancement of Science.

"In discussing the nebular and auroral spectra, we encountered the idea of 'metastable states,'" he said. "At present this conception is not in a very satisfactory condition. The original idea was of a state which did not allow of direct transition by emission of radiation to the stable ordinary state. Let us compare the level of the atom to the stories of a building and the optical electron to a man inside the building. The ordinary state of the atom is represented by the man being on the ground floor, and the metastable state

by placing him on the first floor. But the internal architecture of our building must be pictured as peculiar. A staircase connects the first floor with the second floor, and another staircase connects the second floor with the ground floor: but there is no connection between the first floor and the ground floor except by going up higher and coming down again.

"Such, I say, was the original conception, but facts which have since come to light require some revision of it.

"In the nebulae the electron manages somehow to escape from its prison-house, and descend to the level below not by the legitimate route of going upstairs and down again, but by illicitly breaking through the floor, contrary to the rules of the establishment."

In his own experiments, Lord Rayleigh has obtained spectral lines resulting from such "forbidden" changes.

On account of such experiments, he said, "It has even been proposed to define a metastable state as one with a low probability of transition. This takes us far from the original conception, and makes 'metastability' merely a question of degree. Some recent results which I hope to bring before the section at a later stage in our proceedings seem to indicate that even the normal excited state may possibly persist for a much longer time than has hitherto been supposed. If this conclusion is accepted, a far-reaching revision of our present notions may become necessary. The general softening of outline in our picture of atomic events resulting from the substitution of wave groups for particles seems likely to afford what is required, and to allow the occasional transition downward from a metastable state."

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