

the same methods of soil analysis. This would not matter much if the methods were all absolute; unfortunately, they are mainly conventional. Thus an English analyst will say that a soil contains 0.2 per cent. of total potash, meaning by this the amount extracted by hydrochloric acid under particular conditions, although the *real* total is probably three or four times this amount. Continental and American analysts, working on the same soil, but using different methods, would reach wholly different results. The trouble is still worse in the mechanical analysis of soils. "Clay" in Great Britain means material less than 0.002 mm. in diameter, in the United States it stands for particles less than 0.005 mm. in diameter; elsewhere a widely different limit—0.01 mm.—is adopted; so with the other terms. In consequence, one can never compare mechanical analyses made in one country with those made in another; the same terms are used, but they denote different things. The confusion thus introduced into an already difficult subject is most unfortunate. One great advantage of international conferences of this sort would be to prevent such confusion arising in the future.

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SCIENCE IN SOUTH AFRICA.

THE Royal Society of South Africa consisted at the time of its annual report (April, 1909) of forty fellows and 160 members; it had held six meetings during the preceding year, ten papers altogether being read. Part i. of the Transactions, in which these papers appear, contains 334 pages; part ii. contains the papers read at subsequent meetings, and has expanded to 477 pages, since there were nineteen papers in place of ten. Most of the papers deal with local matters; only about half a dozen are concerned with general problems, and of these three are mathematical.

The local papers are mainly botanical. Dr. Schönland, of the Albany Museum, Grahamstown, gives a full description of *Haworthia truncata*, Schönl., the only species of *Haworthia* with strictly distichous arrangement of leaves. The leaves are to a large extent underground, while the exposed parts resemble small pebbles, so that the plant may be classed among the so-called "mimicry plants." Its structure is well adapted to its peculiar mode of life. The truncate apex is without chlorophyll, and thus forms a "window" through which light can pass by way of the central transparent tissue to the assimilating tissue which extends to the underground basal parts of the leaves. Dr. Marloth describes other plants possessing the same structure.

Experiments were also made to find out whether the aerial parts of plants, particularly those growing in arid regions, can absorb moisture from the air. In the Karroo there is commonly a fall of dew at night. Dr. Marloth's experiments indicate that the native plants can take sufficient moisture from this source through their leaves to satisfy their requirements. Dr. Schönland, on the other hand, is not satisfied on this point; the plants examined by him did not appear to absorb from the air anything like a sufficient quantity.

Mr. A. L. du Toit, of the Geological Survey, describes the evolution of the river system of Griqualand West. This system is very complex, but its history can be traced to a remote geological period. In Palæozoic times a continent, at a level lower than the present, extended over this area, the drainage from it being directed southwards mainly along the Kaap valley. At the close of the Carboniferous epoch this continent was intensely glaciated, and finally buried beneath the Permo-Triassic Karroo deposits; upon the surface thus formed the modern drainage system was initiated. In later periods—in late Jurassic, Cretaceous, and Tertiary times—there has been a succession of uplifts, but the rivers have been enabled to cut a peneplain. One of the most important of these surfaces extended from the Stormberg probably into Griqualand West, where it is represented by the Kaap Plateau. This surface has suffered denudation, and the

rivers have cut down and laid bare the pre-Karroo floor with its drainage lines.

Dr. Broom discusses the relationship of the South African fossil reptiles to those found in other parts of the world. The Lower Karroo fauna of South Africa shows many points of resemblance to the Permian in America; it seems practically certain that both are modifications of an earlier fauna which probably inhabited a southern continent joining Brazil and South Africa. The American types are considered to be nearer the ancestral, though considerably specialised; the African, probably owing to their living in the swamps of the Karroo, developed greater length of limb and tended to become more active; but in South Africa the conditions must have been such as to promote rapid evolution, for many new types soon appeared, the most remarkable being the Anomodonts, which probably originated there. Towards the end of Permian times a land connection with Europe seems to have formed, by which the pareiasaurian fauna passed into Europe; still later—in the Upper Triassic beds of Burghersdorp—a number of European types passed into Africa without, however, any of the Cynodonts, highly characteristic of this period in Africa, passing back in return. In Lower Jurassic times land connection was well established. There is evidence of continuous land between Africa and Australia in Upper Triassic times.

The mathematical papers by Dr. Muir deal with a theorem regarding a sum of differential coefficients of principal minors of a Jacobian, an upper limit for the value of a determinant, and Borchardt's form of the eliminant of two equations of the *n*th degree. Other papers deal with the spectrum of the ruby, snake venom, the rainfall of South Africa, evaporation in a current of air, a list of the flora of Natal, and so on.

The *South African Journal of Science* is the organ of the South African Association for the Advancement of Science, its objects being to give a stronger impulse and a more systematic direction to scientific inquiry, to obtain a more general attention to the objects of pure and applied science, and the removal of any hindrances barring the progress of science. Instead of issuing one large annual volume, like our own association, a small journal is sent each month to the members. The numbers of the present volume (vol. vi., beginning November, 1909) contain the presidential addresses and some of the papers read before the sections; notes and articles from other sources are, however, included. The papers, nearly sixty in all, have the general merit of dealing with local phenomena, thus putting on record something that may pass away and be lost, or else attacking problems that can only be investigated on the spot.

It is eminently satisfactory to find that sufficient material exists to keep going these and the other scientific journals and societies of South Africa, including the geological, the chemical, and the engineering societies. South Africa has hitherto loomed so largely in the political and commercial worlds that it will come as a surprise to some to find that research work has been going on quietly and steadily for several years. The foundation has been laid on which a great superstructure may be raised; it has been proved that the fauna and the flora show in relation to their surroundings many features of very general interest and importance; a number of problems have thus been suggested for future workers to attack. Most important of all, however, is the fact that the spirit of research is abroad in South Africa at a time when colleges and universities are being founded and agricultural departments developed. There is, in consequence, the prospect that these new foundations may be started in the right direction at the outset, and so attain a position worthy of the vast possibilities of the country. The men who are now devoting themselves to research work are therefore making more than an examination of local problems, important as this is in a developing country where development often means extermination of species and obliteration of old records. They are creating an atmosphere in which the college and departmental staffs can do research work, in which, indeed, men will feel impelled to investigate. To do this in a busy commercial country like South Africa is no small achievement.

¹ Transactions of the Royal Society of South Africa, vol. i., 1910.
The South African Journal of Science, vol. vi., 1909-10.