

value  $-4 \times 10^{-6}$ , for the halogens  $K'$  is approximately  $-2.5 \times 10^{-6}$ . The compressibilities of the free metals, as well as the atomic volume relations and the compressibilities in the combined state, are shown to be consistent with relations of the type  $pv = K$ , already indicated by Richards for the free metals;  $K$ , the constant for the eutropic group, assuming a new value in each isomorphous salt-series. The atoms thus behave as regions of a perfect gas under a high pressure.

Mr. H. Collingridge: "On the determination of optic axial angles and crystal forms from observations by the Becke method in thin sections."

A suggested method of combining separate observations of different sections in one stereographic diagram and incidentally finding from the combined diagram the forms and axial ratios and optic axial angle of the crystal. The method is illustrated by an example of olivine in an olivine-basalt.

Mr. S. I. Tomkeieff: "A contribution to the petrology of the Whin Sill."

In this paper are described certain rare varieties of the Whin Sill, such as the coarse gabbroidal rock, occurring in the form of bands within the mass of the normal dolerite, the coarse rock with red granophyric spots, the red felsitic veinlets, and spherical aplitic inclusions. A scheme of differentiation is applied to explain the origin of these varieties.

---

## CORRESPONDENCE.

### THE ORIGIN OF THE DWYKA DEPOSIT.

SIR,—I may be allowed to reply briefly to Dr. du Toit's remarks which appeared in your issue of May last, in connection with my paper on the origin of the Dwyka "Conglomerate" (vide *GEOL. MAG.*, Vol. LXV, No. 765, III, 1928).

Dr. du Toit doubts whether much, if anything, is to be gained just now through attempting to dispose of my criticisms. He prefers to put them before the tribunal of the next International Geological Congress, "when a concourse of geologists drawn from all parts of the globe" . . . will be conducted "over what is hoped will be admitted by Dr. Sandberg as representative sections of the Dwyka Series".

The excursions planned (vide second circular) and the choice of their leaders, amply warrant the entire fulfilment of the promise quoted above.

Thus, nobody will doubt that these sections will represent choice specimens of the Dwyka occurrence, both in structure and composition; that they will contain a reasonable percentage of polished, striated, and grooved material and similarly marked substrata. In one word, we may be perfectly confident that these sections will show all the characteristic features of the Dwyka deposit.

It is not, however, the existence of these features in South Africa nor the measure of their development which are in dispute. The only thing which is contentious about them is *their origin*, or, to be more precise, the dispute is restricted to the conflicting modes of interpretation of the available geological documents from which the origin of the deposit may be deduced. The question to be submitted to the judgment and decision of the tribunal is that of the admissibility of the one interpretation as against the other.

Adopting Dr. du Toit's simile of a test case before a High Tribunal, may I be allowed to propose the following mutually binding terms of submission between parties in order to secure an unequivocal judgment on the essential merits of the case at issue ?

1. It shall be agreed upon that the criteria on which the contention of the glacial origin of the Dwyka deposit was established and is being maintained consists of the polishing, striation, and grooving phenomena established on various elements of the deposit and on its substrata.

2. It is furthermore agreed upon that the parties join issue on the interpretation of these phenomena, the one party maintaining that the said phenomena pertain exclusively to a glacial cause, and that consequently the ultimate establishment of their occurrence implies the one conclusion only, namely, that of a glacial origin ; the other party, however, maintaining that the said phenomena equally pertain to other causes, e.g. such as are of volcanic origin and that therefore the criteria on which the contention of the first party is based and, consequently, the conclusions derived therefrom, are inadmissible.

3. As to the other characteristics of the Dwyka deposit, although perhaps, individually, considered of minor importance for the appreciation of the case, it is agreed between parties that similar divergence of opinion as formulated above exists on the question of their origin.

Although a geological question is thus put in a rather unusual judicial form, such construction has the decided advantage of allowing the case to be put with great precision, which is of eminent importance in view of its decisive bearing on some fundamental principles of geological science.

The prospect that the I.G.C. in its session at Pretoria in 1929, on the classical ground of contest over the origin of the Dwyka, will be called upon to render a final judgment is bound to stimulate materially its attractiveness, as, by its verdict, it is destined to secure itself a prominent place in the history of geological science.

If, finally, the correct interpretation of Dr. du Toit's comments should be taken, as it was suggested, as an appeal to my co-operation for a final settlement of the case, then he may be sure that it will be given whole-heartedly and to the full extent of my power. For apart from any other consideration on my part of loyalty between co-

workers, which I am sure will be reciprocated, his initiative would have proved conclusively that, of whatever nature the divergencies of our opinions may be now, we are in perfect unison on this important point, namely that it is of no consequence as to *who* is right as long as it shall be decided *which* is right.

C. G. S. SANDBERG.

THE HAGUE.  
June, 1928.

---

THE SPECIES PROBLEM.

SIR,—In his criticism of my monograph *The Species Problem* (Oliver and Boyd, 1928) your reviewer states that “it is noteworthy that Mr. Robson should have omitted to refer to Gulick’s work published in the Linnean Society’s *Journal* (vols. xx and xxiii) over thirty years ago”. May I point out that Gulick’s work is cited on pp. 117, 118, 119, 132, 133, 135 (and foll.) of my book? The actual papers mentioned by your critic are not cited, but their substance is contained in Gulick’s comprehensive work (*Pubn. Carnegie Inst. Washington*, No. 25, 1905) to which reference is made in my bibliography.

G. C. ROBSON.

BRITISH MUSEUM (NATURAL HISTORY),  
CROMWELL ROAD, S.W. 7.

[By omitting to refer to the important papers published by the Rev. John T. Gulick in the Linnean Society’s *Journal*, Mr. Robson obscures the fact that the idea of isolation as a fundamental factor in the origin of new species had already been developed by that zoologist in the last century and that Romanes had made it the basis of his well-known views formulated in the third volume of *Darwin and after Darwin*. Mr. Robson gives only two references to Gulick in his bibliography, one to “A. Gulick” (1904) and the other to “T. Gulick” (1905).—THE REVIEWER.]

---

THE GEOLOGY OF NIGERIA: SOME CORRECTIONS AND ADDITIONS.

SIR,—Having now completed a second period of service in Nigeria, I should be glad if you would allow me to record briefly in your pages the following corrections of, and additions to, the account of the geology of the northern provinces contained in my *Geology and Geography of Northern Nigeria* (1911, and subsequent publications).

(1) With reference to the two groups of gneisses (*G. and G.*, p. 119), local opinion is hardening towards the hypothesis of the intrusion of various orthogneisses into an earlier series of paragneisses, as advocated by Dr. Parkinson for the southern provinces (*Q.J.G.S.*, xliii, 1907, p. 308).

(2) About forty outcrops of “alkaline granite of the second type” (*G. and G.*, p. 132) have been mapped in connection with the recent survey of the tinfields and described in Bulletins Nos. 1, 4, 5, 9 and 11 of the Geological Survey of Nigeria. The rhyolites and quartz-porphyrries associated