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OVERSEAS GEOLOGICAL SURVEYS

MINERAL RESOURCES DIVISION

SOURCES OF INFORMATION

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PRELIMINARY NOTE NO.43

"Annotated Bibliography on the Geology, Mineral and Water
Resources of Basutoland (Revised)"

Reference

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OVERSEAS GEOLOGICAL SURVEYS
MINERAL RESOURCES DIVISION

ANNOTATED BIBLIOGRAPHY ON THE GEOLOGY, MINERAL AND WATER RESOURCES
OF BASUTOLAND, (REVISED)

Draft - October 1963

NOTES

References ^{marked} (a) are available in OGS Reference Library, those marked (c) have been consulted in other libraries. Important references have been marked with an asterisk.

REFERENCES (BY AUTHOR)

- (a) 1. ANON. 1952. "An Economic Survey of the Colonial Territories, 1951, Volume I, The Central African and High Commission Territories, Northern Rhodesia, Nyasaland, Basutoland, Bechuanaland and Swaziland." Colon.No. 281(1), 105 pp., tables, maps. (London: H.M. Stationery Office.)
- [Basutoland (pp. 65-74): Minerals (p.70) "A geological Survey carried out in 1938-39 failed to reveal minerals of any value to the Territory. Coal is found in thin seams in the Mohales Hoek district but does not occur in paying quantities." DSP.]
- (a) 2. ANON. 1955. "Colonial Reports, Annual Report on Basutoland for the year 1954." 96 pp., refs., map. (London: H.M. Stationery Office.)
- [Soil conservation (pp. 37-38) Peasant agricultural practice has included monoculture, with little return of animal manure to the soil and overstocking of grazing areas which have resulted in large areas becoming infertile and eroded. A soil conservation campaign has been conducted since 1936, and large acreages in the lowlands have been protected by terrace banks, and by buffer strips in the mountain and foothill areas. One of the most difficult tasks is to educate the Basuto in the importance and practice of soil conservation. Progress of Development schemes; (pp. 13-18) Soil Conservation and fertility schemes. Soils (p.90) of the mountain area are of basaltic origin and those in the lowlands are derived mainly from the underlying cave sandstone. D.S.P.]
- (a) 3. ANON. 1955. "Diamond Prospecting in Basutoland — Patto Ea TaImane Lesotho". Mohlabani, Maseru Vol.1, No.6, Phupu/July 1955, pp. 19-20.
- [Expresses misgivings on the monopoly awarded to the Basutoland Diamond Corporation and recommends a royalty of 40 per cent. and not merely 10 per cent. Questions whether Europeans should be searched for diamonds as well as Africans. D.S.P.]
4. ANON. 1955. ["Basutoland diamonds"] The Times, Lond. August 16th, 1955.
5. ANON. 1955. "Basutoland: Diamond Prospecting". Afr. Digest, Lond. Vol.III [3], No.3, September 1955, p.9.

[Diamonds are reported to have been discovered in a Kimberlite pipe at Kau Stream, 25 miles SW of Mont Aux Sources by the Basutoland Diamond Corporation which recently acquired sole prospecting rights in the territory. The country was previously regarded as devoid of mineral resources although rumours of diamond deposits have persisted for many years. Summarises views expressed by the Basuto journal Mohlalani (July 1955) D.S.P.]

6. ANON. 1955. "The Basutoland Diamond Corporation Ltd". Min. World, San. Fran. Vol.17, No.11, Oct. 1955, p.78.

[The Company "... is reported to have found a large kimberlite pipe ... in northeastern Basutoland. The pipe may be as much as 300 yards in diameter, and a fair number of stones of still unknown quality have been discovered. Jack Scott, founder of Stilfontein Gold Mining Company, and Chairman of Basutoland Diamond, personally secured the three-year prospecting concession in Basutoland, and then ceded the concession to the Basutoland Diamond Corporation".]

- (a) 7. ANON. 1956. "The water and power potentials of Basutoland". S.Afr.Min.Engng.J., Oct. 26, 1956, Vol.67, Pt.II, No.3324, pp. 647-655, 673.

[The Rand Water Board has shown concern over the increased extraction of water from the Vaal River which is the main source for southern Transvaal and northern Orange Free State. The catchment area of Basutoland seems to be the most promising and this is considered with particular reference to the report by SHAND, N. 1956. D.S.P.]

- (a) 8. ANON. 1958. "Diamonds found in Basutoland, only known mineral resources of barren highlands" Diamond News, S.Afr. Jeweller, Kimberley, July 1958, Vol.XXI, No.10, p.36.

[Diamonds found in the Makhotlong area were first reported in June, 1956, are said to lie in a pipe of blue clay with roughly the same dimensions as the "Big Hole" of Kimberley. Diamonds are present in workable quantities, but the expected yield is unknown. Industrial and gem stones have been found by the concession holder, Colonel Jack Scott, but the isolation and rugged country are creating difficulties in working this pipe. The diamond concession terms are that 60 per cent. shall be paid into the treasury of the Paramount Chief. D.S.P.]

- (a) 9. ANON. 1961. "Diamond rush in Basutoland". Financ. Times, Lond., 15th August 1961. p.?

["Diamond speculators were flooding into Basutoland today in anticipation of a rush tomorrow to peg out diamond claims in Letsa-La-Drai in the Protectorate's rugged mountains. Licences for digging will only be granted to Basutos resident in the Protectorate but whites flying in by charter aircraft have been financing Africans to start their diggings on a share basis".]

- (a) 10. ANON. 1961. "Basutoland ban on diamond diggings" Diamond News, S.Afr. Jeweller, Kimberley, Aug. 1961, Vol.XXIV, No.11 pp. 24-25.
- [All foreigners have been barred from pegging any more claims, which are to be reserved for the Basuto nation. This new policy has coincided with a new agreement with Mr. J. Scott's Company. D.S.P. Abs.]
- (a) 11. ANON. 1961. ["Diamond rush in Basutoland"] Gemmologist, Sept. 1961, Vol.30, No.362, p.174.
- [Diamond speculators have been busy in Basutoland where there was recently a rush to peg down claims at Letsa-La-Drai in the mountain area. D.S.P. Abs.]
12. ANON. 1961. "Report of the Select Committee on Diamond Agreement". 392 pp. [Mimeographed.]
13. ANON. 1961. "Report of the Select Committee on (1) the Diamond Trade Act of 1885 and the Diamond Amendment Bill of 1960, and (2) the Concessions Veto Proclamation of 1922 and the Concessions Veto (Amendment) Bill of 1960". 118 pp. [Mimeographed.]
14. ANON. 1962. ["Basutoland diamond mining"] Gemmologist, Lond. August 1962, Vol.31, No.373, p.141.
- ["De Beers is to have a 40 per cent. interest in a company formed by Mr. Jack Scott to prospect and mine for diamonds in Basutoland, say the directors. Mr. Scott has given up his exclusive rights over the territory for a specific area, which De Beers geologists are confident is the most favourable. De Beers has granted the company loan facilities for £300,000, which will be repayable out of profits".]
- (a) 15. ANON. 1962. "African Diamonds: Basutoland has recently become mineral minded". Min.J., Lond. Vol.259, No.6634, Oct. 12, 1962, p.332.
- [Prospecting, once forbidden in Basutoland, is now subject of a changed outlook. The Basutoland Diamond Corporation under the chairmanship of Mr. Jack Scott was formed in 1955; now £40,000 is to be invested in an all-African venture the Sparta Diamond Co. In 1961 prospecting was prohibited except in special reserved areas. Diamond areas in Letsa-la-Drai and Mokhotlong districts of NE Basutoland are reserved for Basuto workers. A comprehensive geological survey of the territory is to be undertaken with assistance from Britain. No minerals in economic quantities have been proved except diamonds but there are indications of oil, coal and iron ore. Promising oil indications have been found in the Orange Free State near the Basutoland border and an exploration programme is to be launched by the South African Oil Mining Company. D.S.P.]
- (a) 16. BOONSTRA, L.D. 1947. "Notes on some ^SStormberg fossil bones from Basutoland" in STOCKLEY, G.M. 1947, Part V Palaeontology of Basutoland pp. 94-95, photos., 39 and 40, refs.
- [Specimens from the Molteno Beds, Red Beds and Cave sandstone of the Stormberg Series (Karoo System) are mainly unidentifiable. Vertebrate material

specifically determined include the reptiles.
The *Codontosaurus browni*, (Seeley) and from the
Molteno Beds, *Cynidiognathus longiceps* (Haughton).
D.S.P.]

- (c)^x17. DAWSON, J.B. 1960. "A comparative study of the geology and petrology of the Kimberlites of the Basutoland Province" Ph.D.Thesis Dep.Geol.,Univ.Leeds.
Unpublished Typescript, March 1960.

[Abstract published in KENNEDY, W.Q., 1962.]

- (a)^x18. DAWSON, J.B. 1961. "Basutoland Kimberlites" Nature, Lond.
February 11, 1961, No.4763, Vol.189, p.475.

[Letter: A prospecting programme for diamonds begun in 1954 has led to the discovery of a new predominantly basaltic kimberlite province to the east of the micaceous kimberlite province in the Orange Free State of South Africa. The dykes and diatremes are intruded into Karroo sediments and lavas, and petrographically are similar to other South African kimberlites. Trace elements like the major elements can be divided into two contrasting suites; (a) typical ultrabasic; (b) typical alkaline. It is believed that kimberlite owes its origin to reaction between carbonatitic magma and crustal granite. D.S.P.]

- (a)^x19. DAWSON, J.B. 1962. "Basutoland Kimberlites". Geol.Soc.Amer.Bull.
Vol. LXXIII [73], No.5, May 1962, pp. 545-551,
6 figs., 1 plate, 10 tables, refs.

[The locality and form of intrusions in a relatively unknown kimberlite province in Basutoland are tabulated. The Kimberlites, predominantly basaltic, contain inclusions of eclogite and granulite in addition to cognate xenoliths and fragments of the Karroo country rocks. It is shown that the intrusion of the Kimberlites has been governed by the regional joint pattern, and evidence is presented that the Kimberlites were emplaced by a gas-solid fluidization process. Auth Abs.]

- (a)^x20.[DORNAN, S.S. Rev.1905. "On the geology of Basutoland"] Nature,
Lond. Nov. 23rd, 1905, No. 1882, Vol.73, p.92.

[A paper on the geology of Basutoland by the Rev. S.S. DORNAN was read at the Meeting of the British Association of the Advancement for Science held in South Africa (Section C, Geology), in 1905.
".....The rocks belong to the Stormberg series and consist of sandstones, mudstones and shales forming the Molteno Beds and the overlying 'Red Beds'. Fossils are rare, but a few plant and reptile remains have been found in the former. Above the Red Beds lies the Cave Sandstone, a thick-bedded sandstone which forms the crests of the hills and contains caves sometimes showing Bushman paintings. Reptile tracks are frequent, but few other fossils occur. The higher ridges of the Drakensberg and Maluti ranges are formed of lava-flows and intrusive sheets belonging to the volcanic series..."
ANON Abs.]

- (a)^x21. DORNAN, S.S. Rev.1908. "Notes on the ancient volcanoes of Basutoland". Rep. seventy-seventh Meeting Brit. Assoc.Advanc.Sci.Leicester 31st July - 7th August, 1907. Trans.Sect.C. "Geology", Tuesday August 6,

[The geology of Basutoland consists of 6,000 ft. of the Stormberg series, lying nearly horizontal, of which 4,000 ft. are volcanic beds. These volcanics beds compose all the highest summits of the Drakensberg and Malöte ranges, and the vents from which the lavas and ash proceeded can be arranged in three or four parallel lines: (i) Manhche, Thaba' Telle; (ii) Dikolobeng, Mokhele; (iii) Mt, Hamilton and Motai and lastly the summits of the Drakensberg (iv) Mont aux Sources, Champagne Castle etc. A short description of four prominent peaks is given and the occurrence of intrusive sheets and dykes cutting the lavas are noted. D.S.P.]

- (a)^{*}22. DORNAN, S.S. 1908. "Notes on the geology of Basutoland" Geol. Mag., Lond., Decade V, Vol.V, No. II, February 1908, pp. 57-63, No. III, March 1908, pp.112-118.

[The author in this comprehensive account established the presence of all members of the Stormberg series, but did not recognise the existence of the Upper Beaufort Beds. He describes the lithological differences of the Molteno Beds, Red Beds and Cave Sandstone, and estimated their thickness at Qalo, near Buthe-Buthe, and at Seapala in the Quthing District. Plant remains, found near Morija, in shales of the Molteno Beds included Thinyfeldia and Stenopteris. Reptilian remains including dinosaurian bones of Massospondylus were found in the Red Beds and dinosaur footprints in the Molteno Beds and the Cave Sandstone. The discovery of the mammal Trityloden, collected by Draper in 1882 from the slopes of Thaba Teoeu, described in OWEN, R. 1884 is recorded. The volcanic beds and connected intrusive sheets and dykes, and recent superficial deposits are also described. D.S.P]

- (a)^{*}23. DU TOIT, A.L. 1905. "The geological survey of the division of Aliwal North, Herschel, Barkley East, and part of Wodehouse," Ninth Ann.Rep.Geol.Comm.Cape of Good Hope, 1904, pp.73-181. (Cape Town: Government Printer.)

[The author records several observations on the Quthing district of Basutoland e.g. p. 91 Molteno Beds near Dilly Dilly and Telle Rivers; p. 108 Cave sandstone near Masitisi Mission (Silver Spruit) p. 162 volcanic neck filled with agglomerate near Masitisi Mission, etc. D.S.P]

- (a)^{*}24. DU TOIT, A.L. 1954. "The Geology of South Africa". Third edition. 611 pp. 73 text-figs., I-XLI plates, refs., col. geol.map. 1:5,000,000. (London and Edinburgh: Oliver and Boyd.)

[Several references to Basutoland are made in relation to the broad geological features of southern Africa. D.S.P.]

- (a)^{*}25. EDWARDS, W.N. 1947. "The Upper Karoo Flora of Basutoland" in STOCKLEY, G.M. 1947, Part V, Palaeontology of Basutoland" pp. 95-96.

[A list of plants collected from the Molteno Beds including one from the Upper Beaufort Beds. D.S.P.]

- (a)²⁶. ELLENBERGER, P. 1955. "Le Quarternaire du Basutoland (Afrique du Sud) (Note Preliminaire)" C.R. Acad.Sci., Paris. Seance 14th Ferrier 1955 Tome 240, No.7, pp. 793-795.
- [Ten stages are distinguished in the middle and upper Quarternary some of which can be dated from artifacts]
- (a)²⁷. ELLENBERGER, P. 1955. "Note preliminaire sur les pistes et les restes osseux de vertebres du Basutoland (Afrique du Sud)". C.R. Acad.Sci., Paris. Seance 21 Ferrier 1955, Tome 240, No.8, pp. 889-891, Fig.
- [Teeth, probably of a carnivorous dinosaur, are abundant among vertebrate remains found in the Red Beds near Maphutseng. Three main types of tracks are distinguishable in the Red Beds. D.S.P.]
- (a)²⁸. ELLENBERGER, P. 1956. "Le gisement de Dinosauriens de Maphutseng (Basutoland, Afrique du Sud)". C.R.Somm.Soc.geol.France. 1956, p.99.
- (a)²⁹. ELLENBERGER, F. and ELLENBERGER, P. "Quelques precisions sur la serie du Stormberg au Basutoland (Afrique du Sud)". C.R. Acad.Sci., Paris. 1956, Tome 242, No.6 p. 799-801.
- [Defines the sequence of lithological units in the Stormberg series. D.S.P]
- ³⁰. ELLENBERGER, F. and ELLENBERGER, P. 1958. "Principaux types de pistes de Vertebres dans les couches de Stormberg au Basutoland (Afrique du Sud) (Note preliminaire) C.R. Somm.Soc.geol.France. 1958, pp. 65-67.
- (a)³¹. ELLENBERGER, F. and ELLENBERGER, P. 1960. "Sur une nouvelle dalle a pistes de Vertebres decouverte au Basutoland (Afrique du Sud)". C.R.Somm.Soc. geol.France. 19th decembre, 1960, pp. 236-238, 2 figs., 5 refs.
- (a) 32. HAILEY, W.M. 1957. "An African Survey, Revised 1956. A Study of problems arising in Africa south of the Sahara". 1676 pp.refs.,maps. (London, New York, Toronto: Oxford University Press.)
- [The Administration (p.1497) had discouraged mineral prospecting because of the fears of the Basuto people that it would involve a threat to their lands. A reconnaissance geological survey in 1938 revealed only mineral deposits of little importance, including thin seams of coal at Mhales Hoek. Kimberlites were observed, but it was not until 1955 that diamonds were discovered in the Kau stream in north-eastern Basutoland by the Basutoland Diamond Corporation which has the monopoly for diamond prospecting in the Protectorate. D.S.P.]
- (a) 33. HOWARTH, R.J. [1962]. "Basutoland Expedition: Projects Report: Geological and Geophysical Surveys". [Univ.Bristol.Expeditions Soc.] 2 pp. geol map. 7 refs.

(a) 34 [HOWARTH, R.J. 1962]. Basutoland Expedition: Second Projects Report: Geological and Geophysical Projects." [Univ. Bristol Expeditions Soc.] 3 pp. geol.map. 6 refs.]

(a) 35. JACOT-GUILLARD^MOLD, A. 1960. "The Flora of Basutoland, II The Flora of the Dolerite Dykes and Sills". Lesotho: Basutoland Notes and Records Vol.2, 1960, pp.

[Karoo dolerites are intruded into the Cave Sandstone, Red Beds and Molteno Beds. The dykes forming sunken channels in the Cave Sandstone and raised walls in the Red Beds and Molteno Beds and the sills forming linked chains of low hummocks. They vary in width from 20 to 40 feet wide to some hundreds of feet at Lancers Gap near Maseru. Generally the dykes run in a north east-south west direction. Sills occur only in the Red Beds and Molteno Beds.

The flora of the dykes does not vary much from the surrounding Cave Sandstone, Red or Molteno Beds soils, but a few plants grow exclusively on dykes in the lowlands and also appear as constituents of mountain flora on volcanic soil. Neither the dykes nor the sill outcrops support a lush vegetation. Various species which favour the dolerite soils of the dyke and sill outcrops are described. D.S.P.]

(a) 36. JACOT-GUILLARMOUD, A. 1962. "The bogs and sponges of the Basutoland mountains". S.Afr.J.Sci., Johannesburg, June 1962, Vol.58, No.6, pp. 179-182, map, 4 refs.

[The lowlands, comprising 1/5 of Basutoland lying between 5,000 - 6,000 ft above sea level are composed mainly of the Cave Sandstone and in places marshy reed beds have produced an immature form of peat used locally as fuel. The true peat bogs and spongy areas are found in the volcanic soil of the mountains, which rises from 6,000 ft to 11,000 ft, but lie mostly above 7,500 ft. The mountain ranges fan out from north to south from the key point Mont-aux-sources, the eastern most range being part of the Qathlomba or Drakensberg, and the rest being called the Maluti (ie. 'ranges of mountains') This mountain system is formed by lava outpourings and their subsequent dissection by erosion. The valleyheads, especially in the northern part of the country, have a gentle slope. It is in these valley heads, along the northeastern and southeastern borders of the country, that peat bogs are fairly common. These peat bogs collect and hold much of the heavy rainfall, and regulate the flow to the rivers. Smaller isolated bogs and sponges, of varied size, occur all along the ranges, mainly on the high slopes, diminishing in numbers southwards. These bogs and sponges show up clearly in the mountain vegetation which consists of a grass-covered steppe-like zone with patches of dwarf shrubs. The Spongy areas do not form peat and are seepage areas which do not produce an open flow of water. Peat-producing bogs always form around springs on both mountains slopes or in valleyheads. The true bogs form at the heads of streams and often form a series of bogs connected

by open channels of water. The two types distinguished by VAN ZINDEREN BAKER, F.H. (1955) seem to be mainly a difference of degree and extent rather a division into types. Species of grasses and aquatic plants inhabiting the various zones are listed with notes on their distribution. D.S.P.]

(a) 37. JACOT-GUILLARMOD, A. 1963. "Further observations on the bogs of the Basutoland mountains". S.Afr.J.Sci., Johannesburg. April 1963, Vol.59, No.4, pp. 115-118, figs., refs.

(a)^x38. KENNEDY, W.Q. 1962. "University of Leeds, Research Institute of African Geology, Sixth Annual Report on Scientific Results, Session 1960-61".

[Kimberlite Studies (p.17) Publications and Thesis abstracts. Abstracts of DAWSON, J.B. 1960, and NIXON, P.H. 1960.]

(a)^x39. KERMAK, K.A. 1963. "Demonstrated vertebrate fossils from Basutoland". Proc.Geol.Soc.Land. No.1603 [Session 1962-3], 30.January 1963, pp.1-2.

[The Red Beds and Cave Sandstones form the uppermost sedimentary beds of the Karroo Series. In passing up through the Red Beds Sandstone bands become thicker and more persistent. In places the Sandstones, including the massive topmost layer, pass laterally into typical red marls. The Cave Sandstone is thus only a depositional facies of the Red Beds and not a separate formation as sometimes supposed.

Specimens collected from the Red Beds included mammal-like reptiles and appear to belong to four genera. Eight specimens have been collected previously from the Red Beds. The identifiable species are Tritylodon long ✓ aeyus and Lycorhinus angustidens. Other specimens include a small amphibian and a tiny archosaur. The beds also contain large saurischian dinosaurs.

The complete absence of true mammals such as are abundant in the Welsh fissures (Lower Rhaetic?) would suggest that the Red Beds can be as late as the Lower Jurassic, as has been suggested in the past. D.S.P.]

(a) 40. MEIJS, L. [1960]. "Dolerite Dykes in Basutoland with special reference to the geomorphological effects of the dykes and their economic significance". Pius XII Papers No.1. Roma Basutoland. 54 pp., 27 photos., refs. (Mazenod Basutoland: Mazenod Printing Works.)

[Dolerite dykes are present in astonishing numbers, and vary in width from 4 to 30 feet wide. The impression gained from the Geological Map of Basutoland compiled in 1939 by STOCKLEY G.M. (1947) is that they are confined to the lower western part, but this is due more to the difficulties of transport in the mountains at this time rather than the absence of dykes. Aerial photographs taken in 1950 show them to be more widespread, and equally as abundant in the Brakensburg lava beds. The dykes therefore form an important

aspect of the landscape. Their petrological and geological characters are described, and the types of weathering affecting them. The Geomorphological effects of the dykes on (i) the Molten~~y~~ and Red Beds, which is roughly the area below 5,500 ft.; (ii) the Cave Sandstone which occurs generally between 5,400 and 6,000 ft.; and (iii) the Drakensberg lavas which cover more than $\frac{2}{3}$ of Basutoland. *is described* The dykes are economically important because of their influence on the circulation of underground water; the "bottle necks" or "poorts" formed where the dykes cross the rivers offer excellent natural conditions for the erection of dams; their rapid decomposition has made natural passes, especially in the Cave Sandstone; provide road metal and building material. D.S.P.]

(a)⁴¹ MEIJS, L.

1960. "Notes on the occurrence of Petrified Wood in Basutoland." Pius XII papers No.2, 1960 Roma, Basutoland. Opp. sk.map.2 plates (photos) refs.

[Reprinted in Lesotho: Basutoland Notes and Records Vol. 2, 1960, pp. 20-26, sk.map., 2 plates (photos) refs.]

Records discovery of petrified wood rooted in the massive Cave Sandstone at the junction with the younger Drakensberg lava beds, at Masitise Mission, near Quthing; Thaba Tsoeu, near Mophale's Hoek; Roma Valley, near Sekoma village and Popa mountain, near St. Patrick's Mission. The late Triassic period was unfavourable climatically for plant and animal life and therefore these discoveries being spread out over such a wide area are important. The humidity conditions may have increased locally especially after an ash-cloud eruption as has been observed in present regions of volcanic activity for example eastern Java. The presence of ash beds in SW Basutoland are prevalent where the fossil wood was discovered. Where the volcanic ash beds are practically absent no fossil wood has been found. D.S.P.]

(a)⁴² MORSE, C., HADLOW, G. HAWES, G.G., JENKINS, O.T, and PHILLIPS, J.F.V. 1960. "Basutoland, Bechuanaland and Swaziland report of an Economic Survey Mission" 555 pp. refs.maps.(London: H.M. Stationery Office.)

[Basutoland pp.201-405; Minerals (pp.205,273-274) a brief summary of STOCKLEY, G.M. 1947 with additional notes on diamond prospecting and mining since 1955. Strongly recommends that a geological survey team be sent to Basutoland to make a thorough exploration over a period of three to five years. Soil (pp.228-232) conservation is an urgent problem in this mountainous country. Water: (pp.254-259) Basutoland is well watered and there is little need to tap underground resources. From professional reports on surface water it is clear that there is an urgent need for a hydrological survey and such a survey is recommended to include 21 stations in all. D.S.P.]

- (c)⁴³. NIXON, P.H. 1960. "A Mineralogical and Geochemical Study of Kimberlites and the associated Xenoliths". Ph.D. Thesis, Geol. Dep. Univ. Leeds. 262 pp., 27 figs., 55 tables, refs.
[Abstract published in KENNEDY, W.C. 1962.]
- (c)⁴⁴. OWEN, R. 1876 "Catalogue of the Fossil Reptilia of South Africa in the British Museum (Natural History)." 88 pp. plates 1-LXX.
[Reptilian genera (Misticosaurus, Batrachosaurus etc) from the Trias of Thaba-chou, Basutoland, in a collection submitted by Dr. Exton, Curator, Bloemfontein Museum, Cape of Good Hope. D.S.P.]
- (a)⁴⁵. OWEN, R. 1884. "On the skull and dentition of a Triassic Mammal (Tritylodon longaeus, Owen) from South Africa." Quart. J. Geol. Soc. Lond. Vol. XL [40], pt.1, February 1884, No.157, pp. 146-152, plate VI, discussion.
[The skull was associated with some reptilian remains (OWEN, R. 1876) in a collection of fossils from the Trias of Thaba-chou, Basutoland.
The skull has mammalian characters with a dentition of incisors and molars, with a diastema of the relative extent shown in many Rodents and some Marsupials. Prof. T. Rupert-Jones in the discussion noted that the fossil appeared to have come from the Stormberg beds which are generally regarded as Triassic in age. The specimens were collected by Mr. Draper in 1832 and are now in the British Museum (Natural)History). D.S.P.]
- (a) 46. SEEISO, C. BERENG. 1962. "Declaration of Diamond Digging - Hololo" Basutoland Government Notice No.57 of 1962", Off.Gazette High.Comm.Basutoland Prot. Swaziland. Vol. CCXXVII [227], No.3324, 14th Sept.1962, p.864.
- (a) 47. SEEISO, C. BERENG. 1962. "Declaration of Diamond Digging - Kolo." Basutoland Government Notice No.58 of 1962, Off.Gazette, High Comm.Basutoland., Bech.Prot.Swaziland. Vol.CCXXVII [227], No. 3324, 14th Sept.1962, p.865.
- (a) 48. SEEISO, C. BERENG. 1962. "Declaration of Diamond Digging - Nquechane". Basutoland Government Notice No.59 of 1962. Off.Gazette High.Comm. Basutoland.Bech.Prot.Swaziland. Vol.CCXXVII [227] No.3324, 14th Sept.1962. p.865
- (a)⁴⁹. SHAND, N. 1956. "Report on the Regional development of the Water Resources of Basutoland" 28 pp., 9 annexures incl.col.geol.map. 1:1,500,000.
[Regional development of water schemes in the uplands of Basutoland for the supply of water, for domestic and industrial purposes, and power to western Basutoland and the Orange Free State is economically feasible. Topographical limitations reduce the economic sources under present conditions to the headwaters of the Malibamatse and Orange Rivers. Three complimentary schemes are examined: (i) The "Ox-bow Lake" scheme from

the Malibamatse to Hololo rivers which could provide 350 million KWh of energy generated per annum and 100 million gallons of water per day; (ii) Kau river scheme from Malibamatse to Hlotse rivers; and (iii) Semena river scheme from Orange and Semena rivers to Leribe or Teyateyaneng areas. Urgent priority should be given to the collection of additional hydrographic and topographic information. D.S.P. Abs.]

- (a)^x50 STAPLES, R.R. and HUDSON, W.K. 1938. "An Ecological Survey of the mountain area of Basutoland" 68 pp. col.vegetation map 1:500,000. (London: Crown Agents).

[Geology p. 3 and Annexure A pp. 47-56 see VENTER, F.A. 1938]

- (a)^x51. STOCKLEY, G.M. 1940. "The geology of Basutoland" Geol. Mag. Lond., Vol. LXXVII, No. 6, Nov.-Dec. 1940. pp. 444-460, refs.

[A preliminary report and summary of the geology from notes collected during a tour of duty as government geologist between 1938-40. Three erosion levels are evident in Basutoland at 8,590 ft., 7,500 ft. and 5,800-6,200ft. The rocks outcropping in the protectorate consist mainly of the Stormberg series of the Karroo System with small inlier of the underlying Upper Beaufort Beds. Volcanic eruptions began and continued through the early and middle Stormberg period in two main phases: an early explosive phase and a subsequent quieter phase of lavas welling up through well-defined fissures, the infilling of which forms dolerite dykes. The volcanic vents of the early stage are completely buried under the later sheets of basaltic lavas. D.S.P.]

- (a)^x52. STOCKLEY, G.M. 1947. "Report on the Geology of Basutoland" 114 pp., 40 photos, plates I-III, tables I-III, col.geol.ap.1:380,160. (Maseru: Basutoland Government.)

[The standard reference to the geology of Basutoland, being the results of 54 weeks in the field and some 27 weeks laboratory work completed between 1938 and 1940 by a Government Geologist seconded from Tanganyika Geological Survey. The report consists of a detailed geological account with sections on economic geology and Palaeontology (see BOONSTRA, L.D. 1947 and EDWARDS W.K. 1947.) Seven kimberlites were discovered yet to be proved. D.S.P.]

53. VAN ZINDEREN BAKKER, E.M. 1955. "A preliminary survey of the peat bogs of the alpine belt of northern Basutoland" Acta. Geog. (Geog. Soc. Fenn.) Vol. 14, No. 25, pp. 413-422.

[Distinguishes two types of peat bogs: (i) the mountain slope type where water collects on gentler slopes by seepage and forms peat-bogs; (ii) the stream-head peat-producing swamps formed around springs.]

- (a) 54. V[ARLEY], E.R. 1957. "Diamonds in Basutoland" Colch.Geol. min. Resour.&. Lond., Vol.6, No.3, p.346.
- [A brief note on the discovery of diamonds, in June 1955, by Mr. J. Scott and on Kimberlites of the Buthe-Buthe area. Various new Kimberlites (see STOCKLEY, G.M. 1947) have been discovered and the most promising for future work for the recovery of diamonds is situated on the Kao river, D.S.P.]
- (a) 55. VENTER, F.A. 1938. "Short general report on the geology of the extreme northern and north-eastern portion of Basutoland Annexure A, pp. 47-56, in STAPLES, R.R. and HUDSON, W.K. 1938.
- [A geologist of the Union of South Africa completed one months' work consisting of reconnaissance traverses, for background information to the ecological survey, in 1936 covering about 1,000 sq.miles. D.S.P.]
56. WALTON, J. 1951. "Occupied rock shelters in Basutoland". S.Afr.Arch.Bull. Vol.6, pp. 9-13.
- (c) 57. WEBB, R.S. 1950. "Gazetteer for Basutoland: The First Draft of a List of Names, with special reference to the 1:250,000 map G.S.G.S. No. 2567 of June 1911: (Basutoland, from a reconnaissance survey made in 1904-9 by Captain M.C. Dobson, R.F.A.)" Pt. I. 346 pp., Pt. II [adjoining territories] 66 pp. Pt. III [farms etc on immediate boundary] 11pp. (Paarl, C.P.S.Africa: A.H. Fisher and Sons.

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