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"Annotated Bibliography on the Geology, Mineral and Water
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INSTITUTE OF GEOLOGICAL SCIENCES
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ANNOTATED BIBLIOGRAPHY ON THE GEOLOGY, MINERAL AND WATER RESOURCES
MINING AND MINERAL INDUSTRY OF THE GAMBIA, 1903-1970

NOTES

29 September 1970

Items marked (a) or (b) may be available for consultation, preferably by prior appointment, in the Reference Library between the hours of 10.00 a.m. and 4.30 p.m. Monday to Saturday. The more important references are marked by an asterisk.

Geographically The Gambia is an enclave within the Republic of Senegal comprising an area of 4,003 sq. miles lying between the parallels $13^{\circ}05'N$ and $13^{\circ}50'N$ lat. and the meridians $13^{\circ}47'W$ and $16^{\circ}49'W$ long. It consists essentially of strips of territory on either bank of the river, no more than 7 miles wide, for most of its length of some 250 miles.

British settlements were established on Dog Island and James Island due to the reputed existence of gold in 1661. In 1816, the Island of Banjol (St. Mary's Island) was ceded to Britain and Bathurst was established. In 1821 Gambia was placed under the Government of Sierra Leone, and in 1843 became a separate colony. Between 1866 - 1888 Sierra Leone and Gambia were again united under a single administration. In 1902 the whole of Gambia was proclaimed a Protectorate except Bathurst and Kombo St Mary which continued as a Colony. The Colony & Protectorate became independent on 18 February 1965.

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2. 1911 TODD, J. L. & WOLBACH, G. B. "Stone Circles of the Gambia" Man. (Roy. Anthr. Inst. Lond.) 96, p. 161.
3. 1912 REEVE, H. F. "The Gambia"
[Mentions occurrence of gold in Gambia]
4. 1917 HUBERT, H. "Nature des Formations geologiques de la Gambie Anglaise" Ann. et Mem. du Comm. d'Etudes Hist. et Scient. de l'A.O.F. 1917 pp. 45-47 ref.

- (a) 5. 1920 ANON "The Gambia : Economic Investigations". Colon. Repts. Ann.
No. 1034 (for 1918) p.14

[Results of examination of three sets of mineral samples: Aluminous minerals found to be argillaceous not bauxite (from Kossoun Hill) Seven samples of clay and limestone concretions from the River Gambia, near Yarbutenda examined and found possibly suitable for making bricks and tiles and for cement making. Three samples of auriferous sand examined but not promising]

- (a) 6. 1923 PARKER, H. "Stone circles in Gambia : Percy Sladen Memorial Fund Expedition" Jnl. Roy. Anthropol. Inst. Gt. Brit. vol. LIII [53]
(~~N.S. vol. XXVI [25]~~) (N.S. vol. XXVI [26]) 1923, pp. 173-228,
16 figs.

[Menhirs and stone circles of worked pillars occur in Gambia on the north side of the river from Balangör 114 miles from Bathurst eastwards to Kunchawa Creek, but only in a small area, near Kudan on the south side of the river about 150 miles from Bathurst.

In this area low orders of brown iron-stone rock approach the river at intervals of a few miles and in some parts run nearly parallel to it for several miles. The stones are worked; there was no single manufactory of pillars for the whole area, but were probably quarried locally at the nearest suitable site on the iron-stone ridges. § 2 pp. 183-196 D.S.P]

- (a) (b)* 7. 1927 COOPER, W.G.G. ~~1927~~. "Report on a Rapid Geological Survey of the Gambia, British West Africa; with coloured geological map and sections." Gold Coast Geol. Surv. (Bull. No. 3) 36 pp., 7 plates (incl. photos sections, geol. map. 1:500,000.) Appendix by DAVIES, A. M. op. cit

[The author was seconded from the Gold Coast (Ghana) Geological Survey for three months from March to May 1925 to carry out a brief reconnaissance survey. Brief notes on the geography, climate and geology of Gambia, including details of some cliff and well sections, rocks, concentrates and sands examined. There are three main stratigraphical divisions:

- (1) Raised beach deposits, marine and dune sands, shelly beds and alluvium of Recent and Pleistocene? age; (2) clayey sandstone with grits, clays and fine grained conglomerate (Sandstone Series) and (3) the Wallikunda Calcareous Sandstone. The Protectorate is well supplied with underground water. Mineral occurrences include gold, iron, tin, salt, phosphate but no economic deposits were located and building materials are scarce. Clays may be worth investigating for bricks and pottery on a small scale. D.S.P.]

- (a) (b) 8. 1927 DAVIS, A. MORLEY. ~~1927~~. "Report on Marine Mollusea and other remains from near Barra Point, Gambia." in COOPER, W.G.G. 1927, pp. 35-36.

[The fauna closely resembles living fauna and " the age of the fossil-beds cannot be far removed from the Recent period". Only two species were of definite stratigraphical value: The Lammellibranch Senilia (Arca) senilis, Linné and the Echinoid Heliophora rumphii, Klein. D.S.P]

9. 1949 JARRETT, H. R. "Major natural regions of the Gambia" Scott Geogr. Mag. Vol. 65, No. 3, pp. 140-144.

- (a) (b)* 10. 1949 REED, F. R. C. "The geology of the British Empire" Second edition. (London : Edward Arnold) 764 pp. figs. refs.
[Gambia pp. 218-219, 8 refs.]
11. 1950 JARRETT, H. R. "Geographical regions of the Gambia" Scott Geogr. Mag. Vol. 66, No. 314, pp. 163-169.
- (a) 12. 1952 ANON "An Economic Survey of the Colonial Territories 1951", Vol. III the West African Territories, the Gambia, the Gold Coast, Nigeria and Sierra Leone, and St. Helena. Colon. No. 281-3, 103 pp. maps. (London : H. M. Stationery Office.)
[Gambia pp. 1-16, p. 7. "There are no known mineral resources in Gambia".]
- (a) 13. 1954 ANON "Gambia's Mineral Development" West Africa Aug. 21, 1954, No. 1956, p.785.
[Negotiation with British Titan Products Co. to begin mining are proceeding. Harbour dues payable on titaniferous are mined or exported from Gambia were agreed. One million tons are considered minimum economic reserve - results of the survey are not yet known.D.S.P.]
- (a) 14. 1954 ANON "Ilmenite in Gambia" Min. World Engrg. Rec. Lond. Sept. 18, 1954, Vol. CLXVII [167] No. 4355, p. 169.
[British Titan Products is to develop titaniferous minerals in Gambia through its fully owned subsidiary Gambia Minerals Ltd.]
- (a) 15. 1954 ANON "Report on the Gambia for the years 1952 and 1953" Colon. Off 78 pp. map. (London : H. M. Stationery Office)
[Mining p. 26. "During 1953, research carried out by geologists revealed the presence on the Gambia littoral of large deposits of ilmenite. Investigations have been carried on to determine the extent and quality of the deposits, and these are not yet complete...."]
16. 1954 JARRETT, H. R. "A Geography of Sierra Leone & Gambia" (London : Longmans, Green)
- (a) 17. 1955 ANON "Mining in Gambia". Min. World Engrg. Rec. Lond. Feb. 5, 1955, Vol. CLXVIII [168], No. 4375, p. 83.
[Laboratory tests and factory tests have made it possible to put the scheme to develop Gambian ilmenite resources into full operation. Details of royalties, taxes and capital expenditure for the plant and equipment are given. D.S.P]
- (a) 18. 1955 ANON ["Gambia"] Commonw. Surv. Jan. 14 1955 Vol. 1, No. 1 p.33
[British Titan Products formed subsidiary company (Gambia Minerals Ltd) to mine 1 million tons of ilmenite - export to begin production in 18 months D.S.P]
- (a) (b) 19. 1956 POLLETT, J. D. "Sierra Leone et Gambie - Gambie" Lexique Stratig. Int. Cong. Geol. Int. Comm. Stratig. Vol. IV Afrique fasc.3 Afrique Occidentale Anglaise (Paris: Centre National de la Recherche Scientifique) pp. 3-11.
[Gambia p.8. Raised Beach Deposits (Pleistocene & Recent); Sandstone Series (Tertiary) and Wallikunda Calcareous Sandstone (Tertiary) p. 10]

- (a) 20. 1957 ANON "The Gambia : Report for the years 1954 & 1955" Colon. Off.
(London : H M Stationery Office) 83 pp. map

[Mining p. 31 "In 1953, large deposits of ilmenite were discovered on old storm beaches along the Atlantic coast. Legislation governing the gaining of minerals was provided in the Minerals Ordinance, 1953, and the Mineral Rules, 1954. Prospecting rights are held by a subsidiary of a large United Kingdom firm which has, during the period under review, proved the extent of the reserves and erected quarters for staff, mining and treating machinery, ancillary buildings and several miles of road and light railway. It was expected that mining operations would begin in 1956.

Investigations have also been undertaken to discover whether workable reserves of oil are present in the Gambia; the results of these have not yet been made public". D.S.P.]

21. 1957 HAILEY, W. M. "An African Survey, Revised 1956, A study in problems arising in Africa south of the Sahara" Roy. Inst. Int. Affairs (London, New York, Toronto : Oxford University Press.) 1676 pp. refs. 11 maps.

[p. 1513 "In Gambia a geological survey carried out in 1953 disclosed the existence of ilmenite in the littoral area, but it was doubtful if this would repay exploitation"]

- (a) 22. 1958 ANON "Gambia's first heavy industry" West. Afr. Rev. April 1950 pp. 281-283.

- (a) 23 1958 ANON "Ilmenite in Gambia" Rhodes Min. Jnl. (Jo'burg) July 1958, Vol. XX [30] No. 374, pp. 194-195.

[Gambian Minerals Ltd produce zircon and rutile as by-products from ilmenite bearing sands with high TiO₂ content]

- (a) 24 1958 ANON "Another disappointment for the Gambia" New Commonw. Dec. 1958, Vol. 36, No. 6, p. 402

[Gambia Minerals Ltd., closing down ilmenite mines at Brufut]

- (a) 25 1958 ANON "Gambia Min. Jnl Ann. Rev. 1958, pp. 160-161.

[Deposits of ilmenite discovered in 1953 on the coast SE of Bathurst. At Brufut Gambian Minerals Ltd., subsidiary of British Titan Products Co., installed plant to ship ilmenite to Britain, by-products include zircon and rutile. The deposits are very limited in extent and will be exhausted within six years. Production is about 40,000 tons of ilmenite per annum. Africans operate the draglines on the mining site, the sand is concentrated by sand hoppers and jigs to a mixture of 20% sand and 80% heavy minerals. The site is linked by five miles of narrow gauge railway to a mill. The dry mill electrostatically separates the minerals and they are taken to Bathurst for shipment D.S.P.]

- (a) 26 1958 ANON "The Gambia; Report for the years 1956 and 1957" 96 pp. map. (London: H M Stationery Office.)

[Mining P.37. "...Mining operations were begun in 1956 and up to the end of November 1957, 18, 250 tons of ilmenite has been extracted; of this quantity 10,240 tons had been shipped to the United Kingdom.... "]

- (a) 27 1958 CROWDER, M. "The Gambia is a river", New Commonw. June 1958, Vol.35, No. 12, pp. 567-568, photos, map.

[Ilmenite (p. 568) deposits on the coast will be exhausted in 10 years time, 1957 production p. 604]

- (a) 28 1959 ANON "Gambian Minerals Shutdowns" West Afr. Lond. No. 2177. 3 January 1959, p. 19.
[Following the decision to terminate ilmenite extraction in Gambia, practically the whole Mining plant will be exported. It includes an up-to-date installation for the electrical separation of the important heavy minerals ilmenite, rutile and zircon.D.S.P.]

- (a) 29 1959 ANON "Britain Titan Products losses". West Afr. Lond. No. 2186 7 March 1959, p. 235.

[British Titan Products Ltd., which owns Gambia Minerals Ltd., has lost about £1m. in Gambia.D.S.P.]

- (a) 30 1959 ANON "Exploration for Petroleum Deposits in the Gambia:Exchange of correspondence between the B.P. Exploration Company Ltd., and the Government of the Gambia", Gambia Legislative Counc. Sess. Pap. No. 6 of 1959 (Bathurst Government Printer 1633/59) 7 pp.

- (a) 31 1961 ANON "Gambia Report for the years 1958 and 1959" (London: H.M. Stationery Office) 97 pp.

[Mining p. 29. The deposits of ilmenite discovered in 1953, and on which mining operations were begun in 1956 have proved less extensive than was originally thought. This fact coupled with the fall in world price of ilmenite, led to the closing of the project in February 1959. Geophysical (magnetic and seismic) Surveys have been carried out in connection with oil exploration and test wells are now being drilled. D.S.P.]

- (a) 32 1962 ANON "Carte Geologique du Senegal, Echelle 1/500,000e, 4 Feuilles" [Notice Explicative] Rep. Senegal Minist. Trav. Publics, L'Habitat L'Urbanisme Serv. Mines et Geol. (Paris : B.R.G.M.) 36 pp. Col. geol. map.

[The geology of Gambia is shown on the map but not described in the text except as far as formations ignore political boundaries.

Yellow and white dunes (Recent), Sands and clayey gravels (Mio-Pliocene?); Clayey gravels, calcareous marls and sands (Oligo-Miocene); and limestones with ~~nummifites~~ marls and phosphates extend into Gambia. D.S.P.]

- (a) 33 1963 ANON "Gambia: Report for the years 1960 and 1961". (London: H. M. Stationery Office) 85 pp. map

[Mining (p.27); Two test wells, both drilled near Bathurst, to discover whether workable reserves of oil exist have been abandoned. Local Building materials (pp. 42-43) include 'lisso' (a lime manufactured locally from burnt and pulverised oyster and cockle shells) and mud blocks; Waterworks (p. 50) Bathurst is supplied from a 200,000 gallon tank fed from a deep borehole in Bathurst and 3 shallow boreholes located some 10 miles to the west. The dry season demand has risen to over 500,000 gallons per day. A new Bathurst Water Supply Scheme is being implemented. In the Protectorate a new borehole has been completed at Basse and a new borehole at Yundum is being drilled.

Some 600 village wells have been completed to date and a further 231 wells were sited; Roads (p.53); Yundum Experimental Station (pp. 56-7) employs 2 soil scientists; Geography (pp.61-64) D.S.P.]

- (a) 34 1964 ANON "The Gambia for Visitors and Businessmen". The Cambian Govt. (July 1964). 29 pp. map.
- [Brief notes on the Gambia. Topics include: "Situation and climate"; the Economy of Gambia; "Water Supply" (Gambia possesses ample underground water supplies: Piped supplies from boreholes exist in Bathurst and main centres up river. Rural areas are usually supplied from shallow wells). "Concessions for Investors"; Scope for Investment" (Gambia has few proved mineral resources. Ilmenite was mined from 1956-1959 on the Atlantic coast; with new techniques and higher prices there may be prospects for further mining. There are indications that exploitable petroleum oils and possibly diamonds may be found offshore.)]
- (a) 35 1964 ANON "Gambia : Report for the years 1962 and 1963" (London : H. M. Stationery Office) 147 pp. map refs.
- [Mining and Quarrying (P.49) "Gambia has few proved mineral resources. Ilmenite (titaniferous Iron Sands, $FeTiO_3$) was mined on the Atlantic coast. Petroleum surveys were carried out in 1959 near Bathurst but the bores were abandoned. In 1962-3 surveys were carried out on the continental shelf but the results were indecisive.
- Building stone is quarried in Kombo, and crushed stone, gravel and laterite are produced for road construction by the government but quarrying resources are limited.
- Marine shells are burned to produce "lasso" lime and also used for road surfacing in Bathurst, Water Supply (p.74). New boreholes were completed at Abuko and Kundum. The village water supply programme started under the Farmers Fund, continued under CD&W funds in 1962-3, carried on under Development Officers of the Ministry of Local Government. 600 wells have been sunk including 120 in 1962 and 144 in 1963. The programme is planned to 1966. Surveys (pp. 86-88 Geography & Climate (89 - 93) D.S.P.)]
- (a) 36 1965 "The Gambia" Central Off. Inf. Ref. Pamphlet 70 (London : H.M.Stationery Office) 30 pp. map.
- [Gambia emerged as an independent sovereign state on 18 February 1965, and has an area of just over 4,000 square miles.
- Mining (p.18) "In 1953 deposits of ilmenite were discovered on the Atlantic coast and mining operations were begun in 1956. The deposits however, proved less extensive than was originally thought, and this coupled with a fall in the world price of ilmenite, led to the closing of the project in 1959.
- Magnetic and seismic surveys have been carried out to discover whether workable reserves of oil are present in the Gambia or in the Continental Shelf. Results have hitherto been inconclusive.D.S.P]
- (a) (b) 37 1965 "The Mineral Resources of Africa" (Amsterdam Elsevier Publishing Co.) 740 pp. figs, refr. maps.
- [Gambia p.78]

- (a) (b) 38 1966 KIMBELL, C L "Mineral Industry of other Areas of Africa" U.S. Bur. Mines Minerals Yrbk, 1964 Vol. IV, Areas Int. Washington: U.S. Government Printing Office) pp. 979-1021.

[Gambia (p. 999) No organised mineral production but presumably small quantities of simple construction materials have been produced for local requirements. Petroleum exploration continued: results of a 1963 marine seismic survey were undergoing interpretation and a new seismic exploration was planned by B.P. Development Co. Ltd. in new oil exploration licence area on Gambian continental shelf. D.S.P.]

- 39 1968 ANON "Annual Economic Review Sierra Leone & Gambia, August 1968" (London: Standard Bank Group) 13 pp. photos; map.

- 40 1969 STIPP, H. E. & SLATICK, E. R. "The Mineral Industry of other Areas of Africa" U.S. Bur. Mines Minerals Yrbk 1967, Vol. IV Areas Int. (Washington: U.S. Government Printing Office) pp. 959-998.

[Gambia p.975, No recorded Mineral Production in 1967. Revised Gambian laws effective from 1st July 1966 were issued regulating minerals and mining, exploration and exploitation of the Gambian continental shelf & extending its territorial waters and contiguous zone, D.S.P.)

- 41 1970 STIPP, H. E. & SLATICK, E.R. "The Mineral Industry of other Areas of Africa" U.S. Bur. Mines Minerals Yrbk 1968 Vol. IV Areas Int. (Washington : U.S. Government Printing Office) pp. 891-933.

[Gambia p.905. No recorded production of minerals in 1968, but laterite and stone was quarried for local consumption.D.S.P.]

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