A Middle Pleistocene Discovery in the Anglo-Egyptian Sudan

Andrew's and Arkel's important discoveries of Chellean-type and Acheulean-type artefacts in the 5 m. ironstone gravels of the Khor Abu Anga, and elsewhere near the confluence of the Blue and White Niles[1], is consistent with results obtained in the Lake Plateau Basin of the Nile farther south, where it is plain that erosion levels were not very different from those of to-day, first in "pre-Chellean" and, later, in "Chelleo-Acheulean" times. There is, moreover, striking evidence of "post-Acheulean" sedimentation to higher levels and the consequent deep burial of "Chelleo-Acheulean" and afterwards of "late Acheulean" land surfaces (flats) which had been brought into existence by temporary but relatively long-sustained low levels of Lake Victoria (Victoria Nyanza), and of other open waters.

Perhaps I might be permitted to record here that, before the War, I discovered in the Victoria Basin some of these buried surfaces which are rich not only in implements but also in fossil remains. The latter still await specialist identification and study. One day, after the War has ended, a memoir on these and closely allied matters, much overdue and long ago started by Prof. van Riet Lowe and myself, will, we hope, be completed and published. Meanwhile, these Sudan discoveries are most welcome. They are, we may be sure, the forerunners of others no less important; and in this connexion, and with all due deference to Messrs. Andrew and Arkel, I would like to suggest that the terrace deposits and erosion surfaces near Sarsareib, on the Atbara river, might well repay careful study—especially, perhaps, with regard to very early cultures.

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[1] NATURE, 151, 226 (1943).

Production of Potent Toxins by *Shigella dysenteriae* (Shiga) in a Synthetic Medium

ACCORDING to Doerr[1], *Sh. dysenteriæ* fails to produce toxin in a synthetic medium, but regains its toxicity if transferred from the synthetic medium into alkaline broth. Braun and Cahn-Bronner[2] showed that certain dysentery strains can utilize ammonium as source of nitrogen, and that they produce a weak toxin on media containing lactate as source of carbon, and ammonium as source of nitrogen. From a medium with this composition Wichmann[3] produced a toxin with a minimal lethal dose of 1·0–2·0 c.c. on rabbits of about 1,000 gm. weight.

In the experiments described below, *Sh. dysenteriæ*, Bukarest strains (*R* and *S*) kindly provided by Prof. Boivin, were employed. The base medium contained (expressed in percentages) sodium sulphate 0·5, magnesium chloride 0·01, phosphate (KH_2PO_4 0·05 and Na_2HPO_4 0·45), asparagin 0·05, *l*-cystin 0·05, glutamic acid 0·05, tryptophane 0·05, nicotinic acid 0·001, arginin carbonate 0·05 and pyruvic acid 0·5 (*p*H 7·4). Under these conditions the bacteria were capable of excellent growth for more than five generations both at 30° and 37° C. 300–400 millions of bacteria were counted in 1 c.c. within the first days of growth.

At the beginning of growth, acid was produced, but after 3–5 days the reaction turned alkaline. When 0·05 per cent of sodium nitrate was added, the reaction turned alkaline after two days. Addition of 0·1 per cent of glucose enhanced the amount of acid produced and lessened the toxicity. 10 c.c. of the base medium was autoclaved in ordinary size test tubes. For better aeration, the test tubes were maintained during incubation in a nearly horizontal position. After incubation for ten days at 30° C. the bacteria were removed by sharp centrifugation and the clear supernatant fluid left overnight in the ice box after an addition of 0·5 per cent of phenol. On the following day the sterile fluids were injected intravenously into rabbits of 850–950 gm. weight. The results were as follows:

Quantity of toxin injected (c.c.)	*R*-strain		*S*-strain	
	Total number	Died	Total number	Died
1·0	4	4	4	4
0·5	3	2	3	3
0·4	5	2	5	5
0·3	5	3	5	5
0·2	9	3	9	4

The *R*-strain produced only neurotoxin; the *S*-strain produced in addition enterotoxin, as observed by Boivin and Mesrobeanu. It caused a higher mortality.

Gildemeister and Grillo[4] and Takita[5] obtained unusually potent broth toxins when the dysentery bacteria were grown in 'Cellophane' sacks suspended in a large volume of medium. Similar results were obtained with the synthetic medium described above. A 'Cellophane' sac containing 2 c.c. of the medium was suspended in a vessel containing 40 c.c. of the same fluid. After an incubation time of ten days, 30,000–50,000 millions of bacteria were counted in 1 c.c., and the minimal lethal dose was 0·005 c.c. for the *S*- and 0·025 c.c. for the *R*-strain.

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[1] Doerr, R., "Handbuch der Technik und Methodik der Immunitaetsforschung", edited by R. Kraus and C. Levaditi (G. Fischer, Jena, 1908), p. 1,150.
[2] Braun, H., and Cahn-Bronner, C. E., *Biochem. Z.*, **131**, 3 (1922).
[3] Wichmann, F. W., *Arbeiten aus dem Staatsinstitut fuer experimentelle Therapie und dem Georg Speyer Hause zu Frankfurt a.M.*, **21**, 362 (1928).
[4] Gildemeister, E., and Grillo, J., *Zentralbl. f. Bakt., I. Abt., Orig.*, **133**, 201 (1934).
[5] Takita, J., *Kitasato Archiv. Exp. Med.*, **16**, 174 (1939).

Laboratory Synthesis of Diamond

IN 1928 an article entitled "The Problem of the Artificial Production of Diamond" appeared in NATURE[1], in which, after a careful analysis of the existing evidence, the writer stated: "The conclusion seems inevitable that diamonds have not yet been produced in the laboratory, and that investigators have been misled into regarding as diamond various transparent, singly-refracting minerals which happen to be very resistant to chemical reagents".

We have recently examined, by various X-ray methods, twelve minute 'artificial diamonds' prepared by J. B. Hannay[2] in 1879–80, and now in the British Museum (Mineral Department) collection. We find