

to which 7500*l.* was added for the purchase of instruments, apparatus, &c. The value of the building site was probably 30,000*l.* to 40,000*l.*

The Second Chemical Institute and the Technological Institute were both built after 1870, and have repeatedly received large sums for apparatus and instruments.

A new building is at present in course of erection for the Institute of Pharmaceutical Chemistry, estimated to cost 26,250*l.* without the value of the site, which may amount to 10,000*l.* The annual vote for instruments, &c., is to be raised from 225*l.* to 750*l.*

These figures, as Consul Rose states, are eloquent enough, and show clearly what facilities are provided in these great institutions for tuition in all branches of chemistry. "Finally they show—and this is, perhaps, the most significant indication of all—that the Prussian State, in spite of the expenditure already incurred, and the leading position attained by the chemical industries, is far from regarding the present admirable means of chemical instruction as adequate for future contingencies, but is at all times, after representations from the requisite industrial and educational quarters, prepared for further lavish outlay should future developments reveal this necessity."

T. E. THORPE.

RHODESIA AND OPHIR.¹

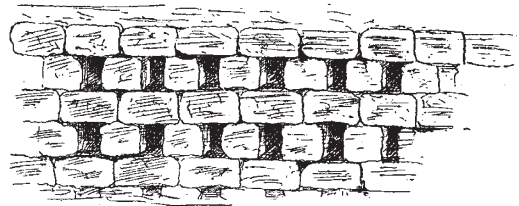
IN this handsome and copiously illustrated volume are embodied the results of six years' (1895–1900) systematic exploration amongst the numerous prehistoric remains of all kinds which are widely scattered over the whole region between the Zambesi and the Limpopo, and even range at some points into the conterminous districts of North Transvaal and Bechuanaland. During the operations, which were conducted under grants from the Chartered Company licensing these researches, the authors, with their indefatigable colleague, Mr. George Johnson, personally inspected nearly two hundred ruins, a list of which is here given and a great many of which are described in more or less detail. They further tell us that, so far from being completed, the work of exploration has scarcely been more than well begun, that their precursors and contemporaries—Bent, Mauch, Baines, Maund, Willoughby, Swan, Schlichter, White—have merely scratched the surface, and that of more than five hundred temples, citadels, enclosures, chains of forts, gold workings and terraced slopes reported from various districts and covering a total area of at least 115,000 square miles, not a tenth part has yet been thoroughly examined. This will be read with surprise by those archæologists who supposed that after Bent and Swan's classical descriptions of the "Great Zimbabwe" and a few neighbouring monuments, little more remained to be discovered. But the statement is supported by abundant first-hand evidence, and it is shown that Zimbabwe itself "is still practically unexplored," while elsewhere the original floors of the *earlier* structures still rest for the most part buried under ten or even fifteen feet of the accumulated débris of ages.

That there are earlier and later structures, bespeaking either a long continuous or an intermittent occupation of the land by foreign intruders, is placed beyond all doubt, and a comparative study of the various groups so far explored has enabled the authors tentatively to classify them in four categories, clearly indicating time sequences ranging from at least 1000 B.C., possibly even 2000 B.C., down to the advent of the Mohammedan Arabs and Portuguese. The buildings of the first period, of which the Great Zimbabwe is typical, are marked by great solidity and superior workmanship, with massive walls

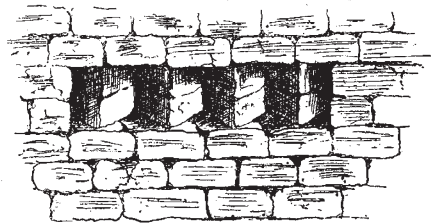
¹ "The Ancient Ruins of Rhodesia." By R. N. Hall and W. G. Neal with above seventy illustrations, maps and plans. Pp. xxvii + 396 (London Methuen and Co., 1902.) Price 21*s.* net.

of dry masonry resting on the bed-rock, often 15 to 17 feet thick at base, batter-backed both inside and outside, with no false courses, but bonded throughout their entire width and diversely ornamented with dentelle, check, chevron and especially herring-bone patterns (Fig. 1). These are assigned with Bent, Schlichter and myself to the South Arabian Himyarites, and are compared—in their characteristic elliptical curves, the absence of mortar and other details—with the ruined temples and palaces of Marib (Maraiba Bahramalakum), capital of the ancient Sabæan empire.

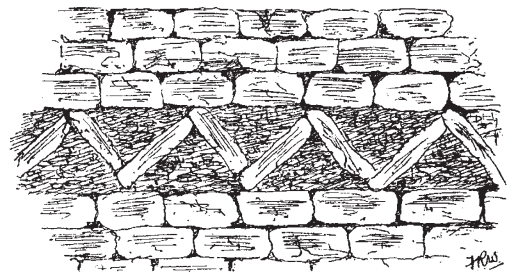
To the Phœnician successors of the Sabæans are assigned the less substantial and otherwise somewhat inferior structures of the second period, which are either superimposed upon, or else form extensions of, the earlier monuments, and also occur by themselves generally in



CHECK PATTERN



DENTELLE PATTERN



CHEVRON PATTERN

DECORATIVE PATTERNS

FIG. 1.

districts farther removed from the east coast. This is, of course, what we should expect to find on the assumption that the Himyarites were the first arrivals, and settled in the rich auriferous tracts (Manica, Sabi basin, Mashonaland) lying nearest to the seaboard. Yet remains of the first period are also met sporadically farther west in various parts of Matabililand, which may be explained either by assuming a very long pre-Phœnician Sabæan occupation or a joint Sabæo-Phœnician occupation probably in Solomonic times, when we know that peaceful relations prevailed between the Israelites, Hiram, King of Tyre, and Balkis, Queen of Sheba. It was then that the auriferous stream, which had already reached Palestine during the reign of David, rose to high-water level, and it is here suggested that

the sources of that stream are to be sought in Rhodesia, where the ancient gold-workings are stated to have yielded a total output of at least 75,000,000*l.* Then it is asked, "Where else but Rhodesia did the ancient Sabæans obtain the vast supply of gold which they purveyed to Phœnicia, Egypt and the rest of the then known world? The only answer possible at present is: Rhodesia; and the later discoveries in Rhodesia only serve to strengthen and emphasise this answer." Hence the inference that Rhodesia was the Biblical Ophir, though the point is not regarded as settled. Indeed, in their preface, written after the appearance of my "Gold of Ophir," the authors seem inclined to adopt the modified view that Rhodesia was the source, and Ophir in South Arabia the importer and distributor, of these treasures throughout the ancient world. My conclusions bearing on this solution of the question are given in full, and seem to be tacitly accepted.

But the authors remind us more than once that their object has not been to advocate any particular theory,

crucibles showing gold in the flux, and especially the massive gold objects—beads, bangles, plates, wire, pegs, nails, ferrules—which were so characteristic of the monuments of the first period, and of which more than 2000 ozs. have already been collected (Fig. 2). Some of the ornaments, obviously manufactured on the spot and displaying considerable artistic taste and technical skill, were found on the original cemented floors, while others were taken from the skeletons of men, women and children buried under the floors. "All the branches of the goldsmiths' art were practised by them, including gold wire drawing, beating gold into thin sheets, plating iron and bronze with gold, and burnishing" (p. 93). It is evident from such details as these, as well as from the slave-pits, the chains of forts stretching along the old highways seawards, and the terraced slopes erected with prodigious labour for agricultural purposes, that the country was not merely conquered, but settled, that it was a true colony in the modern sense of the term, and was held as such by the South Arabian Himyarites for many generations. But enough has perhaps been said to show the great value of a work which places the Ophir question on a new footing and sets history back some two millenniums in the austral world.

A. H. KEANE.



FIG. 2.—Gold ornaments and pottery discovered at Dhlo-Dhlo and M'telegwa Ruins.

but "to allow facts to speak for themselves." Judged from this standpoint, the work must be pronounced an unqualified success. It would be impossible to improve upon the general plan, by which law and order is introduced into a chaos of small but indispensable details, brought together during six years of continuous exploration amid the ancient ruins south of the Zambesi. Students of Rhodesian antiquities will also feel grateful for the aid afforded by the accompanying large-scale map, which covers the whole ground and shows in red lettering the exact position of the five hundred ruined sites which have so far been either described or reported in every part of Rhodesia.

Limitation of space prevents more than the merest reference to many incidental matters, such as the structures now recognised as slave-pits, the extensive terraced slopes of the Inyanga and Mount Fura districts exactly resembling those of the Yemen uplands, the quartz crushers, the gold-smelting works, the numerous gold

After "(*Journal Inst. Elec. Engin.* vol. xxx. p. 475), in which the author dealt with the question of England's backwardness in the development of electrical engineering. The paper may be considered in some respects one of the most important communicated to the Institution of late years. It led to a prolonged discussion—the report of the proceedings occupies more than sixty pages of the Institution's *Journal*—in which, though various opinions were expressed as to the cause of our deficiency, the general conclusion seemed to be reached that the backwardness was due largely to the out-of-date and grandmotherly legislation which governed electrical undertakings. As a result, a powerful committee was appointed by the council of the Institution to report on the subject and advise the council whether they should take any action, and if so what action, to improve the position. The members of the committee were the following:—Prof. W. E. Ayrton, J. Perry and S. P. Thompson, Major P. Cardew, Lieut.-Colonel R. E.

THE INSTITUTION OF ELECTRICAL ENGINEERS AND ELECTRICAL LEGISLATION.

REFERENCE is made in our notes columns to the ceremony performed by Sir Frederick Bramwell in connection with the South Wales electrical power distribution scheme. The Bill for the promotion of this scheme was, it will be remembered, one of six before a Select Committee of Parliament presided over by Sir J. Kitson last year. These Bills gave rise to a paper read by Mr. W. L. Madgen before the Institution of Electrical Engineers on "The Electrical Power Bills of 1900: Before and