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mysterious little temple of ẖasr eṣ-Ṣāgha, with its seven shrines. She publishes references to such literature as there is on the subject, a plan, and a number of good photographs which show all there is to be seen of the building. She even ran a trench in front of the temple, in the hopes of elucidating the date of its foundation. Unfortunately, owing to the disturbance due to treasure-seekers, the results were inconclusive, but like so much else they suggested an Old-Kingdom date. The occupation periods of this part of Egypt were Neolithic, Old Kingdom, and Middle Kingdom, after which the district was deserted until Ptolemaic times. Miss Caton-Thompson's conclusion on general grounds is probably the right one: that the temple was built in the Old Kingdom, and was kept up during the Middle Kingdom. The one fragment of inscription found is probably later than the Old Kingdom.

Not far from the temple are a number of stone-capped ridges and hillocks, and these in their turn have been called 'quays'. In historic times, at least, they never could have been such; actually they are natural formations, surfaced over by man with rough stone slabs, and in one case topped with a wall. The one or two objects found in the interstices of the stones were of Old-Kingdom date, and the hillocks were no doubt primitive citadels of that period, strong enough for what would have been rather desultory warfare.

The above remarks by no means include all that should be said of this valuable publication. They do, however, give some indication of the wide field covered by the authors. It is greatly to be regretted that such devoted labours should have been hampered by the difficulties described on pp. 6 ff.

G. A. WAINWRIGHT.

Einiges zur dritten Bauperiode der grossen Pyramide bei Gise. By L. BORCHARDT. Berlin, Julius Springer, 1932. 4to. 21 pp., 12 pls. 9 Rentenmark.

As becomes an Egyptologist who is also an architect, Dr. Borchardt has made a special study of the Pyramids and the building problems which they present. He began to publish his observations as long ago as 1892, in the *Zeits. für aeg. Sprache* of that year, and since then he has time and again given the world a further sample of his results; in *ZÄS*, 1894, 1897, and in 1928 in a separate work entitled *Die Entstehung der Pyramide*. Now in 1932 we have another study which is a valuable addition to the already large literature on the archaeological problems of the Pyramids. Those discussed here are concerned first with the Great Gallery and then with the so-called Antechamber, which is really the Portcullis Chamber. Though most of the details discussed have been known since the days of Perring and Vyse, now, thanks to the better lighting available, Dr. Borchardt has been able to observe some that he had overlooked before.

As every one knows, the ascending passage suddenly changes its nature from a low rectangular passage to a high corbel-roofed gallery. This fact has always attracted attention, whether of the pyramidological theorists or of the students of antiquity. The ascending passage is blocked at its lower end by three granite plugs weighing about seven tons apiece. Fitting the passage as they do, they could not have been pushed up from the outside. Where, therefore, were they kept inside the building until they were put in place after the funeral? Borchardt replies: in the Great Gallery itself, on a wooden scaffolding above the heads of the workmen passing backwards and forwards. The Gallery was heightened to provide room for the stones, and having heightened it the architect had to taper it off gradually to spread the weight. This is a remarkable conclusion, but on the evidence provided it seems unavoidable, and shows what careful measurement and observation will yield to the competent observer.

At the foot of the walls of the Great Gallery is a series of carefully cut holes in pairs which would take posts. These, however, were given up, and stopped with plaster. In the floor of the passages, in front of each of the first set of holes, another socket had been cut three times as big. These would take three of the beams suitable for the first set, and by enabling them to stand more upright would give not only greater strength but also more space for movement between them. Also, in the third corbel is a groove running parallel with the floor, which is evidently intended to receive something. By combining all this it is not difficult to postulate a strong platform raised up above the passage. It is on this that Dr. Borchardt supposes that the granite plugs were stored till needed. The pairs of sockets stop short of both the upper and lower ends of the Great Gallery. Dr. Borchardt reasonably supposes that this was to give access to the platform, and to enable the stones to be removed at the lower end. The stones would have to be put on the platform before the Gallery was roofed over, which gives one more indication of the forethought expended by the ancient architect—a thing not always sufficiently appreciated by students of Ancient Egypt.

This all seems very satisfactory to the reviewer, who, however, is neither architect nor engineer. But he does not feel that the means have been demonstrated by which the plugs were put into place when let down

from overhead on to the floor of the Great Gallery. Perhaps, however, there is no evidence left for this. The 'well' is a tunnel mined through to the original subterranean passage, and Perring (*The Pyramids of Gizeh*, I, pp. 2, 3, notes to Pls. ii, viii) could not decide whether it was contemporary with the pyramid or the work of plunderers. Dr. Borchardt supports Perring's first view, namely that it was used as a means of exit for the workmen after the plugs were put in place. But it may be asked, why trouble laboriously to block up the main entrance if a way round was to be left open?

Before leaving the Ascending Passage mention must be made of the set of three pairs of double sockets shown in Fig. 1. These are evidently intended for a strong tripod astride the passage. Such an apparatus was no doubt used as a crane.

In the Portcullis Room (Antechamber) Dr. Borchardt notes the crutches which on the west wall are situated over the slots in which the three portcullises were slid down into place. They have always been accepted for what indeed they visibly are, *i.e.*, crutches for rollers over which passed the ropes in which the portcullises were slung and finally let down. But even after long consultation with an engineer, Dr. Ricke, he is still unable to give a satisfying explanation of the absence from the east wall of what should be the corresponding set. That four ropes were used is shown by the four grooves cut in the south wall palpably to receive them. The author calculates that rollers of 45 cm. diameter and palm-fibre ropes of 5 cm. diameter would be quite sufficient for the manipulation of the portcullises, weighing, as they do, some 2½ tons apiece.

Knowing of the grooves for the ropes in the Great Pyramid, Dr. Borchardt has been able to point to similar ones in Snefru's pyramid at Mēdūm. These explain the presence above them of the beam, which projects a foot or more from the wall immediately over the well: it was the block over which ropes ran. When Maspero entered the chamber in the early eighties the ropes were still hanging over it. It is fortunate that he mentions the fact, but unfortunate that he gives no drawing or details of the size or material of the ropes. The reviewer would suggest, however, that the apparatus was one for hoisting up into the chamber, not one for letting down a portcullis. There is no portcullis in this pyramid, and it would be a simple matter to slide plenty of plugs down the sloping passage. In fact this is how the great mastabah, No. 17, was sealed just outside Snefru's pyramid; *cf.* Petrie, Mackay, and Wainwright, *Meydum and Memphis*, III, Pl. xii, top.

A contrivance of ropes passing over rollers seems to have been the regular method of letting down the portcullises in the pyramids at Gizeh. Indications of it remain in the Third Pyramid. Dr. Borchardt does not deal with one difficulty which troubles the reviewer. The ropes are conceived as encircling the stones, and would no doubt be safe so long as they were at rest. But on letting down the stones the edges would begin to fray the ropes, which sooner or later would break. In any case how were the ropes got out from under the stones once they had descended into place? Can it be that the builders trusted to the ropes breaking before the descent was completed, and so freeing themselves? In Nefermaat's mastabah at Mēdūm the extraction of the ropes was arranged for: in this case the much smaller portcullis was bored with three holes at the top, and two channels were cut at the bottom for the withdrawal of the ropes from underneath the stone; the holes were 10 cm. (4 inches) in diameter, and the portcullis had been let down into the well over a beam (*cf.* Petrie, Wainwright and Mackay, *The Labyrinth, Gerzeh and Mazghuneh*, Pl. xv, top, and p. 26).

Dr. Borchardt quotes the well-known passage in the Westcar Papyrus as to Khufu's desire to copy in his pyramid details from the temple of Thoth. The story, however, does not refer to the blocking of the passages as used to be supposed, but, as Gardiner showed (*JEA* 11, 4), to the number of the chambers. It should read Khufu 'had spent (much) time in searching for the secret chambers of the sanctuary of Thoth in order to make the like thereof for his horizon', *i.e.*, his pyramid. This information Djedi was not able to impart, but he did tell him where it could be found.

Dr. Borchardt apparently no longer supports the old theory of Lepsius of far-reaching reconstructions and accretions. It was always strongly combated by Petrie and Maspero, who maintained that the Great Pyramid was originally laid out to be of its present size. The supposed evidence of enlargements now reduces itself to evidence of the means by which the mass of the Pyramid was piled up, and the reconstructions to nothing more than change in the position of the burial-chamber. It is even possible to say at what stage of the building the alteration was made; this emerges from a study of the joints of the masonry in the ascending passage. The lower part has been quarried through the existing masonry, and passes through four faces of the successive coatings by which the body of the structure has been constructed. In this part the masonry is that of the core of the Pyramid; it is comparatively rough, and the joints are wide and not at right-angles to the slope of the passage. At about thirteen metres above pavement-level all this changes. The walls of the passage are properly built, with joints fine and sharp, running at right angles to the slope. As already noted, the mass of the Pyramid is constituted of a series of coatings, each enclosing the previous

one. This is somewhat in the style of Snefru's pyramid at Mēdūm, and like his each of these coatings is ten cubits thick.

Dr. Borchardt supposes that the sarcophagus was extracted from the chamber of the second building scheme, the Queen's Chamber, and was put into that of the third, the King's. But is it necessary to suppose that it was ever put into the Queen's? If the change was made when the building was only thirteen metres above pavement-level, this chamber was probably not then roofed in.

The method of constructing the underground chambers at Gizah is not that so often used. They are mined out of the native rock, whereas a vast pit was often dug, in which the chamber was built. This method was employed before Khufu at Zāwiyet el-'Aryān, and after him at Abu Rawāsh; it was also the method by which Sethos I constructed his 'underground' Osireion at Abydos.

In conclusion Dr. Borchardt draws attention to a number of questions yet to be solved, but they do not include one which has always exercised the reviewer. Possibly it has already been answered elsewhere; possibly to an engineer it is no problem at all. It is: how did the builders keep so vast a construction so perfectly true that the apex came out correctly over the centre of the base?

G. A. WAINWRIGHT.

History and Significance of the Great Pyramid. By BASIL STEWART. London, John Bale, Sons & Danielsson Ltd., 1935. 8vo. xvi+224 pp., frontispiece and 2 diagrams. 6s. net.

Pyramidology is not so much a science as a state of mind. For those who are in that condition this is no doubt a useful book.

There is, however, one point in it of interest to Egyptologists. That is the frontispiece, which reproduces a Japanese colour-print dating from about 1820 to 1825. In the accompanying inscription the artist describes it as 'New edition perspective picture after the Dutch: Pointed Towers in the land of Egypt (Ye-gip-tu)'. The picture shows a couple of Dutchmen discussing and admiring a pyramidal structure, which, like almost all early reproductions of pyramids, is much too high for its base. Mr. Stewart remarks in his description of it that at that time Japan was utterly cut off from the outside world, yet, even so, the hermit empire was not proof against the wonders of Egypt and its pyramids.

G. A. WAINWRIGHT.

Die Thebanische Gräberwelt. By GEORG STEINDORFF and WALTER WOLF. (Leipziger Ägyptologische Studien, Heft 4.) Glückstadt and Hamburg, J. J. Augustin, 1936. 100 pp., 24 pls.

This book is one of those summaries of existing knowledge on one aspect or other of Egyptology of which a number has emanated from Germany in recent years, and it is the fourth of its own special series. The subject with which it deals, the history of the Theban necropolis and the principles underlying the construction and decoration of the various types of tomb, is of great interest not only to the student but also to the intelligent tourist, and it may be said at once that the present work admirably fulfils its function of describing this famous city of the dead.

After dealing with the history and topographical distribution of the various cemeteries of which the necropolis as a whole is composed, the authors devote nearly a third of the book to a description of the arrangement and decorations of the tombs of Dyns. XVIII-XX, endeavouring successfully to indicate the underlying principles, and illustrating their descriptions with many plans of extant tombs and reconstructed perspective drawings of the main types.

From the architectural aspect of the tombs the authors turn to the scenes sculptured or painted on the walls, and discuss their purpose, arrangement, and technique. With regard to the much-debated question of the magical purpose of the wall-scenes, they assume an eminently reasonable position. While admitting that the magical reproduction after burial of scenes of daily life and religious rites was an important motive in covering the walls with paintings, they point out that a considerable part was played by the desire for a memorial of the outstanding incidents of the earthly career of the deceased or of the general tenor of his life, and also by the aesthetic desire for decoration (see also Davies and Gardiner, *The Tomb of Amenemhēt*, 19-21; the authors do not refer to this discussion). The account of the technique of the paintings is brief, and might have been expanded without disadvantage, though it must be remembered that the full account of the technique in Nina M. Davies, *Ancient Egyptian Paintings*, III, xxii ff. was not available when this book was written.