THE GENESIS OF OPERATIVE MASONRY

THE PRESTONIAN LECTURE, 1964

BY BRO. THE REV. A. J. ARKELL, M.B.E., M.C., D.Litt., F.S.A.

Sometime Reader in Egyptian Archaeology at the University of London,
Past Master, Old Bradfield Lodge, No. 3549

(2nd October, 1964)

BRO. FRED L. PICK concluded the Prestonian Lecture for 1948[1] with these words: "There would therefore appear to be some justification for the theory of Bro. J. E. Shum Tuckett[2] that a portion only of the store of legend, tradition and symbolism possessed by Freemasonry passed into the Rite evolved after the constitution of the first Grand Lodge in 1717."

And Robert Freke Gould, in his *History of Freemasonry*,[3] quotes with approval Brand's *Popular Antiquities*[4] as saying: "We must despair of ever being able to reach the fountain-head of streams which have been running and increasing from the beginning of time. All that we can aspire to do is only to trace their course backward, as far as possible, on those charts that now remain of the distant countries whence they were first perceived to flow"; and a very few lines later Gould makes the thought-provoking remark: "Past events leave relics behind them more certainly than future events cast shadows before them."

These considerations, then, are my justification for asking you to take yourselves back in time a long way before 1717, when the Grand Lodge of England was founded, indeed back for nearly five thousand years, to consider what archaeology has revealed to our generation of the circumstances under which operative masonry began. I must from the outset disclaim any intention of suggesting that the beginning of operative masonry in any way influenced the evolution of the ceremonies of speculative masonry; but the beginning of operative masonry cannot lack interest to us as Freemasons; and it is particularly important to note that the invention of operative masonry sprang from a religious impulse.

It was probably in the Old Stone Age that some genius first thought of piling rough stones on one another to make a shelter. And archaeologists have recently discovered that in Asia, by the seventh millenium B.C., rough stone-walling had been so far developed that, for example, Jericho proves to have been a well-built town, surrounded by stone fortifications, during much of the seventh and sixth millenia B.C.[5]

History begins in Egypt with the introduction of picture-writing, which has enabled us to compile a list of kings and to learn something about the events which led to the union of Upper and Lower Egypt under the First Dynasty, *c.* 3000 B.C., and about ceremonies and other events; for labels on wine jars and receptacles containing food, buried in the tombs of kings and their great officers, mention these events as a way of recording dates.

The kings of the First and Second Dynasties were buried at Abydos, the religious capital of Upper Egypt before the union of Egypt, while their great officials and some relatives were buried at Sakkara, a few miles south of Cairo on the western edge of the fertile Nile Valley, in the middle of which they had sited Memphis, the new capital of united Egypt, at the junction of the Nile Valley with the Delta.

The superstructures of the royal tombs of the first two dynasties at Abydos have not survived, but judging from the burial chambers there and the great tombs of the same date at Sakkara, there is little doubt that what was seen of them above the surface of the ground was a rectangular mass of sun-dried mud brick with a rounded roof, the whole painted white, in length anything up to fifty yards, and up to thirty feet high. Internally, the superstructures were divided into thirty or so rooms, in which were stored jars of wine and food, furniture and copper tools—indeed, any objects that were then considered essential for good living. In the centre was a great room; gradually sunk deeper and deeper into the ground in order to make it more safe from robbers. In this room was a wooden coffin, constructed to resemble a house of the period. In the burial chamber were also placed the most valuable treasures—jewellery, dishes of unbelievably skilled workmanship in rock crystal and other fine stones, some made to resemble vine leaves or baskets, etc. Sometimes the burial chamber itself was panelled with wood; in one case (King Den or Udimu) it was paved with slabs of granite brought from Aswan, about 240 miles south of Abydos. As the burial chamber was sunk deeper into the ground it was cut into the natural limestone, the shaft being sometimes built up above the living rock with rough stone walling. Where a sloping staircase was cut down from the surface of the ground to the burial chamber, it came to be blocked by one to three large slabs of dressed limestone, let down by ropes in grooves, portcullis-wise, to prevent robbers getting in by the stairway.

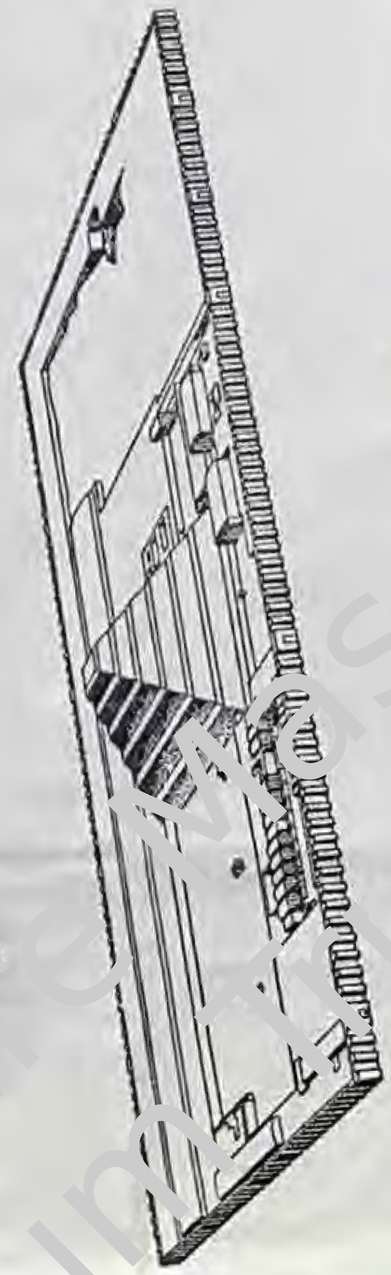
Frequently on the walls of the burial chamber, and occasionally on the walls of the store-rooms above it, was painted a doorway in red to imitate wood. There were no other doors, these false doors being intended for the use of the spirit of the dead king, whose "house of eternity" (the ancient Egyptian phrase for the tomb) this large erection was. Indeed, the tomb was an attempt to make in brick as a more permanent material a lasting copy of the palace in which the king lived in life, and which was constructed of timber, with the walls decorated with matting woven in elaborate coloured patterns, of which imitations were painted on the mud brick walls of the tomb. The spirit of the dead king was at this time thought to remain on earth, living in his "house of eternity" among his people, continuing to influence the land for good, as he had done in life.

Zoser Neterkhet, the first King of the Third Dynasty, built a tomb of this old type at Bet Khallaf, in Upper Egypt; but then he built a much larger tomb of a new type at Sakkara, employing a completely new method of construction: stone blocks cut and fitted together. Indeed, this new tomb is so large and shows so much advance in many details that at first the mind refuses to believe that it is the first stone masonry construction in Egypt—or, for the matter, in the world. But the more familiar one becomes with the remains, the more clearly one can see that they contain in themselves evidence of the rough-patch of stone masonry—of the efforts of a genius wrestling with problem after problem as it arose from the use of the new technique.

There is, too, some indication that it was a new religious belief, attributable to the same genius, which was behind not only the use of the new building material, but the change in form of the superstructure and surrounding of the royal tomb. Neterkhet, the Horus name of King Zoser and the only name used in his tomb, written with two signs, a flag on a pole above an animal's belly. The first sign means 'god' or "divine", and the second is usually interpreted "body". Whatever the exact meaning of the conjunction of the two signs, the name Neter-khet indicates that the king was invoked as divine. Thus when he died, it was reasonable for a man of sufficient imagination to think of the king's spirit as no longer haunting the tomb, his "eternal home" on earth, but as going up into the sky where the Imperishable Stars, those that revolve round the Pole Star in the northern sky without ever setting, had been—probably from prehistoric times in Egypt—thought of as the Kingly Dead. Indeed, I hope that you will be able to see, from what follows, that the superstructure of Neterkhet's tomb, the Step Pyramid of Sakkara, the mightiest and oldest of the pyramids, began as a representation of the kings' palace and ended as a staircase to heaven.

While its enclosure wall was plain, the rectangular mud-brick superstructure over a large First Dynasty tomb was panelled or recessed, apparently in imitation of the appearance of a movable house constructed of timber planks fastened together by lashing and so of necessity overlapping one another.[6] The wall enclosing the Step Pyramid and its associated buildings was nearly one hundred yards long from north to south and just over three hundred yards wide. The enclosure was thus ten to twelve times as long as that of a large First Dynasty tomb, and covered one hundred times the area. This enclosure wall preserved the traditional recessed form of the First Dynasty mud-brick tomb superstructure,[7] but instead of being built of brick it was built of very fine white limestone brought from the Tura quarries on the other side of the Nile. It was, however, built, according to the principles governing brickwork, in regular courses of small cut-stone blocks, each from seven and three-quarters to ten inches high. In this wall, fourteen double gates were represented as closed and irregularly spaced, suggesting that the architect modelled this enclosure on some actual enclosure in which the gates served a real purpose, probably the famed "White Wall of Memphis", the palace compound built by Menes, legendary first king of united Egypt. The height of this stone enclosure wall, twenty royal cubits or over thirty feet, was ascertained from its batter. In the upper half of this wall were small rectangular recesses representing the ends of timber beams usually built into the upper part of large mud-brick walls to strengthen them.

1 *The Deluge.*
2 "The Origin of Additional Degrees", J. E. S. Tuckett, *A.Q.C.*, xxxii.
3 Herbert Poole's revised edition (Caxton), 1951, Vol. I, p. 3.
4 1849, Vol. I, p. ix.
5 W. F. Albright, *The Archaeology of Palestine*, revised edition, 1960, p. 62.
6 A few of these planks have been found lining First Dynasty graves at Tarkhan, not far from Sakkara. See p. — for sketch of restoration of the Step Pyramid by J.-P. Lauer.



The Step Pyramid enclosure at Sakkara
(Reproduced by permission from I. E. S. Edwards, *The Pyramids of Egypt*—after J.-P. Lauer, *La Pyramide à Degrés*, vol. II, plate IV)

In the centre of the vast rectangle enclosed by this wall, a pit about twenty-three feet square was sunk in the rock to a depth of ninety-two feet, and at the bottom of this pit a chamber about 27ft. 9in. in length and 5ft. 6in. in width and height was constructed, entirely of granite brought from Aswan. At its northern end a hole was cut through two of the rafter-like slabs spanning the roof, in order to admit the royal corpse at the funeral. After the body had been placed in the chamber, this hole was filled by a granite plug, measuring about six feet high and three feet in diameter, and weighing about three-and-a-half tons. Access to the chamber above this granite roof was by a staircase, which began in an open trench on the north side of the pyramid and descended underground. The tomb was completed by various underground passages in which were stored very many magnificent stone vases and other furniture. One gallery and two underground rooms nearby had their walls lined with blue faience tiles. In one of the rooms the tiles represented the matting-covered façade of a palace with windows, its three dummy doors of fine limestone carved with reliefs showing the king in the crown of Upper Egypt performing religious ceremonies.

Above the burial pit at first was built a rectangular stone platform (or *mastaba*) 207 feet square and 26 feet high, each side facing one of the cardinal points. It was made of rubble set in clay mortar, and cased with carefully-dressed white limestone blocks. It was then extended by about fourteen feet on all four sides and a second facing of dressed limestone added. The height of this extension was two feet less than that of the original platform, making a step, which was probably significant in view of subsequent developments. Along its eastern edge were now sunk a series of eleven pits, each over a hundred feet deep, having at the bottom of each a corridor nearly a hundred feet long running west under the superstructure. These corridors were intended as tombs for the various members of the royal family; in some of them, alabaster coffins were found. This row of tombs was then incorporated in the main tomb by a further enlargement of about twenty-eight feet which was added on to the east side of the superstructure, thus rendering it oblong. But before the facing of this second addition had been dressed, there was a complete change in the design.

Hitherto the tomb had been hidden from anyone outside the enclosure wall; only the wall on the crest of the western desert could have been seen by the inhabitants of Memphis. But now the architect conceived the idea of a great step-shaped building, a gigantic ladder as it were, erected skywards, as if to facilitate the ascent of the dead king's soul to a celestial abode. The platform was extended by nine-and-a-half feet on each side, and it now became the lowest stage of a pyramid with four steps. On the northern side of this pyramid the construction of a mortuary temple was begun, but before either the pyramid or the temple had been finished it was decided to extend the pyramid further to the north and west, and to give the pyramid six steps. But when this enlargement had reached the fourth step, this plan also was abandoned, and the sixth and last extension added a little more to each side. The six-step pyramid was now completed and cased with a final layer of dressed Tura limestone. Its height was now 204 feet, and its base approximately 411 feet from east to west and 358 feet from north to south.

It is interesting to note that there was a change in the size of the blocks of stone used in the construction of the pyramid, larger blocks being used in the last extension. No doubt the architect was learning as the work proceeded that though small blocks of stone approximately the size of bricks are easier to handle, they take more time to prepare and the resultant construction is less strong than one built of larger blocks.

Zoser's successor, Sekhem-khet, possibly employing the same architect as an old man, began another enclosure with a step pyramid close to the south-west corner of Zoser's tomb complex. It was never completed and is therefore known to archaeologists as the Unfinished Pyramid. Probably the architect died. Its excavation, begun in 1951, has also not been completed; but as far as it has gone it has revealed that the stone blocks with which the enclosure wall was built are twenty inches high, that is, double the height of the largest blocks used in Zoser's wall. An economy was also made in the best limestone facing it; for the casing was reduced to one course (about one foot) thick.

Many stone masonry constructions surrounded (and mostly still surround) Zoser's Step Pyramid within the great enclosure wall. With the exception of the Mortuary Temple and the *Serdab*, each built up against the pyramid on its north side, none of the other buildings has any precedent or parallel. But it is important to note that every building in the enclosure had a religious purpose, being intended to provide for the king's needs after death. Between the pyramid itself and the entrance colonnade at the south-east corner, which will be described later, there is a series of dummy buildings, all solid, of rubble covered with cut stone, intended to provide the setting necessary for repeating in the king's after-life his jubilee ceremony. Every king of Egypt was entitled to celebrate his jubilee after a certain number of years (usually thirty). This festival derived from prehistory, when kings reigned for a limited time and were then put to death, in the belief that it was essential for the welfare of the country that the king should be physically strong. The jubilee ceremony enabled the king to regain his vigour by magic, and so obviated the necessity of replacing him by a younger man. It is probable that by reproducing in stone the temporary booths, shrines, etc., of wood and matting, in which the ceremony was celebrated in life, the aim was to secure immortality for the king by providing for the perpetual celebration of his jubilee in a new and more permanent medium, stone.

In the jubilee festival all ceremonies were duplicated, for, despite the union of Upper and Lower Egypt, the king usually wore a double crown and was looked upon as a dual personality, the King of Upper Egypt and the King of Lower Egypt. Thus the buildings within the Step

Pyramid enclosure appear all to have been duplicated for the same reason. There was even a tomb complete with burial chamber duplicating the tomb under the Step Pyramid itself. The superstructure of this second tomb was in the form of a large rectangular *mastaba* with a curved roof, running east and west, the greater part of it being concealed in the body of the southern stretch of the enclosure wall. The substructure of this *mastaba* has many features in common with the Step Pyramid itself. A tomb chamber made of blocks of Aswan granite was built at the bottom of a vertical shaft. Its only entrance was a hole, stopped with a granite plug, in the flat roof. East of the tomb chamber were galleries, in one of which were also three separate limestone reliefs of the king performing religious ceremonies. In a parallel gallery just west of the first one, the backs of three doors were carved in the limestone facing of the wall. The position of these doors, approximately behind the reliefs of the king, suggests that the panels with reliefs were regarded as false doors through which the king was thought of as emerging. The walls of several of these galleries were covered with blue faience tiles, representing hangings of matting. The tomb chamber here, being only five-and-a-quarter feet square, is unlikely to have been used for an actual burial, and is therefore regarded as a duplicate tomb required for ceremonial purposes, especially in view of the duplication of the reliefs showing the king performing ritual ceremonies.

Immediately on the north side of this apparently duplicate tomb, and thus corresponding in orientation with the temple on the north side of the pyramid, there is a rectangular masonry building. It is almost solid except for two elongated chambers set at right angles to each other, and its outer walls of dressed limestone are decorated at the top with a frieze of cobra-heads—the first known example of a motif which was to become very common. These are the well-known emblems of the cobra goddess of Buto, guardian of the kingdom of Lower Egypt, and it is therefore probable that this south *mastaba* complex was regarded as the ceremonial tomb of Zoser as King of Lower Egypt.

Immediately between this "duplicate tomb" and the pyramid itself was a large open court in which are two solid stone B-shaped bases, and in line with them near the pyramid an altar. These bases probably marked the course of the ritual race which the king, carrying a flail and accompanied by the priest of the spirits of the dead kings of Upper Egypt, had to run as part of his jubilee ceremony. The king is shown running this race in reliefs found both under the Step Pyramid and in the duplicate tomb.

An important element in the jubilee was a re-enactment of the coronation. Here a procession led by a priest entered the chapels on one side of the jubilee court, in which were the gods of the various districts of Upper Egypt. Having obtained from each god consent to a renewal of his kingship, the king was conducted to the southern of two thrones, placed on a dais beneath a canopy, in order to be crowned with the white crown of Upper Egypt. A similar ceremony was then repeated in the chapels of the gods of the districts of Lower Egypt, before the king ascended the northern throne to receive the red crown of Lower Egypt. This clearly was the purpose of an oblong court on the eastern side of the open space for the ceremonial race. Along both the east and west sides of this oblong court was a series of dummy chapels constructed of solid masonry. In front of each chapel was a small court provided with an imitation open door (also in solid masonry). Sculptured in high relief on the stone walls separating each chapel were representations of a wooden fence made of tapered uprights piercing a horizontal crossbar.

A passage from the south-west corner of the jubilee court leads to a smaller court, in which stood a building with an imposing entrance hall, three inner courts and a group of side chambers. Projecting from the middle of the west side of the entrance hall were three tongue-walls, two of which ended in engaged columns decorated with vertical flutings. Another similar engaged column projected from the north wall, and in the east wall is a dummy door of stone in a half-open position. The whole may have represented the pavilion in which the king was thought of as residing during his jubilee, and to which he retired between ceremonis in order to change his robes.

Going back again through the oblong court between the two rows of dummy shrines, one passes out at the north end between two large masses of rough masonry from which the casing has been stripped, into the area east of the pyramid which was originally dominated by two large rectangular buildings with curved roofs, each composed of a solid core of masonry overlaid with dressed Tura limestone. The southern face of each building, which was once nearly forty feet high, was decorated with four engaged columns, which, together with a broad pilaster at each side, supported a cornice following the curve of the roof. In the more northern of the two buildings, vertical flutings were carved on both the engaged columns and the pilasters. In the southern building the engaged columns were similarly fluted, but the pilasters were ribbed. The capitals of the engaged columns resemble two large pendant leaves, probably those of the Giant Fennel, of which the stem is ribbed when green and fluted when dry.

Situated near the middle of the southern face of each building was the entrance to a narrow passage which led, by two right-angled turns, to a small cruciform sanctuary. The stone ceiling of the passage was carved to resemble the log rafters with which similar corridors were roofed in buildings composed of wood and mud-brick.

In front of each of these buildings was an open court, the southern one much the larger of the two. Each court was surrounded by a wall, in the east side of which, near the corner of the building, was a broad recess. In the northern court in this recess were three engaged columns, each representing the triangular stem of the papyrus with a single flower head at the top; while in the recess in the southern court there was only a single engaged round-stemmed column which represented a lily. The lily and the papyrus were the emblems of Upper and Lower Egypt respectively, and it is probable that the southern building represented the prehistoric sanctuary of Upper Egypt, and the northern the corresponding sanctuary of Lower Egypt. The presence of a D-shaped altar in the court of the southern building confirms that their function was religious.

The southern sanctuary is near the east side of the pyramid, and its northern face in line with the northern face of the pyramid.

Going round the north-east corner of the pyramid one comes to the *serdab* already mentioned. This was a chamber completely closed and backing on to the pyramid, built throughout of dressed Tura limestone, its front wall inclining backwards at an angle of 16 degrees from the perpendicular to correspond with the angle of the lower step of the pyramid. Inside it was a limestone statue of King Zoser seated. Two round holes were cut in the front wall of the *serdab* opposite the face of the statue, to enable the king to look out without himself being dazzled by the glory of his presence. It is probably significant that the king is looking towards the north. The *serdab* is flanked on either side by a small wall, against the north end of which on the inside is sculptured in stone the representation of the half of a double door, outside open!

Just west of the *serdab*, and also abutting on the north side of the pyramid, is the outer wall of the mortuary temple. Six feet of this wall still stand today. In it is the entrance to the temple, with a single (dummy) door sculptured in stone as if open, with a baffle passage behind it. Little remains of the interior of the temple, but there were many other similar imitation open doors in stone, and the bases of fluted engaged columns belonging to the façade of two interior and symmetrical courts. A staircase descends to the passage under the pyramid. To the west were store rooms, each with a stone bath in its floor, and on the south side of the temple was a sanctuary with two recesses similar to the face of the pyramid itself. The duplication of the chief features (courts, ablution rooms and recesses in the sanctuary) indicates that the temple was intended for the celebration of the ritual which had to be repeated for the king, once as ruler of Upper Egypt and again as ruler of Lower Egypt.

We have yet to consider the actual entrance (into the great compound surrounding the pyramid). This was situated about thirty feet from the south-east corner of the enclosure wall, and consisted of a narrow passage running through the fourth bastion. The passage, originally roofed with stone slabs carved on the underside to represent wooden logs, ends in a small hall, on the right side of which can be seen the hinge of one half of an open dummy door carved in stone. Then follows another passage, slightly wider than the first, which ends in another dummy open door, this time a single door. Beyond this a magnificent walled colonnade consisting of a long narrow passage running westwards between a series of alcoves formed by tongue walls, of which there were forty in all, twenty on each side. These tongue walls terminated in engaged ribbed columns, about twenty feet high. No trace of statues has been found, but it is probable that these alcoves were intended for double statues of the king, each with one of the gods of the forty-two nomes or districts of Egypt, those on the south side representing him as King of Upper Egypt and those on the north side as King of Lower Egypt. (Such double statues are known from the next dynasty.) This colonnade was covered with a heavy roof made of stone slabs placed on edge and carved round on the lower edge to represent trunks of palm trees. Slits cut at an oblique angle in the side walls near the roof admitted light to each alcove. Across the west end of the colonnade ran a small rectangular hall with a flat roof, borne by eight ribbed columns joined in pairs by masonry walling.

The exit from this small pillared hall was on its west side by a narrow passage, at the end of which is an unusually detailed half-open dummy door, on which can be seen the ends of the crossbars to which the wooden panels were nailed, all details carefully represented in stone. Passing through, one enters the large open court, bounded on the south side by the panelled enclosure wall and on the north by the pyramid itself. Straight in front on the west side of this open court is a wall decorated with recessed panelling, which is the outer wall of the first of two parallel structures of solid masonry which cover nearly the whole of the western side of the pyramid complex. The second structure, which was higher than the first, had a curved roof resembling the roof of the south *mastaba*, and it may therefore be the superstructure of a row of tombs belonging to the king's retinue, but here the rock is dangerous and it has not been excavated. Beyond the two structures was the thick enclosure wall itself.

We have now considered the main features of the complex of buildings surrounding the Step Pyramid. It is indeed one of the most remarkable feats of architecture ever produced by the ancient Egyptians. No other pyramid was surrounded by such an array of buildings to supply the king with his needs in the after-life. In their place, subsequent pharaohs were content with pictorial representations painted or carved in relief; no court with buildings specially designed for the jubilee ceremony was ever made again.

Doubts are naturally expressed from time to time as to whether such a high degree of architectural perfection could have been achieved without having been preceded by long development, but for some centuries before this the Egyptians had been making beautiful stone vases from the hardest of stones, which show that the stone-worker had obtained complete control over his material, both in cutting, drilling, shaping and polishing it. There is, however, no evidence that stone had been employed in any earlier building, except for the construction of isolated parts, and then seldom, if ever, carefully cut stone. Over and over again in the Step Pyramid, features occur which show that its builders lacked experience in the use of stone for building. Small blocks which could easily be handled were used instead of the massive blocks found in later buildings. Clarke and Engelbach[8] point out that the masonry of the Step Pyramid is inferior to the better examples of later times in that the fineness of the joints between two adjacent blocks, which appears good when viewed in front, only extends inwards for at most a couple of inches, afterwards the joints become wide and irregular, and are filled in with thick white gypsum mortar.

In the Step Pyramid, fineness of jointing at the face of the walls was only obtained at the expense of solidity. More patches are noticeable at the joints in the Step Pyramid than ever afterwards. The architect was also clearly puzzled as to how to represent in immovable stone the doors which, in wood, naturally swung on their hinges. That is why in the Step Pyramid the doors are made in stone in one of three positions: open, shut or half-open. Later, when stone architecture developed its own rules, the door itself was of wood covered with copper plates and had copper hinges. The unique character of many of the buildings, of which the form, line and proportions were those suitable for the brick, wooden or reed constructions of the time, shows how they were adapted quite naturally by the architect who was faced with the need for innovation in creating this, the first great construction in cut stone.

It is the size, complexity and beauty of the completed work that make it seem incredible that it is the first edifice in cut stone, especially when one remembers that the architect had little but manpower and the copper chisel at his disposal. The explanation is that he had genius as well. Imhotep, King Zoser's architect, must have had the brain of the same type as that of Leonardo da Vinci. He must have been an inventor and organizer of unique brilliance, capable of inspiring both his master, the king, and all who worked under him, of teaching craftsmen and of controlling the huge labour force required for this work.

It is to Manetho, an Egyptian priest of Heliopolis, who wrote in Greek a history of Egypt in the third century B.C. for the new Macedonian rulers of the country, that we owe the bare statement that Imhotep invented the art of building in dressed stone. This association with the Step Pyramid is supported by the occurrence of his name on part of the base of a fine limestone statue of King Zoser found just outside the main entrance to the Step Pyramid, with an incomplete inscription which suggests that Imhotep dedicated the statue to the king. This statue, judging from the fragments which survive, represented Zoser as King of Lower Egypt, and must have been one of a pair of statues, the other representing him as King of Upper Egypt. The fragmentary inscription on the front of the base describes giving the names of the king and of Imhotep, gives part of Imhotep's titles, which may be translated "the Treasurer of the King of Lower Egypt, Next after the King, Steward of the Pharaoh, Prince, Chief (Astronomical) Observer", and two signs, a carpenter's axe and a pair of harpoons, which probably stand for "carpenter" and "sculptor".[9] and suggest something like the old priestly title, "Chief of the Master Craftsmen" which was the title of the high priest of Ptah at Memphis, as "Chief of the Observers" was the title of the high priest of On (later Heliopolis, the seat of the cult of Ra). Imhotep's apparent combined responsibility for the astronomical reckonings and craftsmanship is significant, for his masterpiece, the Step Pyramid, is orientated on the north, and its successor, the Great Pyramid of Giza, is the most carefully orientated of all Egyptian buildings.

We know that for the construction of temples in later times the actual site was astronomically fixed the night before the foundation ceremony by orientating the short axis of the temple from north to south between the Great Bear and Orion. At the beginning of the ceremony the site was marked out by the king, who, with a mallet, drove in a stake at each of the four corners and then himself made four mud-bricks. The ceremony ended by the king laying one of these bricks at each corner of the temple. Foundation deposits, including model tools, were placed at these corners.[10] Professor Cerny says that this ceremony was very old and was designed for buildings made of wood or bricks, and is therefore probably earlier than the introduction of building in stone.

No foundation deposits have yet been found at the Step Pyramid site, but, at Meidum, Petrie found two foundation deposits[11] that had been under the temple attached to the pyramid. This was begun at the end of the Third Dynasty, perhaps as a step pyramid, and changed into a true pyramid by Seneferu, the first king of the Fourth Dynasty and father of the builder of the Great Pyramid at Giza.

By 2000 B.C. model metal tools were being included with full-sized pots in the foundation deposits of the temple of the pyramid of Senusret II at Illahun, although for some reason the four sets of deposits, instead of being put under the corners of the building, were all put together, in a cavity roofed with stone blocks, at the centre of the building. By the New Kingdom (1580-1085 B.C.) it was the regular custom to place deposits consisting of stone vases (some unfinished), model pots and tools, and specimens of the materials used in the building, under each of the four corners. Many of these objects had the name of the reigning pharaoh in hieroglyphs inscribed on them.[12] Thus our present custom of placing coins of the realm, etc., under the corner of a new building is likely to be a continuation of the Egyptian custom of over 3,400 years ago, and unlikely to be connected with a primitive human sacrifice, as Bro. Speth suggests.[13] The foundation stones of Sennacherib and Ashurbanipal of Assyria, which were probably inscribed bricks placed under the walls of the palaces they built, were the oldest foundation deposits known to Bro. Speth, but they only date from the seventh century B.C., and they are later than all the Egyptian examples I have mentioned. Indeed, the introduction of this custom into Mesopotamia was no doubt part of the spread of Egyptian culture into Palestine and the Near East. This culture was influencing Byblos in Syria by the First Dynasty; and in the two millennia that followed, Palestine and Syria were dominated by Egypt, often politically as well as culturally. This applied in the sphere of architceture as well as in other spheres. King Solomon's date is about 1000 B.C., and his temple can have been no exception to this Egyptian influence.

About a century before King Solomon's day, during the Twentieth Dynasty in Egypt (1200-1085 B.C.), we know something about the life and organization of the stone-cutters and masons employed on the construction of royal tombs in the Valley of the Kings at Thebes, from the excavation of their village at Deir el Medina. These workmen were organized in gangs. Each gang was divided into the right side and the left side. Each side was under a foreman, "the head one of the gang", and each foreman had a deputy to help him. The size of the gang varied, usually numbering about sixty. The division into right and left sides was not only administrative, but applied also to their work, the right side apparently working on the right side of the tomb. A scribe or secretary kept a diary of the work, helped to supervise it, and forwarded regular progress reports to the vizier, the highest official under the king, a rank held by Imhotep long before. As the tomb working penetrated the hill, lamps (pottery bowls filled with vegetable oil) became necessary, and the issue of wicks from the royal store to either side of the gang was recorded by the scribe.

The working day seems to have been divided into two equal periods for labour, with an interval for refreshment. Do we not hear an echo of this when our Lodges are called off and on? The workmen were paid monthly by issues of wheat, barley, etc., from the royal granaries. This is interesting, for in the Bible (II Chronicles, 2) we read how King Solomon gave wheat, barley, wine and oil to the hewers of timber from Lebanon for his temple, and, in the explanation of the Tracing Board in our Second Degree ceremony, it is said that at the building of K.S.T. the E.As received a weekly allowance of corn, wine and oil.

Near the village were small sanctuaries of the deities specially revered by the workmen, and it may be significant that the largest and finest sanctuary was that of Hathor, the goddess of the night sky in the Archaic period. Some of the workmen themselves acted as the priests of these sanctuaries. Professor Cerny, who took part in the excavations and gave me this information,[14] comments that this small community of royal workmen enjoyed a degree of self-government in religious as well as civil matters which is remarkable, for Egypt at that time was under the control of an elaborate bureaucracy and a powerful priestly class.

[8] *Ancient Egyptian Masonry*, 1930, pp. 97 ff.

[9] C. M. Firth, "Preliminary Report on the Excavations at Saqqara (1925-6)", *Annales de Service*, Vol. 26, 1926, pp. 97-101. Battiscombe Gunn, "Inscriptions from the Step Pyramid Site", *op. cit.*, pp. 178-202.

[10] J. Cerny, *Ancient Egyptian Religion*, 1952, p. 114 f.

[11] W. M. Flinders Petrie, *Meydum and Memphis III*, 1910, p. 2 and pl. XXV.

[12] The erection of the Egyptian temple at Sesibi, in the Sudan, has been dated to within four years because the name of the pharaoh in the foundation deposits is Amenhotep (IV), and we know that he changed his name to Akhnaton in the fourth year of his reign.

[13] G. W. Speth, "Builders' Rites and Ceremonies: the Folk Lore of Masonry", *Quatuor Coronati Pamphlet* No. 1, 1947, pp. 5 and 31.

[14] To be published in the forthcoming revised edition of *The Cambridge Ancient History*.

The organization of stone masons into gangs in King Solomon's time seems to find an echo in our own ceremonies when, on a particular occasion which will be familiar to you, fifteen trusty F.C.s formed themselves into three Lodges or classes when ordered by K.S. to search for . . . H.A. There is evidence that gang organization of masons went back in Egypt to the Fourth Dynasty, and probably to Imhotep and the building of the Step Pyramid itself, for his workmen must have been well organized, or such a "stately and superb edifice" could never have been completed. At a certain point, which will again be familiar to you, our ritual also reminds us of the grievous consequences of the loss of the principal architect, which could not fail to be generally and severely felt, and you will recall that the want of those plans and designs which had hitherto been regularly supplied to the different classes of workmen was the first indication that some heavy calamity had befallen our M. From the pyramid at Meidum, probably begun as a step pyramid at the end of the Third Dynasty, come the names of several gangs found on casing blocks: "Step Pyramid gang", "Boat gang", "Vigorous gang", "Sceptre gang", "Enduring gang", "North gang" and "South gang". And at the Great Pyramid of Giza built by King Khufu (Cheops), the successor of Seneferu who finished the Meidum pyramid, was found a block of limestone on which is written: "The Craftsmen gang. How powerful is the white crown of Khnum Khufu."[15] Here the king's full name means that he is under the protection of Khnum, the creator god from Aswan, incidentally the source of granite much used in his pyramid. Egyptologists have not explained why the names of gangs were placed on stones. Does the last inscription suggest a lodge or class of operative masons who, with instruction in their craft, gave their apprentices esoteric teaching too?

Parallels with our Working Tools are remarkable. I have already mentioned the copper chisel. I do not know of any masons' tools which actually come from the Step Pyramid, but all the working tools of the First and Second Degrees must have been used by Imhotep's masons. If we take the cubit rod as equivalent to the 24-inch gauge, gavels of wood for striking the chisel and mauls of stone for dressing the stone were in use then, and so no doubt were the square, level and plumb rule. Examples of masons' tools which survive from the Third Dynasty, and must be almost, if not quite, contemporary with the Step Pyramid, are plumb bobs of limestone, gavels of wood and chisels of copper. A model wooden square and plummet were found in a mason's grave at Sedment, dating from about 2200 B.C. The earliest surviving level of which I am aware dates from about 1250 B.C. (about the time of the Exodus). Long before that we know that the Egyptians made use of the property of water to maintain its own level, a slight error in the level of the base of the Great Pyramid being attributable to the prevalence of the north wind.

From early times, scribes used to pour a libation to Imhotep from the little vase of water with which they prepared their coloured inks before writing. A number of statuettes of Imhotep as a demi-god date from 1000 to 500 B.C., and it was probably about 500 B.C., during the Persian occupation of Egypt, that Imhotep was raised to the status of a full god, as third member of the trinity of Memphis, where he was known by such titles as "Great One" or "Son of Ptah, who gives life to all men". Two centuries later, when the Ptolemies ruled Egypt, he had become the chief god worshipped at Memphis, and under the Greek form of his name, Imouthes, he was equated with the Greek god of medicine, Asklepios. His botanical skill, shown by his accurate representations of plant forms in his columns, which copy the papyrus, lily and Giant Fennel, probably led him to study the properties of plants and so to found the science of medicine.

His final deification is not unconnected with the great part he played as high priest in the spiritualization of the religion of ancient Egypt. This we have seen reflected in his alteration of the superstructure of the royal tomb, what had been the king's "house of eternity" on earth being changed into a "place of ascent" to the sky, where the king's spirit was to join the immortals, the "Imperishable Stars", revolving round the Pole Star. This explains the northern orientation of the Step Pyramid, with its mortuary temple on the north side, and the chief royal statue in the *serdab* or "statue house" facing the Pole Star, at the north-east corner of the pyramid. Incidentally, this may possibly explain why, as it is stated at the beginning of the Charge in our First Degree ceremony, "it is customary at the erection of all stately and superb edifices"—what an apt description of the Step Pyramid!—"to lay the first or foundation stone at the N.E. corner of the building". For the king, who in foundation ceremonies had to lay a brick at each corner, may well have chosen to lay the first one at the corner of which his own representation in stone was to stand in his "statue house".

We know that in the next (Fourth) Dynasty there was a change in the state religion, the worship of Ra the sun god becoming predominant. The king was now given the title "Son of Ra" during life, for he was regarded as the representative of Ra on earth, and thought of at death as rejoining Ra in the boat in which he crossed the sky every day. The superstructure of the royal tomb now became a true pyramid, probably reflecting the angle at which the sun's rays may often be seen descending from the clouds in the afternoon sky in Egypt. Corresponding with the change from stellar to solar religion, the pyramid temple was moved from the north side to the east side of the pyramid, the eastern horizon now becoming important as that on which the sun rises to open and enliven the day.

The priests of Ra from On (Heliopolis) seized political power and replaced the Fourth Dynasty. During their dynasty (the Fifth) the walls of the royal burial chamber under the pyramid began to be covered with magic texts. These texts, which consist of spells, some of which must have been preserved from prehistoric times in the college of the priests of On, not only refer to the pyramid as a "place of ascent to the sky", but reflect in confused way all three beliefs as to the after-life of the king: terrestrial, stellar and solar.[16]

Imhotep's title, "Chief of Observers", shows that he was head of the college of priests at On. His other title suggests "Chief of the Master Craftsman", a title of the head of the college of priests of the god Ptah at Memphis: and this is to some extent confirmed by the fact that when he was deified centuries later he was called the Son of Ptah. He was a priest as well as an architect and a builder; and it was his religious belief which led him to use his creative and imaginative genius to become the Father of Operative Masonry. The purpose of the stately and superb edifice which he built at Sakkara was entirely religious, to provide a heaven by day as opposed to an early after-life for the Pharaoh: and to achieve this end he invented, or at least developed into a new form of architecture, the use of cut stone, which before his day had only been used incidentally for the flooring or doorway of mud-brick buildings. His pyramid and its associated temple and shrines set a pattern for all temples built in Ancient Egypt during the three thousand years that followed. And it is generally accepted that operative masonry all over the Near East, including Palestine, evinces evidence of an Egyptian origin.

Thus, while there can, of course, be no suggestion that Imhotep's beliefs in any way influenced the evolution of the ceremonies in speculative masonry as we know them, he did undoubtedly influence the ideas behind the construction of King Solomon's Temple. In so far, therefore, as Solomon and his temple are imbedded in Masonic tradition, it can be said, if only obliquely, that Imhotep and his pyramid are imbedded in Masonic tradition also. Thus, Brethren, should we not be grateful for this light shed by archaeology on our past, revealing as it does how, through his priestly position as mediator between God and man, Imhotep became the Father of Operative Masonry, being associated in all his undertakings with the Great Architect of the Universe?

[15] I. E. S. Edwards, *The Pyramids of Ancient Egypt*, 1961 (revised Pelican edition), p. 262, quoting Alan Rowe.

[16] J. H. Breasted, *Development of Religion and Thought in Ancient Egypt*, 1912, pp. 85 ff.