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Ancient Egypt 1922 Part 4

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ANCIENT EGYPT

1922. PART IV.

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MOSAIC FROM SHELLAL, 560 A.D.

ANCIENT EGYPT.

THE SHELLAL MOSAIC.

During the war the Australian troops found a great mosaic pavement of a church which had been much cut up by Turkish trenches. This was between Beersheba and Khan Yunis; and it shows what prosperity existed down to the time of Justinian, in what is now a barren region incapable of supporting a population. As any dated example of mosaic is valuable, for comparison with other mosaics or decoration, it is here reproduced from the copy officially issued in Egypt. The broken border is here omitted, except an example at the top, in order to give the figures on a larger scale. There is a much more broken inscription also at the bottom. The top inscription reads: "This temple with spacious . . . was built by our most . . . and most pious George . . . in the year 622 according to . . ." It is supposed that this was according to the era of Gaza, the nearest city, with an era of 63 B.C., which was also usual in other Syrian cities. This date would be therefore equal to 560 A.D., or five years before the death of Justinian.

The fashion of placing subjects in circles is familiar at 330 A.D. in the mosaics of S. Costanza; but the development of flowing lines to form the circles comes from the vine pattern with leaf or grapes in the circle, as at S. Vitale, 546 A.D. The idea of placing animals in these circles is seen on the ivory throne of Maximian at Ravenna, 550 A.D. The Shellal mosaic has at the base one of the earliest groups of the vase between peacocks, which is not generally found till from two to four centuries later.

The mosaic was most carefully removed by the Australian troops, stored in Egypt during the war, and then removed to Australia. Beneath the inscription was found a burial, which was doubtless that of "our most pious George" who founded the church.

W. M. F. P.

AN OLD WORLD CUBIT IN AMERICA.

EVERY connection that can be traced between the civilisations of Asia and America is so important, for lighting up one of the greatest of historical questions, that it should be put on record, in hope of drawing out further information. The School of American Research at Santa Fé, New Mexico, has been exploring the remains in the Chaco Canyon, which was proclaimed a National Monument fifteen years ago. An account of the work, with many illustrations, is given in *Art and Archaeology* for September, 1922. The structures described by Mr. Edgar Hewett are built of naturally faced pieces of sandstone, like tiles, about 8 to 12 inches square and a couple of inches thick. They are laid with remarkable regularity to form walls with flat faces, which were covered with white plaster.

The principal class of remains are circular areas, with a bench about 3 feet high, around, and a wall behind that about 6 feet higher. Joining to this is a square chamber; and around the circular wall is another beyond it, and the intervening space divided, by cross walls, into between eight and fourteen chambers. In the floor of the great area are two rectangular pits, in which had been a great burning; they are about 3½ feet deep. The great size, the regularity and also the fine finish show the importance and the care in construction of these works, and justify us in examining whether they were made by measurement.

On looking over the measurements that are given it is obvious that they indicate a unit of about 20·7 inches. This is not found by guessing, but by trying all simple ratios between the numbers on a slide rule, until a series of multiples is found which shall be in proportion to the quantities. Thus at Chattro Ketl—

	Inches.		
Diameter	750	÷ 36	20·8
Bench, wide	42	2	21
Post holes apart	312	15	20·8
Altar	61 or 62	3	20·5
At Aztec, San Judu River (36° 50′ N., 108° 5′ W.)—			
Outside outer wall diameter	827	÷ 40	20·67
Inside outer wall diameter	786	38	20·68
Outside inner wall diameter	638	31	20·58
Inside inner wall diameter	*579·5	28	20·70
Inside lower bench	*495·5	24	20·65
Large chamber, wide	249	12	20·75
,, ,, long	208	10	20·8
Post holes apart, over all..	290	14	20·71
,, ,, ,, ...	283	14	20·21
,, ,, ,, ...	310	15	20·67
,, ,, ,, ...	308	15	20·53
Pits, long	*102	5	20·4
,, wide	* 42	2	21·0
Wide curved chamber	*124	6	20·67
In South-West Colorado—			
Circular wall diameter	1,632	80	20·4

The starred measures are direct statements; others are measured from the plan in *Anthropological Papers* of the American Museum of Natural History, xxvi, Part 2, 1921.

Other dimensions are not detailed enough to give an accurate result.

Now from these it seems clear that the unit is about 20·68 inches by the most accurate measures. In the circle at Aztec it appears that the inside of the benches and the outer wall are the simple numbers of design (24, 25, 40), and the intermediate numbers result from 7, 3, 3 and 2 cubits for chambers and walls. This accords exactly to the well-known Egyptian cubit: 20·62 in the best early example, 20·65 in later cubit rods, 20·76 on the Roman Nilometers. Babylonia had a rather longer form, 20·88 for the cubit of Gudea's plotting scales, carved on the drawing-board that rests upon his knees in the Louvre statues. This was also the standard of Asia Minor, 20·6 to 20·9, mean of all 20·63. How could this reach New Mexico? It was evidently Asiatic. We have evidence from weights of an Asiatic diffusion of a Babylonian original over India, China and Etruria. If the cubit similarly passed to China, it might thence reach North America. It has been already pointed out in this Journal (1916, p. 108) how the cross at Palenque (Southern Mexico) was in its detail of ornament derived from Italian crosses of about the eighth century, probably carried to China by the Nestorian mission. By the same route the Asiatic cubit may have passed over to the New World at some earlier period.

W. M. FLINDERS PETRIE.

WAS THE CONSTANTINOPLE OBELISK PART OF THE 108-CUBIT OBELISK OF HATSHEPSÔWET ?

WHILE studying the unfinished obelisk, now lying in a quarry at Aswan, which I excavated last season, I worked out, with a fair degree of accuracy, what internal strain due to bending would be set up when the obelisk, if completed, were supported at its centre of gravity. The dimensions of this obelisk are, in the rough :—

Overall length	41·75	metres.
Side of base	4·2	,,
Base of pyramidion	2·5	,,
Height of pyramidion	4·5	,,

The total weight, when fine-dressed, would have been just over 1,100 tons (English).

The result of my calculations is that, if this obelisk were supported at its centre of gravity, the stress due to bending would have been 1,086 lbs. per sq. in. The maximum stress, or " modulus of rupture " for granite is given as 1,500 lbs. per sq. in. (It may be noted here that if the obelisk is supported at the base and the base of the pyramidion, the stress set up will be very nearly the same, the difference being in the plus or minus effect of the pyramidion in the moment formula.)

If an obelisk cannot endure the strain set up due to its own weight, an unevenness in the packing when it was being undercut in the quarry or the slightest concavity in the bed on which the rollers run (which seem to have been used), would result in the obelisk snapping across ; this applies even more in considering the question of its erection. I believe that a modification of the theory that the obelisk was let over the edge of an embankment is generally accepted. If this was the means employed, it is essential that the obelisk be rigid enough to resist breaking when supported at its centre of gravity. The theory that the obelisk was pulled and levered up while engaging in the notch on the pedestal is, to me, untenable for a 1,100-ton obelisk, however well it may have succeeded with the 35-ton obelisk of Seringapatam (Barber, *The Mechanical Triumphs of the Ancient Egyptians*). The standing obelisk of Queen Hatshepsôwet at Karnak never has engaged in the pedestal-notch, as the inner edge of the notch, unlike those of all other obelisks I know, is quite sharp, and the obelisk now stands several inches to a foot away from the notch (as it does not stand square on the pedestal).

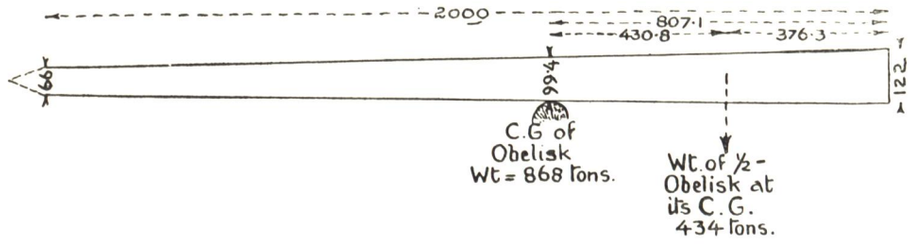
Having reached the figure mentioned above, which leaves a very narrow margin considering the slight flaws unavoidable in very large granite blocks, it occurred to me that if the Constantinople obelisk is, as held by several authorities, merely the top of the 108-cubit obelisk mentioned in the well-known inscription of Thutiy as having been erected by Hatshepsôwet, it would suffer an even greater strain, if supported at its centre of gravity or ends, than would the Aswan Obelisk, had it been completed.

Turning to Petrie, *A History of Egypt*, xviith and xviiith dynasty, pp. 131, 132, we read, referring to the 108-cubit obelisk (L.D. iii, 27, 11) : " Taking the lighter obelisk, that of Hatshepsut, which weighs about 300 tons, if the thickness were increased proportionally to the length on 185 feet, it would imply a weight of over 2,000 tons. This is so obviously excessive (as the heaviest blocks yet

known are the colossi of Ramessu II, 800 tons at the Ramesseum, and 900 tons at Tanis), that we cannot suppose that the thickness was proportionate to the height. Probably, therefore, the missing obelisks should be about the same width at the top as the other great obelisks, and wider at the base.

" The only obelisk that could fit this requirement is that of Constantinople. It is only the top of a broken obelisk ; but the inscription on the south face is exactly parallel to that on the west face of Hatshepsut's obelisk. If it continued like that, its height would come to about 120 feet ; but it may, of course, have been a longer inscription. If we suppose that it was 172 feet (or 100 cubits, leaving 13 feet for the pedestal), then, as the top is about 5 feet 6 inches wide (by photograph), and the broken end 7 feet wide, the base would have been 10 feet 2 inches wide, there being no perceptible entasis. As the Lateran obelisk is 9 feet 9 inches, this size of base would be very probable for a longer mass." The calculation of the stress set up in the proposed obelisk is as follows :—

If we allow 7 feet for the pyramidion, since we have no exact details of it, and since it affects the problem very little, we have a length of 165 feet or 2,000 inches, the side of the small end being 66 inches and that of the large end 122 inches.



Centre of Gravity of the whole Obelisk.

The distance of the centre of gravity from the large end (D) of a truncated pyramid of length l, having sides to the thicker and thinner ends A and a respectively, is given by the formula :—

$$D = \frac{l}{4}\left\{\frac{A^2 + 2Aa + 3a^2}{A^2 + Aa + a^2}\right\}.$$

Substituting the dimensions given above, we have :—

$$D = \frac{2000}{4}\left\{\frac{(122)^2 + 2\,(122)\,(66) + 3\,(66)^2}{(122)^2 + (122)\,(66) + (66)^2}\right\} = 500\left\{\frac{14884 + 16104 + 13068}{14884 + 8052 + 4356}\right\}$$
$$= \frac{500 \times 44056}{27292} = 807 \cdot 12 \text{ inches.}$$

Width of Obelisk at its Centre of Gravity.

By proportion, this is equal to—

$$122 - \frac{807 \cdot 1}{2000} \text{ of } (122 - 66) = 99 \cdot 4 \text{ inches.}$$

Centre of Gravity of right-hand half of the Obelisk when supported at Centre of Gravity of Obelisk.

Here we have, in the formula quoted above,

$$l = 807 \cdot 1,\ A = 122 \text{ and } a = 99 \cdot 4.$$

Therefore the distance of the Centre of Gravity of the half-obelisk measured from the thicker end is :—

$$\frac{807\cdot1}{4}\left\{\frac{(122)^2+2\,(122)\,(99\cdot4)+3\,(99\cdot4)^2}{(122)^2+(122)\,(99\cdot4)+(99\cdot4)^2}\right\}$$

$$=\frac{807\cdot1}{4}\left\{\frac{14884+24253\cdot6+29641\cdot08}{14884+12126\cdot8+9880\cdot36}\right\}=\frac{807\cdot1\times68778\cdot68}{4\times36891\cdot16}$$

$$=376\cdot3 \text{ inches.}$$

The distance of the Centre of Gravity of the half-obelisk from the point of support will then be $807\cdot1-376\cdot3=\underline{430\cdot8 \text{ inches.}}$

Weight of the Half-obelisk (W).

Calling A = side at one end, and a = side at other end, the volume is $A^2+Aa+a^2\times$ length $\div 3$, or $(99\cdot4^2+12127+122^2)\times807\cdot1\div3$, which $\times$ weight per cubic inch (at 170 lbs. to cubic foot) = 435·9 tons. The obelisk then, if of two similar halves, would weigh 872 tons.

Now (Stress due to bending) (Modulus of Section) = (Sum of moments on one side of support).

The modulus for a square sectioned beam is one-twelfth the cube of the side, or $\frac{(99\cdot4)^3}{12}$.

Substituting we have :—

$$S\times\frac{(99\cdot4)^3}{12}=\frac{(110\cdot7)^2\times807\cdot1\times170}{1728}\times430\cdot8,$$

from which $S=\frac{(110\cdot7)^2\times807\cdot1\times170\times430\cdot8\times12}{(99\cdot4)^3\times1728}=5{,}120$ lbs. per sq. in.

Thus it would not carry a third of its own weight if supported at the middle or the ends, as granite breaks at 1,500 lbs. per square inch. If the Egyptians could have handled and erected this obelisk, it would have been the greatest engineering feat which has come down to us.

With the exception of the obelisk of Hatshepsôwet at Karnak, which has rather a slight taper, there is no very great difference in the proportions of the large obelisks now known. Since the resistance to bending of beams *with the same relative dimensions* is proportional to their linear measurements, it follows that, with obelisks, there must be a limit to their possible length. Taking the sharpest known taper, this length is somewhere about 140 feet, though I doubt whether an obelisk of even that length could be erected unbroken, since granite is so rarely perfectly homogeneous.

The subject of the quarrying, transport and erection of obelisks is treated in detail in my volume *The Aswan Obelisk*, which is now in the press.

R. Engelbach.

[We may note here what would be the size of an obelisk 172 feet (or 100 cubits) long for it to carry its own weight. It would need to be about 36 feet square at the base, and 19 feet at the tip, and would weigh about 11,000 tons. It is evident that such a size and weight would be quite impossible ; there must, therefore, be some other explanation of the boasted size of 108 cubits.—F. P.]

THE RISE OF PRICES IN ROMAN EGYPT.

A valuable collection of material relating to the course of prices in the Ptolemaic and Roman period in Egypt has been issued by Dr. Angelo Segrè, under the title *Circolazione Monetaria e prezzi nel mondo antico ed in particolare in Egitto* (Roma, Libraria di Cultura, 1922). Such a study has a special interest now that Europe is suffering from precisely similar troubles of depreciation of currency, and consequent rush of prices upward. The Roman world did not suffer the worst modern effects of that immoral course, as there were no permanent State loans nor paper debentures. Loans between individuals were only for short periods, and could be called in and readjusted without much loss. There was nothing like the entire confiscation of all the loan capital of the saving classes, such as has lately smitten Europe in the East, and partially in the West. The effects of that in wiping out the saving class, and deterring from saving, in Austria and Germany—to say nothing of Russia—will be a fatal injury to the stability of those peoples for generations to come. It is far worse in effect than the War which preceded it. Every stage of this terrible process of destruction in the Roman Empire has its practical interest for us, who are watching a similar dissolution. The depreciation and race between wages and prices sent up nominal prices to 5,000 and at last to 500,000 of their true value ; in this crisis, labour ceased to be paid in cash, and payment was in corn ; at last everything went on to a fixed pure gold basis, the same course which is beginning to be accepted in Europe.

For the examination of the true value of nominal money there is no better basis than wheat in the ancient world. In modern times it is complicated by importation from entirely different economic States ; in the Roman world there was one general currency, and no wheat came from outside that. The production was under various conditions, and therefore was averaged ; there was little difference of quality, and no variation of demand. Labour varied much more in quality, while slaves, animals, oil and wine varied greatly. The standard quantity of corn in Egypt was the artaba, equal to 0·8 bushel. We may first note how closely the true value of debased money was understood ; the amount of silver was by no means obvious, yet it was known and the value reckoned accordingly. Taking a middle date for the main period, we find on the average that the price of the artaba was :—

B.C. 250	.. .. ..	2 drachmae	= 107 grains silver.
A.D. 100	.. .. ..	8 dr. alloyed	= 69
200	.. .. ..	16 ,, ,,	63
600	.. .. ..	1·4 (by gold)	70

The last is by gold value, taken as 14·4 × silver. This suggests that silver became rather scarcer, or more in demand for plate, between the early Ptolemaic and early Roman age ; otherwise the silver value of corn was remarkably stable over many centuries of great political change. Comparing 70 grains of silver per artaba with modern values, it would be 530 grains per quarter ; and on our usual price (before recent changes) of silver, 5*s.* per 480 grains, this would be 5*s.* 6*d.* a quarter, or about a tenth of the modern price of corn. Silver and gold therefore were about ten times more valuable than recently.

In looking at the prices of labour it is remarkable how uniform they remain when reduced to silver values. From 270 B.C., at 1 to 2 obols, the price slowly rises in relation to corn, and in corn values the rate is $1\frac{3}{3}$ obols, in 100 A.D. The payment in corn at 338 A.D. is equal to $1\frac{1}{5}$ obols, reckoned at the old rate of 2 drachmae of silver per artaba. In the seventh and eighth centuries the gold rate equals $1\frac{1}{5}$ obols. So for eleven centuries the real silver value of a day's work was about $1\frac{1}{2}$ obols. This seems very low; but as we saw with corn, that precious metals were worth about 10 times the present amount, it is now equal to $2\frac{1}{2}$ drachmae, or $\frac{1}{3}$ of an ounce of silver—in last century values 1*s.* 8*d.* As the wages in Egypt were 5*d.* a day, or up to 10*d.* or 1*s.* before the war, it seems that the ancient $1\frac{1}{2}$ obol had about double the purchasing power of even the higher modern wage in Egypt. Since the war the wage is about the ancient value, but prices are higher in proportion.

Wine followed a slightly different course, probably influenced by changes in the average of the quality recorded. It shows a slight fall from 300 to 100 B.C. and no distinct rise till about 150 A.D. At 300 the wine prices, like the corn, rushed upward. In the fourth century the gold values quoted are about those of the higher qualities of the Ptolemaic time. A very low price appears for soldiers' wine, which was probably little more than vinegar; and by 690 rather a high price, suggesting that wine was scarce.

The price of slaves is naturally very variable, from 55 to 570 drachmae real value, average 250. This in equal modern values would be £20 to £240, averaging £100. Under Philadelphos little girls from Syria sold at £20 to £60, in modern corn values.

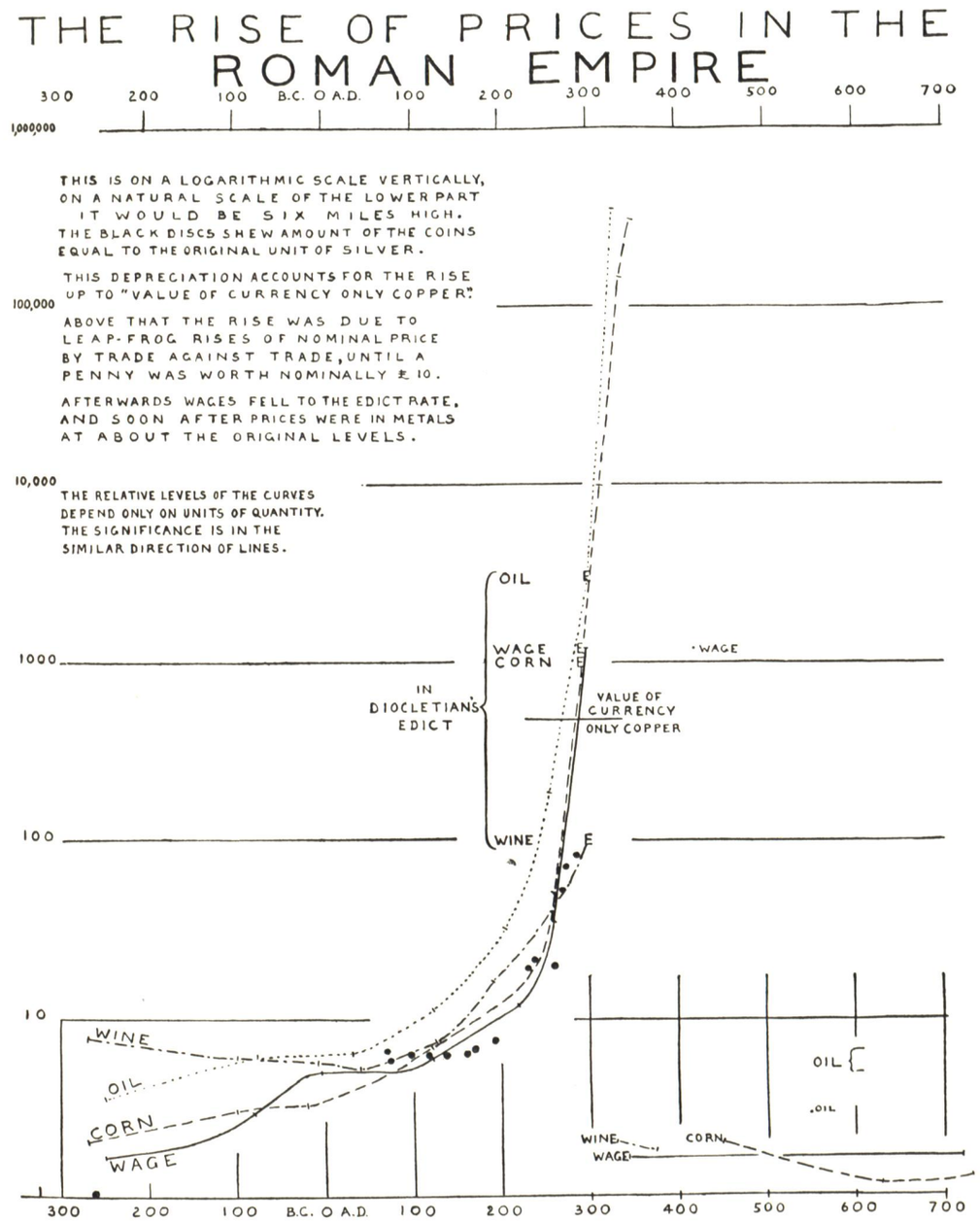
Among cattle, the ass was naturally of various quality, from 26 to 100 real drachmae of silver, average 53; or by corn values £7 to £28, average £15. This is about the modern price. Camels varied less in general, as might be expected, for there were no fancy prices; from 60 to 200 drachmae, with an average of 140; or in modern corn values £17 to £56, average £39. For a horse the common price was 40 to 50 drachmae, but a very fine black Cappadocian was 1,100; in modern corn values £11 to £14, and £300 exceptional. The price of sheep was the same in Byzantine as in Ptolemaic time, about 8 drachmae, equivalent to £2. Hogs were about the same; but goats were only 1 or 2 drachmae. All of the modern equivalents of these animal prices are in corn values much the same as at the present time.

In order to be able to show the whole course of prices over such an immense variation, the only way is to draw it on a logarithmic scale, as on this diagram: if it were all in proportion to the bottom part it would need to be some miles long. As far as about the second century A.D. the lines of price were drawn from the mean lines of diagrams of all the data; beyond that, where the prices rise rapidly, the single data are spotted on this diagram and the lines drawn through them. The first and obvious result is that the celebrated Edict of prices under Diocletian in 301, marked here as E, was not unfair or arbitrary; it falls well into the line of actual values. The lines of wheat and wages keep close together through the E values. The oil and wine values of E may have been too low for the time, keeping to values of twenty years earlier, for the wage and wheat lines cannot have gone up vertically through all the E points. The E values are closely about the copper value of currency.

The real intention of the Edict is now explained. It was not a foolish attempt to stabilise prices by law; Diocletian was too able an organiser and economist to

do that. But coinage having come to mere copper, he tried to check the trade unions from making a nominal rise beyond copper values. The aim was to avoid artificial inflation by "money of account," and keep to real values of metal.

That this astounding rise of half a million, or a million, to 1 was not due



to proportionate scarcity is obvious, for in more disturbed and poorer ages the wheat and wage curves of 500–700 A.D. go back to the old silver values of the beginning. The slow decline in the late curve of wheat probably shows an exhaustion of gold, but wages seem level in that age. Wine was far cheaper,

probably because all the finer kinds were extinct and only the sour wine was left, which was previously at this level for soldiers' rations.

On looking at the coinage, there does not seem any sufficient cause for such a change of values. The alterations were not so much in weight as in the amount of silver in the billon. The worst that this change can make is to reduce a nominally silver coin to a 480th of its value, when it arrives at plain copper. The changes in weight were very slight. The silver denarius ends in the fourth century A.D. at just the same weight as it was B.C. The follis does not decrease, nor its half. The Byzantine coinage, numbered 40, 20, 10, 5, 2, fluctuates, but does not diminish ; and it seems, by the weights, as if the 10 of that scale was the denarius, which had already been reduced to mere copper.

The worst examples of reduction of weight are outside of the system of Rome or Constantinople. Tetricus had a barbaric coinage in Gaul or Britain, which ran the half Antoninianus of 40 grains down from 35 to 10 grains. The Egyptians struck blank spangles of copper, which copied the 20-grain Byzantine copper with only 1 or 2 grains of metal. Yet even such reductions could not make more than a reduction to a twentieth of the value by weight, and there is no evidence of such a change imperially.

We are faced, therefore, with changes of value of perhaps 1,000 to 1, by change of metal and weight, but these cannot possibly explain a change of a million to 1 in nominal values. The only explanation of such changes seems to lie in a race of prices against wages, such as we experienced just after the War. In trying to avoid the general loss each union of wage-earners insisted on more pay (increasing the loss of all producers) ; in turn, production demanded a higher price. We ran perhaps to double in this race, and then saw it was hopeless. The Roman world seems to have run ceaselessly on this line, until prices and wages were a thousand times their value. This shows the terrible bondage of the trade unions, in which all labour was frozen ; without a rigid despotism over a trade it would have been impossible to force an arbitrary rise of wage above the level of other trades, and still more to force it so that metallic currency became of fictitious value in name, though not in purchasing power.

How could the currency bear it ? It never affected gold values of goods ; the gold solidus was worth 16 silver drachms, or 7,680 copper drachms, but was reckoned during the mad rise of nominal prices at 600,000 drachms, or 100 talents, and rose even higher. Thus, so far as gold was concerned, the rise was purely in "money of account." In mediaeval times various European nations traded entirely in "money of account," all the coins that were current having their fractional values, just as I have handled a dozen different currencies of irregular values for payments in "money of account" in Egypt. There is nothing improbable, therefore, in the whole trade for a century or two going on in the Roman world by money of account, incessantly driven higher by wages, by prices, by increased rating of the currency, on a fictitious basis. As a collateral matter, the dissolution of the third century must have closed a large amount of trade ; there was therefore an excess of small currency floating, and it tended to depreciate. This, however, was only a predisposing cause which started the system, as, in the finds of silver and billon coins buried later than Gallienus, there are very few coins before his time. There was an immense amount of burying of money during his reign, nearly half the groups that are found ending during his reign, and about a third of the groups start with the currency of his reign. Obviously all the old money of higher standard was either buried or melted up—one of the clearest cases of bad money driving out good.

Regarding the work of Segrè here noticed, it is a pity that so valuable a collection of material should have no list of the works quoted, nor any explanation of the abbreviations used for references. The students of papyri, such as Reil in his study of trades, forget that their sources and references are peculiar to their subject. There are also some arithmetical slips on p. 145 which suggest that a slide rule would be of value to the author. I have to thank Mr. Grafton Milne for many references, and the weights of his large collection of the Alexandrian mint, which he has most kindly supplied.

W. M. Flinders Petrie.

[There has been a difficulty about the price of hiring slaves in the xviiith dynasty papyri (*Z.A.*, xliii, 31). The prices are expressed in rings, of which 12 were equal to 1 *deben*. This shows that the rings were a rather light shekel weight, $12 \times 125 = 1{,}500$ grains. All other values would be impossibly low if the day's wage was taken at literally a single day. It cannot mean so many days in a week over a long period, as 17 days is named ; but it might mean the hire of so many days' service in every month during a year. The result would be that a nominal day (= 12) was fixed at 2 shekels, so a single day would be $\frac{1}{6}$th shekel, or just the 2 obols that it was in Ptolemaic silver. As certainly copper was far commoner in the xviiith dynasty than silver was under the Ptolemies, the rings cannot have been of copper. On this basis the other prices work out at : goat, 1 drachma ; cow, 12 ; bull, 16 ; female slave, 24 drachmae ; land at 4 drachmae an "acre" must be the hire for one cropping. Such prices are about half, or rather less than the Ptolemaic prices, but that would not be improbable.—W. M. F. P.]

DUALISM IN AFRICAN RELIGIONS.

It is possible to consult many works on comparative religion without being able to gain any ideas on African religions that are at once true and clear. Comparatively few works have appeared in which religious ideas, and more especially West African religious ideas, have received adequate notice. For the ordinary man African religion is characterized by the term "fetishism," one of the most indefinite and most ill-used expressions that it is possible to imagine. Properly speaking, fetishism is the doctrine of spirits embodied in material objects, and nothing corresponding to the popular idea of fetishism can be discovered in West Africa.

Owing perhaps to the dominance of this false notion of fetishism, African religions are often conceived of as homogeneous, though in point of fact there is as great diversity there as in other parts of the world. Mistaken etymologies have also been a source of misunderstanding, and for many years there has been current a myth that the word Tsui-goab, the name of the Hottentot god, means "Wounded Knee."

A year or two ago Dr. Struck unearthed an account of the Hottentots in a work published in 1700, de la Loubère's *Description du Royaume de Sham*, which had apparently been completely overlooked by bibliographers and descriptive writers alike. In this work are eight pages devoted to the "Hotantots," whose name appears to be derived from a word which they repeated in their dances. Regarding their religion, de la Loubère says: "I was told at first that they had no religion; but I learnt later that, though they have neither priests nor temple, they do not fail at new and full moon to celebrate public festivals which represent their religious rites. I suspect that they are to some extent tinged with Manichaeism, for they recognize good and evil principles, whom they call 'captain of the height' and 'captain of the deep.' The former, they say, is so good that there is no need to pray to him; it is enough to let him go his own way, as he does nothing but good. But the 'captain of the deep' is malevolent, and they have to pray to him to prevent him from causing mischief. That is what they say, but to all appearances they do not pray much."

Our principal authority for the Cape of Good Hope in the early eighteenth century is now recognized to be Peter Kolbe, and the above-cited account is in agreement with what he says. We may therefore assume that this dualism, which was rejected by Ratzel as a European misinterpretation, actually corresponds to the facts, the more so as in our own day Schultze has reported of the Nama of the Kalahari that they recognize a good (black) and an evil (red) god, precisely as do the Hamitic Masai and Nandi, north of the Equator. No reader of A. C. Hollis's accounts of the latter two tribes will be tempted to interpret his data as to dualism, as the result of European misinterpretation. We may therefore accept as accurate the older accounts of Hottentot religion.

Kolbe speaks of two gods—Touquo (perhaps a miswritten Tsui-goab), the evil god, and Gounia, the moon, the good god who gives honey, cattle and milk. There is little doubt but that they are identical with the pair mentioned by de la Loubère.

The Hottentots are completely isolated in South Africa, and there is some controversy as to their linguistic position. Meinhof has assigned them to the Hamitic family, and this near agreement in matters of religion adds force to the argument from language.

Passing over the facts as to the Masai and Nandi, who are Hamites, not negroes, I turn to the area of the Lower Niger, a centre of the reincarnation creed, which I have, for other reasons, brought into relation with the Egyptian belief in the *ka* (*Jl. Eg. Arch.*, 1920, VI, 265–273). The Edo of Benin City believe that each man has two *ehi* (geniuses or doubles), one good, the other bad; and precisely the same belief is found among the Ewe of Togoland, intimately related in language to the Edo, under whose domination they stood in the seventeenth century, as we learn from Romer. On the other side of the Edo are the Ibo, and in their reincarnation beliefs also we find the same dualism; in the Asaba area each man is believed to have two *eri*, one good, the other bad. We know less of the beliefs of the Yoruba, who lie immediately to the west of the Edo; it is therefore uncertain whether this feature reappears in their creed.

These facts would have perhaps little bearing upon dualism in religion were it not that among the Edo the dualism repeats itself in their dogmatic theology, so to speak. Their supreme god is Osa, probably a sky god; the Edo proper, though not, so far as I recall, the surrounding tribes of the same stock, have duplicated Osa. They believe in Osalowa, Osa of the house, and Osaloha, Osa of the bush; the latter is regarded as malevolent. Their names correspond to these given to the *ehi* and *eri*.

The Ewe creed is different, but there are points in it which lead to the conclusion that their beliefs have undergone great changes in a not very remote past; they have now a regular pantheon, by no means a characteristic of negro religion.

The Yoruba creed is in this feature similar, though the details differ. For this tribe we have really only one fundamental text, the account published in 1884 by Baudin, which Ellis issued again in his *Yoruba-speaking People* ten years later without a hint that it had appeared in print before. The Yoruba believe in a mischievous being, Esu, whom they have handed on to the Edo, their neighbours on the east. We have no account of the cult of Esu for the Yoruba, but in Benin I found that he had a priest and received sacrifices, though his ritual differed from that customary in the cult of other deities. The Ibo again offer sacrifice to Ago, a mischievous sprite of the same order.

So far, nothing has been said of the peoples of the Gold Coast, who share with the tribes already mentioned the reincarnation creed but do not, so far as we know, hold the view that the genius is double, both good and bad. Dualism is, however, found in their theology, for Sasabonsum, a deity of a red colour, is everywhere propitiated. It is a singular circumstance that the opposition between red god and black is repeated here.

For the rest of West Africa, partly, it may be, owing to our profound ignorance of the beliefs of many tribes, there is no evidence of dualism save among the Igara and the Kerikeri. The former, who are in language closely related to the Yoruba, worship a good god, Ojuosi, and an evil god, Opoku, according to Temple's *Notes on the Native Tribes*. The same work tells us that the gods of the Kerikeri are Dege (good) and Fifila (bad). It can be asserted with some definiteness that the Temne of Sierra Leone, though their creed included good and bad *krifi* or spirits, had no real dualistic element in their religion.

It has been pointed out already that in East and South Africa the creed of dualism (if we except some of the Nyasaland Bantu) is limited to tribes of Hamitic speech. It is, in this connection, by no means negligible that Yoruba (one of the dualistic tribes of the west) is also one that would be mentioned in any account of Hamitic influence as manifested in language.

It must, however, be admitted that the Yoruba, like the Ibo, have but a very attenuated dualism, so far as dogmatic theology goes. But if dualism is foreign to the negro mind, this is precisely what we should expect ; alien influences are assimilated or modified according to whether they find an echo in the native breed or not. Were it not for the dualistic features in the reincarnation beliefs it would perhaps be hardly worth while considering this side of negro religion at all.

When, however, we find dualism in a well-developed form in a creed which has, at least in part, a foreign element in it, it is worth while to put the question whether the situation is not best explained by supposing that the dualistic features in the reincarnation creed are not a reflection of a feature which came to them originally as a part of a religious creed, and did in fact obtain some small hold in native religion, but flourished unchecked in another field to which it was transplanted—that of human psychology.

It can hardly be accidental that dualism in religion is seen at its fullest development in Benin, where the type of house is wholly alien and absolutely unsuited to climatic conditions, though it does not follow that house form and creed were transmitted from the same area and in the same manner.

In putting together these few considerations I do not mean to commit myself to any theory of Egyptian origins ; but I wish to present the facts as one of the problems of African religion which, if they are not due to an internal development to which we should expect to find many parallels among other tribes, can best be accounted for by some influence from the Mediterranean area. It is easier to label elements of material culture with their date and country of origin ; but if we admit transmission in the one case we cannot well refuse to do so in the other, even though the identification of sources may prove difficult or impossible.

NORTHCOTE W. THOMAS.

[A possible relation in Lower Nigeria with the great dualism of Horus and Set in Egypt may be noticed in Eṛi the good and Esu the evil deity, at Asaba on the Niger, and Yoruba adjoining on the west.—F.P.]

ANCIENT EGYPTIAN MATHEMATICS.

CONSIDERING the fact that most of the mathematical learning of ancient times can be traced back to Egypt, it is certainly surprising that we have recovered so little in the way of papyri or other records dealing with the mathematics of Ancient Egypt.

With the exception of the so-called Rhind Papyrus and a few isolated examples of accounts and temple gifts, we have very little to work upon.

Apart from the Egyptian records, the earliest mathematical knowledge dates back to Thales, who in 600 B.C. himself visited Egypt. He wrote on eclipses, the heights of pyramids determined by the lengths of their shadows, the angles in a semicircle and similar problems.

Pythagoras studied in Egypt in the sixth century B.C. Plato spent 13 years at the University of On—Heliopolis—about 400 B.C., and two centuries later Euclid made a name for himself as professor at Alexandria.

The study of mathematics arose out of necessity. Arithmetic was essential for housekeeping, business and government. The need for geometry was of particular importance in a country such as Egypt, where boundaries of property were liable to be obliterated by a fluctuating river. It was essential to have some means of preserving the boundaries of fields and of re-measuring the land which the waters had altered. Herodotus (II, 109) tells us that geometry originated in this way. Diodorus also refers to the fact (I, 81).

The Rhind Mathematical Papyrus and the few other rather scrappy records are but isolated pieces of mathematical work.

The papyrus was copied about 1700 B.C. from an earlier work, dating back, perhaps, to 2000 B.C. It appears to be a handbook on the use of fractions for the agriculturalist, and gives tables and worked-out examples showing how to deal with problems such as the scribes of estates would meet with in their daily duties—the division of a number of loaves among a gang of men, the amount of grain required to fill a granary, and so on.

The first part deals with arithmetic and the use of fractions. Then follows the solution of certain equations, problems on division in unequal shares, and on volumes of granaries. The geometrical section concerns the areas of fields of various shapes. Then come the pyramid calculations and a number of problems of a practical nature.

From this work and the other meagre records we can glean some information as to the mathematical notions of the Egyptians.

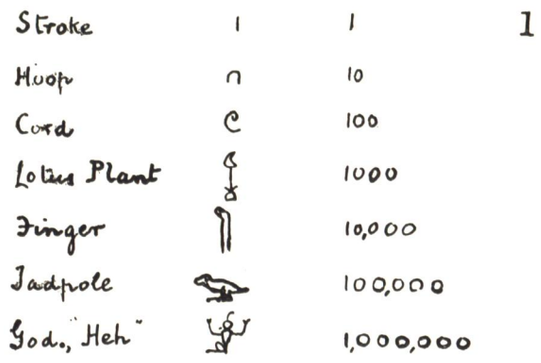
From the first dynasty onwards, a decimal system of numeration was in use involving high numbers running into millions. There was a separate sign for unity and each multiple of ten up to a million. (See Fig. 1.)

Multiplication was effected by successive doublings, thus :—

" Calculate 9 to 6 times.

	·	9
*	··	18
*	4	36
	6	54 together."

Here the scribe had to multiply 9 by 6. On the left, he indicated by dots or figures the multiple of 9, written down ·. As the work proceeded he watched these numbers and, ticking those which totalled 6, completed the addition on the right.[1]



1,234567 was written thus :-

Each such sum, therefore, involved writing out part of the multiplication table. The Egyptian never seems to have tumbled to the fact that his work would have been simplified by tabulating the multiples or learning them by heart as we do.

Division was treated as a form of multiplication in the following way :—

" Multiply 7 to find 77.

*	·	7
*	··	14
	4	28
*	8	56
	11	together."

In this case, in dividing 77 by 7, the successive doublings bring the scribe to the number 56 : he then sees that 7, 14 and 56 add up to 77. Ticking 1, 2 and 8, he adds them to obtain the result, 11.

[1] In these examples, the ticks of the scribe are replaced by asterisks.

The fractional system was complicated since (with one exception considered later) only fractions with unity in the numerator were used in the working out of examples, thus :—

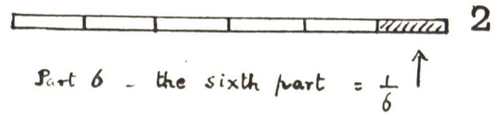
" Multiply 8 to find 19.

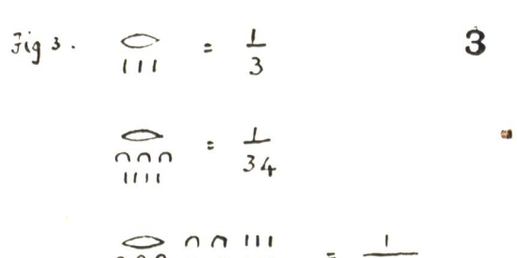
	·	8
*	..	16
*	$\frac{1}{4}$	2
*	$\frac{1}{8}$	1
	together	2 $\frac{1}{4}$ $\frac{1}{8}$."

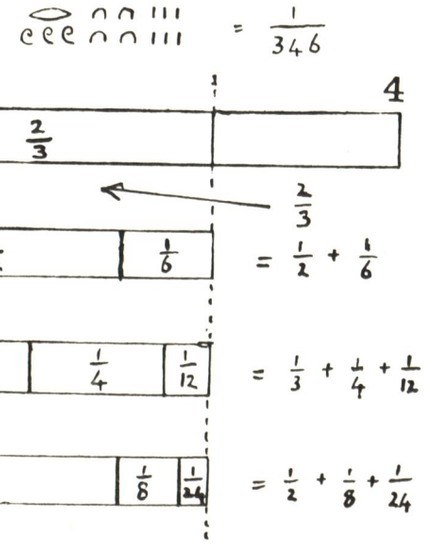
Here the fractions $\frac{1}{4}$ $\frac{1}{8}$ are not added by reduction to a common denominator, but are written alongside the integral part of the result as shown.[1]

The fraction of smallest value occurring in the Rhind Papyrus is $\frac{1}{5432}$.

The Egyptian appears to have conceived of the fraction as the last part of the divided whole, thus :—$\frac{1}{6}$ was " the sixth part," " part 4," namely, the last and shaded portion of the diagram, Fig. 2. He could not work with " mixed fractions " such as $\frac{7}{15}$ or $\frac{3}{11}$. These conveyed no meaning to him.







The exception mentioned above is $\frac{2}{3}$, which plays a large part in the mathematical work. The Egyptian could write down $\frac{2}{3}$ of any quantity without calculation. He may have had tables, but none have yet been discovered.

[1] In the following, when fractions are thus placed together, they are to be added.

Fractions were expressed by writing the symbols for the denominator under the consonantal sign "r," originally "the mouth," which came to have the meaning of "part." (See Fig. 3.)

As mentioned already (with the exception of $\frac{2}{3}$), the Egyptian could not deal with such fractions as $\frac{7}{8}$. He realized it was seven times $\frac{1}{8}$, but he preferred to express it as $\frac{1}{2}\ \frac{1}{4}\ \frac{1}{8}$. This brings us to a very important fact—that any fraction can be expressed as the sum of two or more fractions. This may be done in many different ways, *e.g.* :—

$$\begin{aligned}\tfrac{2}{3} &= \tfrac{1}{2} + \tfrac{1}{6}\\ &= \tfrac{1}{3} + \tfrac{1}{4} + \tfrac{1}{12}\\ &= \tfrac{1}{2} + \tfrac{1}{8} + \tfrac{1}{24} \text{ and so on.}\end{aligned}$$

This is illustrated graphically in Fig. 4.

The Egyptians knew of this and made great use of such "root-fractions." Tables of them have been found, and they existed down to Coptic times. Hero, the Greek mathematician, made use of them in the same way as the Egyptians.

A table in the papyrus gives the result of dividing 2 by odd numbers from 3 to 99, *e.g.* :—

$$\tfrac{2}{29} = \tfrac{1}{24} + \tfrac{1}{58} + \tfrac{1}{174} + \tfrac{1}{232}.$$

This fractional system held the Egyptian fast in its grip from the earliest period. There are, however, some indications that "mixed fractions" were dimly understood in a limited fashion, but even when their use had become common among the Greeks, the ordinary folk still held to the cumbrous methods illustrated above.

A little consideration will make it clear how these very cumbrous methods originated and were necessary in practical problems of division of food and other commodities.

Suppose that five loaves are to be divided equally among six people. The primitive method is as follows :—

(*a*) Divide each in half. Give half a loaf to each person. Two loaves remain.

(*b*) Divide these two loaves in quarters. Give one quarter to each person. Two quarters remain over.

(*c*) Divide each of these quarters in thirds. There are six parts, one for each person.

Thus each person has received $\frac{1}{2} + \frac{1}{4} + \frac{1}{12}$ of a loaf.[1] In Fig. 5 this is illustrated graphically and the shares of each of the six persons are numbered correspondingly.

The following is one of several examples from our Papyrus, and deals with the division of nine loaves among ten persons :—

"The making of nine loaves for ten persons. Do thou count it $\frac{2}{3}$, $\frac{1}{5}$, $\frac{1}{30}$, ten times."

Here the answer is given : the share of each is $\frac{2}{3}$, $\frac{1}{5}$, $\frac{1}{30}$—and the proof is set out as follows :—

"(*a*)			$\frac{2}{3}$	$\frac{1}{5}$	$\frac{1}{30}$
(*b*)	*	..	$1\frac{2}{3}$	$\frac{1}{10}$	$\frac{1}{30}$
(*c*)	*	4·	$3\frac{1}{2}$	$\frac{1}{10}$	
(*d*)	*	8	$7\frac{1}{5}$		
(*e*)	Together 9 loaves."				

[1] Professor Petrie points out that the proceeds of sale values are divided among crews of Scotch fishing boats, in precisely the same manner.

Line (*a*) is first multiplied by 2,

$$1\tfrac{1}{3}\quad \tfrac{2}{5}\quad \tfrac{1}{15}$$

but $\frac{2}{5} = \frac{1}{3} + \frac{1}{15}$ and $\frac{2}{15} = \frac{1}{10} + \frac{1}{30}$;

thus we get line (*b*), which is multiplied by 2,

$$3\tfrac{1}{3}\quad \tfrac{1}{5}\quad \tfrac{1}{15}$$

but $\frac{1}{3} + \frac{1}{15} = \frac{2}{5}$ and $\frac{3}{5} = \frac{1}{2} + \frac{1}{10}$;

thus we have line (*c*), which is multiplied by 2, giving (*d*). Adding lines (*b*) and (*d*) we have

$$1\tfrac{2}{3} + \tfrac{1}{10} + \tfrac{1}{30} + 7 + \tfrac{1}{5} = 9 \text{ loaves.}$$

Other examples provide for double allowances of food for the chief officials.

The only example of a common rule deals with the multiplication of fractions :—

"Making of $\frac{2}{3}$ of a fraction, according as it is said to thee, what is $\frac{2}{3} \times \frac{1}{5}$. Make thou its double, its six times, that is its $\frac{2}{3}$."

Evidently the denominators, not the fractions, must be multiplied, thus :—

$$\tfrac{2}{3} \times \tfrac{1}{5} = \frac{1}{2\cdot 5} + \frac{1}{6\cdot 5} = \tfrac{1}{10} + \tfrac{1}{30}$$

The reason is obvious, since $\frac{2}{3} = \frac{1}{2} + \frac{1}{6}$.

The solution of simple equations of the form $y + \frac{y}{7} = 19$ was effected by the use of root-fractions, in the following way :—

To 7 is added its $\frac{1}{7}$ part. The result is 8. 19 is then divided by 8 (in Egyptian fashion), and the quotient $2\ \frac{1}{4}\ \frac{1}{8}$ is multiplied by 7 to obtain the answer $16\ \frac{1}{2}\ \frac{1}{8}$. The steps of the process correspond exactly to the modern solution :—

$$\begin{aligned}\frac{8}{7}y &= 19\\ y &= \frac{19}{8} \times 7\\ &= 16\tfrac{5}{8}.\end{aligned}$$

In some problems we get a glimpse of higher knowledge such as Arithmetical or Geometrical Progression. The following is an example :—

"Divide 100 loaves among five persons, $\frac{1}{7}$ of the shares of the first three being equal to the shares of the rest."

The "working out" shows that it is assumed that the shares are assumed to be in Arithmetical Progression.

"Proceed as follows. The difference is $5\frac{1}{2}$."

Then taking the share of the last person as unity, the scribe writes down the other shares. Finding that the sum is 60, he proceeds to increase each amount by $\frac{2}{3}$ and checks the results by adding to 100.

The question arises, how did he obtain the "common difference $5\frac{1}{2}$," which would in these days be found thus :—

With the usual notation,

$$(4d + a) + (3d + a) + (2d + a) = 7\,(d + a + a)$$

whence $d = 5\frac{1}{2}a$.

Either tables were referred to, or use was made of a formula similar to the modern one.

Other examples of Arithmetical Progression occur in the papyrus.

In the Moscow Papyrus there is an example of a problem on the Volume of a Truncated Pyramid. This is of particular interest as it indicates a direct application of the modern formula :—

$$\text{Volume} = \frac{\text{height}}{3} \times (\text{sum of areas of top and base} + \sqrt{\text{product of areas}}).$$

The top and base are squares and the last term is obtained directly by multiplying the sides of top and base together.

This problem is not to be found in Euclid.

The Geometrical Section of the Rhind Papyrus is full of gross errors, due probably to the copyists, who often did not in the least understand what they were writing about.

However, it is clear that the Egyptians knew that the area of a rectangular field was to be obtained by multiplying the length by the breadth. In the case of the triangular field an error was introduced by taking the length of a slant side for what we now term the " perpendicular height."

An extremely interesting example is the earliest known attempt to " square the circle." A rough diagram shows a circle—which is evidently meant to be a circle of equal area. Inside is marked the diameter.

The working indicates that the area of the circle is $\frac{64}{81} \times (\text{diameter})^2$, and the following empirical rule was in use :—

" Subtract $\frac{1}{9}$ from the diameter and square the result."

This gives a value for π (ratio of circumference to diameter) of $3 \cdot 1605 \ldots$.

The Pyramid calculations indicate how the measurements of the pyramid slopes were reckoned. The quantity called the " *seqed* " gave a measure of the slope of the pyramid-face away from the vertical, and was equal to the number of spans displacement per cubit of height. A cubit was equal to 7 spans.

Thus in the case of a 4 : 3 pyramid (Fig. 6),

$$\text{the } \textit{seqed} = \frac{21 \text{ spans}}{4 \text{ cubits}}$$
$$= 5\tfrac{1}{4}.$$

There are indications, too, that the Egyptians knew that if the sides of a triangle are proportional to 3, 4 and 5 (or to 20, 21 and 29) the triangle is right-angled.

One instance of Geometrical Progression occurs. The powers of 7 are set down in order up to the fifth power, and the sum is obtained by multiplication. A second calculation, however, starts with the number 2801, which is then multiplied by 2 and 4 in succession in Egyptian fashion to obtain 7×2801. This gives the same result as before.

With the usual notation,

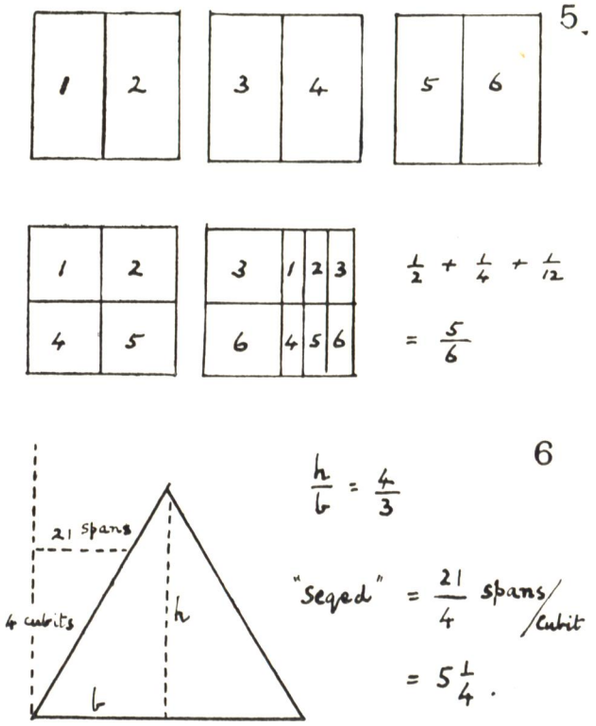
$$s = \frac{1r - a}{r - a} = \frac{a(1 - 1)}{a - 1}, \text{ when } r = a \text{ as in this case,}$$
$$= 7 \times \frac{16806}{6} = 7 \times 2801.$$

Now by some means or other the Egyptian knew how to obtain the number 2801 in order to check his result.

It is necessary to emphasize again the fact that our knowledge is derived from isolated mathematical fragments. Of the really great mathematical minds

among the ancient Egyptians we know nothing. Yet there must have been some who, like their Greek successors, studied the subject for its own sake and whose work gave so great an impetus to learning.

Speaking generally, the Egyptian appears to have regarded the subject from a strictly utilitarian standpoint in order to meet the needs of his everyday life.



It is, however, not too much to hope that more complete papyri in the nature of mathematical textbooks may yet be discovered. Such works must have existed and Pythagoras alludes to them.

R. W. Sloley.

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Borchardt, *Zeitschrift der Aegypt. Sprache*, Vol. xxxi, p. 9.
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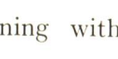
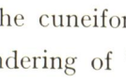
PERIODICALS.

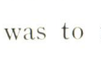
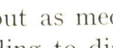
Recueil de Travaux, XXXVIII, 3, 4.

MASPERO, C.—*Introduction à l'étude de la Phonétique Égyptienne* (resumed from 1917, p. 83, of this Journal). This deals first with the Greek equivalents of . It is represented by A in a large number of words, as Amenti, Amen and its compounds, *anok*, Anup, Alexandros, Arsinoe and others. It appears as E in a few words; as H in others; as I in *iri*, Inaros, Imuthis, Isis; as O or U in Osiris, Onuris and On. In the xviiith dynasty is initial A as Amen, Assur, Arvad, Akhsaf, Apki; also as medial A in Amen Appa. The passage into O later is seen in Arunta (Syrian), becoming Orontes (Gr.); like the change in English of All into ôl as pronounced.

 in the xixth dynasty changes with  . Many words in Pyramid Texts beginning with  begin with or with  in later times. There is no example of initial  in cuneiform renderings; in Greek it is regularly A. In medial positions it is always A, and does not change with . It sometimes passes in Greek and Coptic into ε, η, ι, ου, ο, ω. In Greek names medial  is α, ε, η, ο. The transfer to U is seen in  KASHA = KUSHU, Assyrian. It passes into **o** in Coptic.

 in early times changes with  ; and this double vowel for the guttural is like writing Aali for Ali. In Coptic it is rendered by every one of the vowels. In Greek it is A, rarely E or O. In Semitic it is U or A (Assyrian). In Hebrew it is *'ayin*. The cuneiform always has A for terminal place, as in *riya* for  . The rendering of *'ayin* into Egyptian is or  usually in the xviiith dynasty, but also  as in Singara and Gaza (*Khazatu*, Assyr.), and as in Anab and in Anath, in which it varies between *'ayin* and *aleph* in the Phoenician.

The few instances of Semitic names in the xiith dynasty give as *aleph* in Absha (initial) and 'Amu-ansha (final). The conclusion is that it had the value A originally; and as the Latin A has become every other vowel in different

words in French, and in English A has quite different values in father, man, what, all, leopard, name, so the original A passed into every other vowel by Coptic times, though it is more usually A than any other vowel. The proved change of A into O and U in proper names between the xviiith dynasty and Greek times confirms this. The group  was to represent *'ayin*, like writing Aali for Ali.  was , modifying it like English *ee* in *see, need, eel*. As initial it was partly a diphthong, but as medial and final it was usually a vowel, varying between E and I according to dialects.

This is the last paper that Maspero wrote, and there are not even notes to show what else he intended; but it is of great value as a practical study of facts irrespective of theories. In face of these facts Akhenaten has now been spelt with E, I and O initial in Germany. The search for vocalisation is a vain quest for a permanent transliteration, and such is imperatively needed for Egyptian.

DARESSY, G.—*Un second exemplaire du décret de l'an XXIII de Ptolémée Épiphane*. The first example of this decree was published in *Rec.*, xxxiii, p. 1. The present example, found at Asfun, is in sandstone much worn away, and scarcely supplements the gaps in the previous copy. The name of the father of the canephoros of Arsinoe is corrected to Persomedos.

CHASSINAT, E.—*A propos d'un passage de la stèle No.* 8438 *du Musée de Berlin*. This stele records a building in Pharbaethos, of the 51st year of Psemthek I, by Paderpos, son of Padasmataui. The sense of the text has been disputed, and here it is proposed to read it, "I built the house (or temple) of Qed-nezes of the temple of Hermerti Osiris in Remehet"; the word Qed-nezes being looked on as an epithet of Horus, like Qed-hou, "constructor of the body" of Osiris, which again is like Khnum the modeller.

DÉVAUD, É.—*Un signe hiératique peu connu*. This is two parallel slanting strokes: these appear to be used for a duplication of the single-stroke sign of abbreviation, and may replace the eyebrows, jaws, uraei, lion heads, feathers, wings and other signs.

DÉVAUD, E.—*Le Conte du Naufrage*. A discussion of grammatical details of expression, which do not materially affect the sense.

CHASSINAT, E.—*Gaston Maspero*. This is a full picture of the activities of the great French master, by a devoted pupil who writes with a warm feeling of his sympathy and helpfulness.

Tome XXXIX.

NAVILLE, E.—*L'Auxiliare*  . This is similar to English *do*, as beside being a simple infinitive it comes in such phrases as "do send me this book," or "the watching which I have to do." [Note also the English parallel "Where are you *making* for?"] It has no form of past, present or future, which are all expressed by particles and auxiliaries. After a detailed discussion of many passages it is concluded that the auxiliary expresses mainly the relation of time, as "when," the time in which an event happened or a matter was done.

JÉQUIER, G.—*Moulins funéraires.* The placing of corn-grinder stones in graves is here said to be frequent in prehistoric times; but the references given are to a kitchen-midden of De Morgan, to xiiith dynasty pan-graves at Diospolis and one stone at Mahasna, apparently the only instance, as another stone there is merely a rough fragment. The millstones with servants grinding, in the ivth–xith dynasties, are not model stones for the dead to use. So it seems doubtful if there is a real prototype of the figures of the high priest of Memphis grinding corn before Ptah, except as a servant of Ptah. The two alabaster blocks with lion figures at the side, found at Memphis, called "libation tables" (Cairo, 63–64), are claimed as representing corn-grinder blocks. [Since this paper, similar blocks with lion figures were found, of the xixth dynasty, in a tomb at Sedment.] Another sloping block resting on two crouched lions is of the vth dynasty from Abusir.

Origine de la coiffure Nemes.—This paper agrees with Dr. Capart's view that the *nemes* is the cloth covering the wig.

Quelques passages de Sinouhit.—Some passages are here discussed, and the words *ua* and *mest-pet* are identified as the anthropoid coffin and the sarcophagus. The *kherp* sceptre had various other names, as *obă*, *hu*, *ăăt* and *sekhem*.

DÉVAUD, E.—*Deux mots mal lus.* One hieratic sign is used for two words, "baker" and a mineral, and has been supposed to be the nose, *khenti*. Here the evidence is given for the first sense "baker" to be the known word *retehti*; and the second *seti* for the mineral, which was used as paint, and has been guessed to be green, red, yellow and clay by different translators. It was imported from Nubia and in jars, so M. Dévaud would render it "Nubian earth"; and he adheres to the view that the  sign is a bow.

SPELEERS, LOUIS.—*Un papyrus funéraire de basse époque.* This is a charm on a papyrus 8 by 7 inches, with one line on the back, visible when it is rolled up. It is one of the type of "writing that my name may flourish," or "endure" as is here proposed. The text consists of some ideas from common sources, developed according to the taste of the time. It reads: "Words spoken by ——— true voiced, born of Asgertet, true voiced, 'I am Ra at his rising, I am Atmu (at his setting), I am Osiris Khentamentet, the great god, lord of the East [read rather *Abdu*, Abydos]. Grant me your attention O! guardians of the Duat, open to me (the gates of heaven and earth). Receive this good ——— O! guardians of the hall of the two Maots who guard the (bull of the Duat). O! Anubis in Ut, I am one of the guardians who watch for Osiris. Take pure water of Osiris, fresh water for thee, water from Elephantine, milk from Athribis . . . one brings to thee a jar full of drink offering. Receive fresh water of the temple of Ra . . . of Mehen. May thy *ba* go forth to follow the God. He will not reject thee from heaven or from earth . . . thou sittest as a prince unto the end. Thou art great; thou shalt appear at Busiris, established is thy dwelling. . . . To thee (are given) the rays of the Sun, the pure flow of the jar of drink offering . . . in the midst of Dendera, thy flesh rejoiceth, thou art united to . . . thou art before the East. Receive for thee water from the altar of Thesduat at Heliopolis. (I am) the breath of Amen, and the water of the Nile. I am thus eternally.'" On the outside is written, "An effectual phylactery. May it remain on thy bones and rest on thy flesh, without being destroyed."

BLACKMAN, A. W.—*Sacramental ideas and usages in ancient Egypt.* At Heliopolis Ra was regarded as being purified by water before the sun rose, and the high-priest performed the washing of the image of Ra daily. The high-priest in prehistoric time "was of course the King of Heliopolis." Therefore the king had to be purified daily by priests acting as Horus and Thoth, otherwise Horus and Set. The pool from which the water was taken was identified with Nun, the primaeval ocean, from which the sun-god was born. [This suggests that the worship arose on the coast, where the sun was seen to rise over the Red Sea.] After that the king was purified by incense and natron mouth-wash. He was then robed and bore insignia. The same course of ceremony was applied to the Ra image. At the king's death the body was to be similarly prepared for its admission to the company of Ra.

In the Osiris system the dead god was likewise washed, and this revivified the corpse, which was otherwise stated to be revived by eating the eye of Horus. [But the passage of the Pyramid Texts quoted to show the washing, never mentions it, but is concerned with purification by disincarnation: "Unite to thee thy bones, take to thee thy head," after the skeleton had been dissevered and stripped. The different modes of purification must be carefully distinguished. Again in the xixth dynasty the same idea remained: "May Anubis attach for thee thy head to thy bones. Mayest thou be purified . . . in the presence of Horus and Set." Such passages should not be misquoted as referring to washing a corpse.]

Various examples are then illustrated of the lustration of a deceased person, figured in tombs. As these actors are funerary officials, and not gods, it implies that this indicates the actual purifying of the body, and not a moral purification by deities. This purification as applied to the dead Osiris is linked with the inundation covering the fertile land, which is the same as Osiris, as the god from whom vegetation springs up. Various other connections of ideas naturally arose, as that the water was from the pure caverns of the Nile, that it represented the vital fluid of Osiris, or that it was from the Pools of Life; the Egyptian was capable of interminable permutation of ideas. The use of solar formulae in Osirian ceremony may suggest that the lustration is first solar; but the priority of Ra or Osiris is a very complex subject, probably to be solved by their both being immemorial gods of different races coming from east and west.

CHASSINAT, E.—*Un type d'étalon monétaire sous l'ancien empire.* This deals with the well-known sale of a house in the ivth dynasty, published by M. Sottas. The house is valued at 10  , and was paid for by three pieces of goods valued at the same amount. This *shot* had been taken as a measure of cakes, from the usual word *shout*, cake. But examples are here quoted from the xviiith dynasty of values in  , which is assumed to be the same unit, and translated "ring" *shot*; and in one case 16 *shot* + 1 *deben* totals as 2 *deben* 4 ? *shot*, implying that 12 *shot* was equal to a *deben*. In any case, it was a standard of value. Here the subject is left: but we may ask why is this standard of 1/12th of a *deben* ? The *qedet* was well known as 1/10th of a *deben*, and therefore this is not likely to be another name for 1/10th. It looks like the leaf-shaped arrow-head, but that was unknown in metal in the ivth dynasty, and only approached in the xith; and it is too heavy for a flint arrow-head, nor could that be made of regular weight. The 1/12th of a very heavy *deben* would be a light value for the Babylonian shekel (152 ÷ 12 = 12·7).

The phrase *em uzeb* is rendered by " in exchange " or " replacement," which would be a general term for barter, agreeing with *uzeb*, " to turn round." It was certainly usual in later times to state values of all kinds of goods in weights of copper, just as the Romans did before silver coin became usual. A list in the papyrus Mallet is quoted, also the supply of 50 *deben* of copper for the house-keeping at the Ramesseum, and we may add the list of values in the tomb robberies under Ramessu X, all stating weights of copper.

CHASSINAT, E.—*Sur quelques passages du* De Iside et Osiride *de Plutarque.* The statement that Horus was born " feeble in his legs " is traced to the form of the hieroglyph in the name  . The fish, as an emblem of hatred, is the fish *betu*, and *betu*, to execrate or hate, has the fish determinative. The accusation by Set against the legitimacy of Horus is confirmed by passages where Isis states his posthumous conception. The story that Isis allowed Set to escape, Horus in wrath tore her royal head-dress off and Thoth replaced it by a bull's head, is found at length in the Sallier papyrus IV. The mutilation of Set by Horus, stated to be represented at Koptos, is a misunderstanding of the usual figure of Min. The pig is stated to have been unclean, but sacrificed and eaten at full moon because Set, chasing a pig by moonlight, found the coffin of Osiris. The sacrifice of a pig is named among offerings at Edfu.

CHASSINAT, E.—*Fragment des* Actes *de l'Apa Nahroou.* One leaf of parchment ; a fellow leaf is in Cairo Museum.

JÉQUIER, G.—*Le Monde à l'envers et le monde souterrain.* In the xcixth chapter of the Book of the Dead is described " that evil world where the stars fall upside down on their faces and know not how to raise themselves." While the astronomical scenes treat the invisible heaven like the visible, the commoner view was that some subterranean passage served to pass from west to east ; or an animal with two heads, double lion, double bull or double sphinx, which swallowed on the west and disgorged at the east. Lastly, the passage became divided into hours, with successive gates and monstrous guardians.

GUNN, BATTISCOMBE.—*The Egyptian for " Short."* The ignorance about the equivalents for many of the commonest ideas is remarked ; and it is proposed that the word  is to be rendered as " short," as in several passages quoted it is in opposition to " long."

" *To have recourse to* " is proposed as the rendering of  illustrated by several passages.

A note on the verb WRŠ proposes that it is not only " to spend the day time," but that it implies the whole time, and *szr* means similarly the whole night. The sense is that of continuous occupation.

CHASSINAT, E.—*Note sur deux scarabées.* A splendid scarab of lazuli, 4 inches long, is inscribed with *nesut da hetep* for the chief of the royal caravan Pedatnubt. Another scarab, 2 inches long, in schist, has eight columns of inscription naming tribute brought by the chiefs of Naharain to Tehutmes IV, who " smites the lands from Naharni to Kary," from north to south. This is interesting as the forerunner of the large historical scarabs of Amenhetep III.

TOURAIEFF, B.—*Les pertes récentes de l'orientalisme en Russie.* " Our unhappy land, where they destroy with so much zeal the acquisitions of civilization, has lost in the recent months many of its eminent orientalists. Nikolsky, Saleman, Radloff, Wesselowsky, Chukowsky, de Lemm, are no more." To these we must now add the name of Turaieff himself, a victim since writing this dirge : " The death of the greater part of these scholars has been hastened by the terrible events which unfold themselves here." A short biography of Nikolsky and Oscar de Lemm is given.

SPELEERS, L.—*La stèle de Mai.* This Moiy was scribe of offerings to all the gods in the temple of Sety I at Abydos, son of a chief of archers, Bes, and Urmur. The stele shows Sety I receiving life from Osiris, with his chief son (*tep*) Rameses behind him bearing a feather fan, without a cartouche. This proves that the eldest son was already dead, and that Rameses was recognised as chief son in Sety's lifetime. The hymn to Osiris, in fourteen long columns, is completely set interlinear with the parallel copies I and II of the Middle Kingdom, III–V of New Kingdom and chap. 181 of the Book of the Dead, with a full translation. This will be the standard text for the future. There are also many notes and a statement of the position and functions of all the gods named, with references for every point, a very valuable key to authorities in mythology.

JÉQUIER, G.—*Le prefixe*  *dans les noms d'objets du Moyen Empire.* The conclusions are that most words beginning with *m* are compounds formed of a verbal or substantive radical, with preposition *m* in the usual sense of *for, in, of.* Some words with *men* are whole radicals. The preposition *m* may be compounded with the following letter in one sign, as in *men* and *mes*. Before a strong guttural, *k* or *q*, *m* is followed by *n* or *o* for euphony. The examples, for instance, are *m·onkht*, an amulet, " for life," *m·neferti* " for beauty," *men·qebyt* " for refreshing," *m·den·khes* " for (making) to cut the razor," the hone.

DÉVAUD, E.—*Étymologies Coptes.* A paper on thirty-eight Coptic words.

GAUTHIER, H.—*Les " Fils royaux de Kouch " et le personnel administratif de l'Éthiopie.* This paper completes the account of the Ethiopian viceroys given in the list by Dr. Reisner. The title " royal son " does not mean an actual son of the king, but is a title of the viceroy ; there are other " royal sons " of Nekhebt, Thinis, Amon, etc. The royal sons of Rameses are probably descendants. The viceroys were almost always in intimate contact with the king, before their acting as deputies. Their functions were solely civil, and not military. The names given are : Aohmes-să-Tayt, about 1570 B.C. ; his son Aohmes-Tura, 1555–1538 ; Sen, 1537–1486 ? ; Nehy, 1486–1449 ; Usersetet, 1449–1423 onward ; Amenhetep, 1423–1409 (or less at each end) ; Mermes, 1409 or earlier–1375 ? ; Tehutmes, 1375 ?–1350 ? ; Huy, 1350 ?–1335 ? ; Pasar I, 1335 ?–1325 ? ; Amenemapt, 1325 ?–1299 ? ; Any, 1299 ?–1297 ? ; Heq-nekhtu, 1297 ?–1280 ? ; Pasar II, 1280 ?–1262 ; Setau, 1262 or earlier–1237 or later ; Messuy, 1237 or later–1214 ; Sety, 1214–1209 ; Hera I, 1209–1180 ? ; Hera II, 1180 ?–1170 ? ; Pasar III, 1170 ?–1160 ? ; Un·ta·uat, 1160 ?–1155 ; Rameses-nekht, 1155–1130 ? ; Panehsi, 1130 ?–1110 ? ; Her hor, 1110 ?–1102 ; Pionkh, 1102–1080 ? ; Nesikhensu, 1020 ?–1006 ; Uasarken·onkh, about 850. Various other officials and lieutenants of Kush are discussed, for which the paper should be studied.

REVIEWS.

La Religion d'Israël. By RICHARD KREGLINGER. Sm. 8vo, 335 pp. 1922. (Bruxelles, Lamertin.)

This is another volume of the series which was noticed in this journal in 1920, p. 57. The first work dealt with principles admirably; here, in the application of them to a very complex and debatable case, there is naturally much more scope for temperament. The author begins with the dating of the sources of the Old Testament; he would place the final revision of the Hexateuch to the age of Malachi, while taking portions of it as being of the two or three generations after Solomon. These dates seem impossibly late, when we look at the general historical style. He agrees to the date of the earlier part of Isaiah, but what a gulf of style there is from that to the book of Samuel; then again, what a gulf between that and the opening of Exodus; again an immense difference between the business-like style of Exodus and the poetic style of Genesis. Can all these great changes be pushed through in two centuries of a uniform kingdom? It looks far more like the five centuries back to Exodus, with large differences affecting the nation in the interval. There may have been small editing, but the bulk of the documents seem to require something very near their face value in dating. Again, if large changes were as late as after the return from exile, could they ever have been enforced on all the Jews who had been scattered in Egypt and elsewhere at the exile? The accepted body of writings must be pre-exilic, except those which were new history, as Ezra and later works. In other respects Prof. Kreglinger sets his face against the extravagances of Cheyne and others, and keeps to a quiet and sane judgment.

The literary point of view seems to override the archaeology when we read, "La critique biblique est essentialement littéraire; elle recherche la date d'un texte; mais non point celle où les idées que ce texte exprime furent pour la première fois enseignées, verbalement ou par écrit." The archaeologist thinks of facts before the expression of them; criticism must begin with the credibility of statements and their relation to known facts.

The various races and factors that enter into the complex formation of Israelite ideas are then discussed. There is the Troglodyte, as at Gezer, with his sacred caves (kept up still at the Haram and Bethlehem), the pig sacrifice, cave paintings as in Europe, and Neolithic work. Next the Canaanite Semites who burnt the dead and sacrificed the first-born. Here the author parts with the old view of their home being in Arabia, and recognizes the early Semite in North Syria and Babylonia, whence he spread to Assyria. This view, lately enforced

by Prof. Clay, is strongly supported by the North Syrian invasion of Egypt in the VIIth dynasty. A remarkable detail of human sacrifice, at the foundation of building, is the burial of parts of bodies at Gezer; similarly at the Labyrinth at Hawara, part of a man's body and a woman's body, cut in three, were found in the sand-bed beneath the corners of a building (*Labyrinth*, 33–4).

Next the Babylonian influence is considered, and the dynasty of Hammurabi is called Amorite. Tablets of his age name Yau-ilu, or Yahveh is god, centuries before Moses. The Babylonian Ishtar appeared as Ashtoreth in Palestine, and repelled some but attracted other Israelites. The Egyptian influence is first quoted in Sinai under Zeser, but it was as old as the Ist dynasty under Semerkhet. There are statements here which show the unfortunate habit of reading more in a text than is there: "La pratique de la circoncision dont les Israélites croyaient, peut-être à tort, que c'est en Egypte qu'ils l'avaient adoptée," with reference to Jos. v, 2. There is no such belief, only the statement that the generation which left Egypt had died off. Then the winged disc is said to ornament the high-priest's dress, with reference to Ex. xxviii; there is no trace of any such ornament suggested. On p. 75 it is said that David set up a stone on the threshing-floor of Araunah, to connect this with the worship of sacred stones; but it is really stated that he built an altar and sacrificed. On p. 87 the brazen serpent is said to have had prodigious powers in the rout of Amalek; it is never alluded to in that account. Further, all the temples were guarded by a serpent; there is no trace of that in Palestine. The facile statements, for which references are quoted, have no support in those references; this "reading in" is too common a habit with biblical critics.

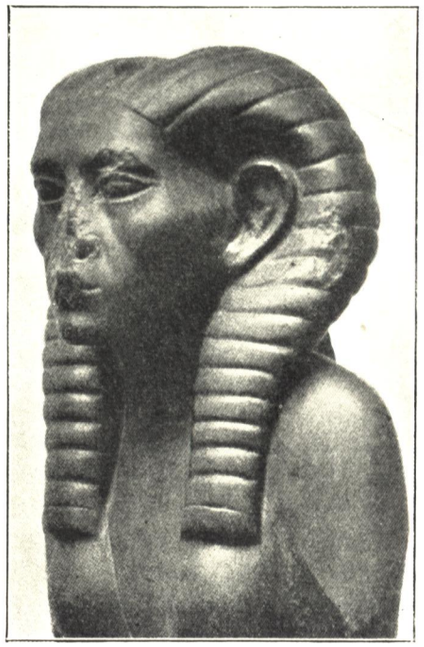
The references to Asher under Tehutmes III and Sety I; to Samnu under Tehutmes III, and Samhuna under Amenhetep IV, as Simeon; to the well-known Yakub-el and Yusef-el, are quoted as reasonable. Also the Khabiri and the Aperiu are both accepted as 'Abri, Hebrews, though one can imagine some hard things being said if anyone but a critic equated *'ain* and *cheth*. The account of Deborah is accepted, and not theorised away as has been the fashion. The usual word *shaqatz* for an abomination is read here as *tabu*; but that distinct sense is not applicable in Ps. xxii, 24: "For he (the Lord) hath not despised nor tabued the affliction of the afflicted"; the simple "abominated" or "abhorred" is a far better rendering.

A proposal which is attractive is that there were four codes of different sanctuaries recorded. After the recognized code of Ex. xx. at Sinai there was the law attributed to the second tables, of which ten commands are in Ex. xxxiv, 14–26; there was the form of ten commands at Mount Pisgah, Deut. v, 6–21, which might belong to the sanctuary of Beth Peor beneath that; and there was the code of 12 commands at Mount Shechem, connected with Baal-berith, the Lord of the Covenant.

There are many interesting suggestions under Magic, Mimetic rites, Vegetation rites, the Prophets and their functions as against mere ceremonial, the influence of Persian views of Dualism and the hierarchy of angels, and the function of intermediaries. There seems rather too mechanical a view of all these various parts, too German an air of analysis—a lack of the sympathetic realisation which is essential to anyone dealing with aspirations. In even the most mistaken devotion one may write of it from the worshipper's point of view, if it is to be really understood in its bearing on life, or its implications. One must be all things to all men if one is to understand their minds.

Die Plastik der Agypter.—By HEDWIG FECHHEIMER. Sm. 4to. 59 pp., 168 pls. (Cassirer, Berlin.) 1920.

This popular book is of value to students as giving many large photographs of sculptures in Berlin which are not published or collected together elsewhere. We may note the remarkable sharp profile of Amenemhat III (53), the strange head (54–56); the queen with high cheek-bones and massive hair, like the Galla and El Kab sphinx type (57, 58). The group of Amarna heads (79–93) is welcome, pending a publication of the German excavations. The aspect of the profiles is greatly altered by the wrong positions given; the facial slope has been sacrificed to keep the neck more upright: what the true position should be is proved by the Louvre bust (86) which places the brow and chin in a vertical plane. Some heads (as 83) are tilted up 18° skew. The same error is seen in the hawk head (45) repeated on the cover. The figure 115 is not from Medum; by the name it is probably from Saqqara. The German is discreetly silent as to the price of the book, so as to get whatever he can.



QUEEN OF GALLA TYPE.

On the Physical Effects of Consanguineous Marriages in the Royal Families of Ancient Egypt. By the late Sir M. A. RUFFER. 8vo, 46 pp., 27 figs. 1920. ("Proc. Royal Soc. Medicine," Vol. xii.)

This paper puts in shape the family histories of the XVIII-XIXth dynasty and the Ptolemies. The genealogy of the XVIIIth dynasty shows that each of six generations married a half-brother except Amenhetep I, who was a full brother; and the last three married Syrian princesses, probably of Egyptian descent. Certainly these latter marriages did not improve the family vitality, and there is very little to show of any bad effects in the six related generations. In the XIXth dynasty there was closest in-breeding for three generations without any obvious ill effects. It is rather hard to write of Ramessu II as being completely bald; he had a fair fringe of hair left when he died at 77 at least, or more probably 85. In the XXVth dynasty the Ethiopians followed half-sister marriage. In the Ptolemies full sister marriage was usual. The physical condition does not seem to have been much affected, but there seems to have been a moral deterioration, even for that bloodthirsty age. The main point which is pressed is that there was no deaf-mutism or congenital disease, which is usually attributed to such marriages. In modern times it may well be that certain weaknesses of structure tend to draw together, from unconscious sympathy and a sense of difference from the average world; in short, the in-breeding is a result of the weakness, and not a cause of it. Nature does the right thing by pooling such stocks to their extermination.

NOTES AND NEWS.

The great event of recent weeks has been the opening of the tomb of Tut·onkh·amen. It will always occupy the first place in public imagination, as making the world familiar with the magnificence of the Egyptian monarchy. The existence of such kind of objects has hitherto only been imagined by those who were familiar with the monumental representations; now all the world will realise the sumptuous display of the "Great House." The art will also impress the public with the ability shown, though it will not surprise those who knew the fine work of the tomb of Yuaa, or the still finer style of earlier times. The taste shown in the alabaster vases, made in one with the stands, and overloaded with elaborate handles, differs much from the simpler beauty and more graceful designs of previous epochs.

As for history, we cannot hope for much from a tomb, unless the king took with him a justification to the gods, like the great papyrus of Ramessu III. But a most interesting historical link is seen in the strange animal-headed couches. The cow-head couch has spotting inlaid on it of a trefoil form; this is foreign to Egypt, but is well-known in Mesopotamia, as on the couchant bull in the Louvre. The weird dog-head of another couch is also entirely un-Egyptian. Now, as Kallimasin, king of Babylonia, sent to Amenhetep III a couch of *ushu* wood, ivory and gold, with three couches and six thrones of *ushu* wood and gold, it is certain that there were Babylonian couches in the Theban palace; and this description of ivory and gold refers to the dog head with ivory teeth and tongue, while the other couches are of wood and gold only. Later than than Amenhetep III, Syria was too much disturbed, and Egyptian prestige in Mesopotamia was too slight, for such presents to be sent. They must be as old as Amenhetep III, and there seems no doubt that these are the very furniture described in the Amarna letter. In accordance with this, we find that each was constructed in four parts, with bronze jointing to fit together. Furniture made in Egypt is naturally all united in one, with fixed joints. But for a rough land journey of over a thousand miles, it was needful to make couches with separate sides, frame and base, in order to pack and transport them.

No doubt there was an imitation of Egyptian motives, as in the Hathor cow-heads, and the tails copied from lion couches. This only shows that they were made for presents to Egypt, and not that they were the work of foreigners in Egypt, because there would be no purpose in the elaborate bronze jointing, instead of solid joints. This detail would not be necessary if they were merely moved about the palace or put on a Nile boat. We see then, for the first time, court furniture of Babylon, and it will be of great interest to examine the technical details of the construction and compare it with Egyptian work. The short form of the couches shows that the Babylonian slept contracted, like the prehistoric people, while the Egyptian couches are all full length.

If some articles were thus of a previous generation, it is very likely that others were likewise old ; and the footstool, with nine foreigners under it, may well be that used by Amenhetep II as figured a century before. On the death of Tut·onkh·amen, who was the last legitimate king of the great family, it seems that the palace furniture was largely buried with him, as there was no heir to inherit.

Of all the Egyptian work the most informing to us will be the dress and personal detail. The colour weaving, the attachment of ornament, the construction of jewellery, will show much that is new to us. The glove has astonished people, but, as Miss Murray observes, gloves are figured in scenes, both among offerings and also worn.

The immediately urgent matter is that all these things should be preserved in the dry air of Qurneh, and not taken to the winter fogs of riverside Cairo. A large new building must be provided in any case, as the Cairo Museum is far too full to take in properly all the objects which are piled up in four chambers of the tomb. The obvious site is Qurneh, somewhere south of Deir el Bahri. There a substantial museum should be built, without any upper floor, and entirely lighted from the north. Then will come the question of the efficient publication of all this mass of objects. The Egyptian Government should begin by an appropriation of £30,000 for the museum and £20,000 for publication. They cannot grudge a few *per cent.* of the value of what has been found for them, if they get everything for nothing. No one can hope that these things will last for another three thousand years ; probably this sheen of gold will perish by ignorant greed within three hundred years. A complete photographic and coloured reproduction of every object from various points of view, and with full diagrams of details, is the least that this generation owes to the past, which has guarded its treasure till now.

BRITISH SCHOOL OF ARCHAEOLOGY IN EGYPT.

Mr. Brunton and four students have been working steadily through the remains of the great cemetery at Qau-el-Kebir ; the site seems to have been largely exhausted by native, Italian and German workings, without any record or publication of the past discoveries. A prehistoric cemetery will soon be examined, and there is much to do in copying tombs in that district. This is the only British work in Egypt this winter.

Mr. Mackay is in Mesopotamia for Oxford and American work. It is hoped that he will also clear up the history of the early civilisation in the Persian Gulf for the British School, in view of the possible connections with Egypt.

On behalf of our School also, application has been made to reserve an important site at Jerusalem. These extensions of the British School work have been caused by the intended change in the Egyptian law of antiquities, by which the Government could take everything of interest or importance from an excavator. All the British and American excavators have protested that such a change would probably stop excavation in Egypt.

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