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## ORDINARY MEETING.\*

MARTIN L. ROUSE, ESQ., B.L., IN THE CHAIR.

The Minutes of the previous meeting having been read and confirmed, the Secretary (in the absence of the author) read the following paper :—

*THE MINERALS AND METALS MENTIONED IN THE OLD TESTAMENT. Their paramount influence on the Social and Religious History of the Nations of Antiquity.*  
By Chev. W. P. JERVIS, F.G.S., Member of the Italian Geological Society, Rome; late Conservator of the Royal Italian Industrial Museum, Turin.

### PRECIOUS STONES, ISRAELITISH TIMES.

B.C. *circum* 1520. The first allusion we know of to precious stones as already sought for in those ancient times is that of Job. "As for the earth out of it cometh bread, and under it is turned up as it were fire; the stones of it are the place of *sapphires* (lapis lazuli, see below, p. 262, etc.), and it hath dust of *gold*." (Job xxviii, 6.)

B.C. 1491. Although Moses simply records that the children of Israel on their departure from Egypt spoiled the people, or land, of jewels of gold and jewels of silver, the sequel proves that many of these must have formed the settings of precious stones, of very great value, since in the wilderness the free-will offerings of the host included the twelve precious stones for the breastplate of the ephod.

Though numerous specialists have devoted the most conscientious study to the precise signification of the Hebrew

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\* Monday, May 22nd, 1905.

text of the Bible as to what stones were employed, no one has ever been able to identify unquestionably more than a few of them. The rest have been doubtfully attributed to several mineral species, mineralogy being so recent a science; and it is reasonable to assume that the word of the Hebrew scriptures for such stones was but that by which they were known to the Egyptians. Can they therefore be ever interpreted by us? One only solution seems to present itself as logical, which is to take the earlier understood and more recent Greek text descriptive of the heavenly Jerusalem; for, be it remembered, that all the Mosaic ceremonies were essentially typical. In the priestly breastplate the names of the 12 tribes of Israel were severally engraved, while the wall of the City had 12 foundations, and in them the names of the 12 Apostles of the Lamb. Now let us give the parallel texts in the Old and New Testament, and compare them together, holding that the stones were identical in either case. Should such an explanation be accepted a slight advance would be possible.

B.C. 1491.—“Thou shalt make the breastplate of judgment with cunning work; after the work of the ephod thou shalt make it, of gold, of blue, and of purple, and scarlet, and of fine twined linen shalt thou make it. Four square shall it be being doubled. And thou shalt set in it settings of stones, even four rows of stones. The first row shall be a *sardius*, a *topaz*, and a *carbuncle*; and the second row shall be an *emerald*, a *sapphire*, and a *diamond*; and the third row a *ligure*, an *agate*, and an *amethyst*; and the fourth row a *beryl*, and an *onyx*, and a *jasper*. And the stones shall be with the names of the children of Israel, 12 according to their names, like the engravings of a signet, every one with his name shall they be, according to the 12 tribes . . . And Aaron shall bear the names of the children of Israel in the breastplate of judgment upon his heart” (Ex. xxviii, 15–29). It may here be observed that the order in which these stones are given in the Septuagint Greek translation differs greatly from the original Hebrew.

In the apostle John’s vision of the new Jerusalem “the building of the wall of it was of *jasper*, and the foundations of the wall of the city were garnished with all manner of *precious stones*. The first foundation was *jasper*, the second *sapphire*, the third a *chalcidony*, the fourth an *emerald*, the fifth a *sardonyx*, the sixth *sardius*, the seventh *chrysolite*, the eighth *beryl*, the ninth a *topaz*, the tenth a *chrysoprasus*, the eleventh a *jacinth*, the twelfth an *amethyst*.” (Rev. xxi, 18–20.)

*Idem*, translated *sardius*, *σάρδιον* in S.; *σάρδιος* in R., is *serd*

in Persian; *sardum* in Syriac; *sardinon* in Coptic; *samuk* in Samaritan. It is given as *sardius* by B. K. L. R. S.\*

Sardius, or noble carnelian pits exist in Guzerat near the river Nurbudda, thirteen miles from Baroda, and have been worked from the remotest antiquity. Other pits whence sardius is obtained in the same region are worked near Ratanpur and Kompurwanye. The Indian sardius, which is derived from igneous rocks, differs from carnelian only in its being coloured milk-white, greenish, or black. The natives heat it powerfully for a few hours in pots with goat or cow dung, when the dark orange varieties assume a splendid clear, uniform red colour, becoming somewhat translucent. It is a very precious stone, and was worked by the ancients in a most magnificent manner. Udem is supposed to have been a variety, from Odom, red. These pits are exclusively worked by the primitive indigenous races, who send all the produce to be cut by the celebrated lapidaries at Cambay. Noble red sardius is likewise found in Bokhara.

*Shebo*, translated agate, *ἀχάτης* in S., is achates in Coptic, whence *achates* in Latin; *shebo* in Persian; *sebog* in Arabic. Given as agate by B. K. L. O. It evidently corresponds to chalcedony, *χαλκηδών* in R.; both are mineralogically identical, only the latter being uniformly whitish, and the former polychrome.

*Shoham*, translated onyx, *όνύχιον* in S., by others *όνυξ*, *σαρδονικον* and *βερύλλιον*; sardonyx in Latin, is given as onyx by B. L. S. J., and clearly corresponds to sardonyx, *σαρδόνυξ*, in R. J.; it is stated by K. to signify beryl, but there does not seem to be sufficient ground for his interpretation, the more so as he also suggests sardonyx as probable. Sardonyx differs from carnelian simply from its yellow colour. It is found in India with the sardius, also in Egypt.

*Yahalum*, translated diamond; (?) the *χρυσόλιδος* of the S., given also as diamond by B. and L., is considered by K. to have been the *ονύχιον* of the S.; whence he translates it onyx. In fact the so-called greenish diamond from near Baroda is merely a variety of chalcedony, and if so would correspond to *χρυσόπρασος* in R., that being simply a greenish variety of

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\* Abbreviations.—Authorities. B. Braun, *De Vestitu sacerdotum hebr.* 1680; Bw. Bredow, *Historische Untersuchungen*; Keferstein, *Mineralogia polyglotta*, Halle, 1849; Luther, *Die Bibel*; O., *Old Testament*; Aaron Pick, *The Bible Students' Concordance, to ascertain the literal meaning in the original*, 1845; R. Revelations; S. Septuagint; J. Jervis.

chalcedony. Further K. shows that though the word chrysolite denotes the colour, there is no means of identifying which of several suitable hard stones in the breastplate was signified, and the matter is shrouded with obscurity.

*Sappir*, translated sapphire, and *σάπφειρος* in S., is *sappir* in Chaldea, *sophor* in Ethiopic, *saphiros* in Coptic, *saphiron* in Syriac, *sapphiros* in Latin. Given as sapphire by B. L. O. R. But K. authoritatively states that what was known to the Chaldeans, Greeks, and Romans under the name of sapphire was lapis lazuli. That mineral comes from Bokhara, and the district of Badakshan in Afghanistan, to the north of the Hindu Kush, not far from the upper course of the Oxus, whence it is taken by caravans to the lapidaries of Cambay.

*Jashpeh*, translated jasper, *ζασπις* in S., is also called *jashpeh* in Persian and Syriac. Jasper occurs abundantly in many countries, including Syria, Egypt, etc., but is also extensively found and cut in Guzerat; it is recognised as such by B. L. O. R.; K. considers that plasma, or jasper, was intended here.

There are potent arguments in support of the conviction that all the foregoing stones in Aaron's Ephod were cut at Cambay, and thence taken to Egypt by regular trade, for it has been traced back to long before the Christian era.

Thence the commerce of the lapidaries of Cambay supplied all countries of the ancient world from China to Greece and Egypt: even at the present day it is hinted that much of what is sold in Western Europe in resorts of modern tourists has a like origin, having been worked and cut at Cambay.

*Akhlomoh*, translated amethyst, *ἀμέθυστος* in S., is amothostos in Ethiopic (whence the Greek name) and in Syriac; amethystos in Coptic; amethystus in Latin. It is so given by B. K. L. O. R. S.; all are concordant. It is abundant: amongst other countries, in India and Ceylon.

As to the identification of the other stones the greatest perplexity exists, and nothing positive can be ascertained.

*Boreketh*, translated carbuncle, from the Sanscrit Barak, shining, is the *σπαράγδος* in S., also *μάραγδος* in Greek; maragd in Ethiopic; marakta in Sanscrit; berakta and ismaragda in Chaldea; barketh and zmerud in Persian; zumurud in Hindustani; zamaragd in Ethiopic, whence evidently the Greek; samurod in Arabic; smaragdus in Latin. Translated emerald by B. K. L. R. S. It is found in Egypt, whence the whole ancient world was supplied. Extensive traces of the ancient emerald mines on the Saburah, between Berenice and Koptos, were discovered in chlorite

schist by Caillaud. Emeralds also exist in Arabia Petrea, in the Ural mountains, and in the government of Irkutsk in Siberia, but they are not found in India. The name "carbuncle" is misapplied.

*Nophekh*, translated emerald, and ἀνθραξ in S., is anthrax in Coptic, whence the Greek; anthrax in Latin. Since no corresponding etymology to nophec is known to us, we have to follow the Septuagint rendering. Given erroneously as ruby by B. and L., considered to have been noble garnet, which has the appearance of burning coal, but decidedly not ruby, K. Precious or oriental garnet, almandine or carbuncle, comes from Jaipur and Rajputana in India, whence the ancients are surmised to have procured them; also from Ceylon and Pegu, and it occurs in isolated crystals in metamorphic schists, as is usual.

*Leshem* is translated ligure, and λιγύριον in S. It is leshem and jeshem in Persian, otherwise there is no affinity to the word in other languages, lygirion in Coptic; lincurios in Latin, rendered ligure by L., hyacinth by B.; K. considers it to signify reddish-brown tourmaline, common in India.

*Pitdoh* is translated topaz, and τοπάζιον in S.; it is topaz as given by B. L. P. R. Supposing the etymology to originate from pitor, *i.e.*, the yellow in Sanscrit, K. infers it to denote some yellow Indian stone, such as yellow zircon, yellow spinel, or yellowish brown grossularia (cinnamon stone) but not yellow topaz, which is not found in Asia. He states that the Greek τοπάζιον, topazion in Coptic, from the island of Topaza, was merely phosphorescent fluor spar.

*Tharsish*, translated beryl, and by βερύλλιον in S., which corresponds to beryl βήρυλλος in R. The word is thorsish in Syriac, but nothing analogous exists in other languages in order to guide us. In Greek it has been given as θαρσεις and translated χρυσόλιθος, from chrysolidos in Coptic. Beryl is a favourite ornamental stone, found in large crystals in Siberia, and is considered by K. to have been known to the ancients and to have been employed for the breastplate, but yet he gives both sardonyx or beryl as intended by shohan, as above. Tharsish is given as turquoise by L. evidently wrong; as chrysolite by B., likewise unsuited, since it is by no means clear what that word indicated; as amber on account of its colour Bw. and K. Though it is possible that amber, obtained by the Phœnicians through their emporium at Tarshish, or Cadiz, might have borne the name of that place, it does not occur among the foundations, while beryl does, and seems preferable, J.

There still remain three foundations in the Revelations to be identified, viz. chrysolite, topaz and hyacinth, in addition to some conjectures made already.

When Moses took the offering special mention is made of "*onyx* stones and *stones* to be set for the ephod and for the breastplate," for the Lord had spoken unto Moses on Mount Sinai, saying, speak unto the children of Israel that they bring me an offering for the tabernacle, and besides metals and other requisites were specified "*onyx* stones and stones to be set in the ephod and in the breastplate." Bezaleel and Aholiab "wrought *onyx* stones inclosed in ouches of *gold*, graven as signets are graven, with the names of the children of Israel, and he put them on the shoulders of the ephod, that they should be as *stones* for a memorial to the children of Israel." And in the breastplate they set four rows of stones: the first row was a *sardius*, a *topaz*, and a *carbuncle*; and the second row an *emerald*, a *sapphire*, and a *diamond*; and the third row a *ligure*, an *agate*, and an *amethyst*; and the fourth row a *beryl*, an *onyx*, and a *jasper*. (Ex. xxv, 7; xxviii, 15-21; xxxv, 9; xxxix, 6, 10-13.)

B.C. *circum* 1015. In describing to Solomon the things he had prepared for the temple David specifies among the rest "*onyx* stones, and *stones* to be set, *glistening stones*, and of divers colours, and all manner of *precious stones*, and marble stones [? oriental alabaster] in abundance." (I Chron. xxix, 2.)

The servants of Hiram and Solomon brought *precious stones* from Ophir, as well as gold; the queen of Sheba likewise brought Solomon *precious stones*. (II Chron. ix, 1, 10.)

B.C. 588. We learn that Tyre procured certain *precious stones* through Syria. "Syria was thy merchant by reason of the multitude of the wares of thy making; they occupied thy fairs with *emeralds* (oriental garnet ? see *ante*), purple and brodered work, and fine linen, and coral and *agate*" (Kadkud), supposed to have been zircon, garnet, or tourmaline, but not certain, K. Take up a lamentation upon the king of Tyrus and say unto him, "Thou hast been in Eden, the garden of God; every *precious stone* was thy covering, the *sardius* (noble carnelian) the *topaz* (zircon, garnet, tourmaline) and the *diamond* (chrysoprase ?) the *beryl*, the *onyx*, the *jasper*, the *sapphire* (lapis lazuli), the *emerald* (carbuncle or precious garnet ?), *carbuncle* (emerald) and gold." (Ezek. xxvii, 16, 22; xxviii, 13.)



## PRECIOUS STONES SYMBOLICALLY.

B.C. 1491. Moses was commanded to go with Aaron, Nadab and Abihu and seventy of the elders of Israel to worship afar off at the foot of Mount Sinai, while only Moses was suffered to go near the Lord: then they went as far as they were permitted, "and they saw the God of Israel and there was under his feet as a paved work of *sapphire* stone (lapis lazuli) and as it were the body of heaven in his clearness." (Ex. xxiv, 10.)

In describing the incomparable value of wisdom Job exclaimed, "It cannot be valued with the gold of Ophir, and the precious *onyx*, or the *sapphire* (lapis lazuli); the gold and the *crystal* (*zekhuketh*) crystal-like glass? (P.) cannot equal it and the exchange of it shall not be for jewels of fine gold. No mention shall be made of coral or pearls, for the price of wisdom is above rubies (*penenem*): this is not a stone at all, but is considered by Gesenius, K. and other authorities to be red coral.

B.C. *circum* 712. Propheying the extension of Christ's Church, Isaiah says, "Oh thou afflicted, tossed with tempest, and not comforted, behold I will lay thy stones with fair colours, and thy foundations with *sapphires* (lapis lazuli) and I will make thy windows of *agates* (kudkud, conjectured to be zircon, garnet or tourmaline, K.), and thy gates of *carbuncles* (ekdokh, an uncertain fiery gem) and all thy borders of pleasant stones." (Is. liv, 11, 12.)

B.C. *circum* 595. The prophecy of Ezekiel opens with a magnificent heavenly vision of four living creatures which came out of a great cloud and a fire, "and out of the midst thereof as the colour of amber, out of the midst of the fire." And as he beheld them behold one wheel upon the earth by the living creatures. The appearance of the wheels and their work was like unto the colour of a *beryl*; and the likeness of the firmament upon the heads of the living creatures was as the colour of the terrible *crystal* stretched forth over their heads above. And above the firmament that was over their heads was the likeness of a throne, as the appearance of a *sapphire* stone (lapis lazuli). And I saw as the colour of amber, as the appearance of fire round about within it" (Ezek. i, 4, 16, 26). The word *zekhukheth* employed here in both cases does not signify amber, but a precious alloy of copper and gold or of gold and silver, so in Ezek. viii, 2.

ADAMANT (*Diamond—Shomīr*) SYMBOLICALLY.

B.C. *circum* 595. When the Lord sent Ezekiel to reprove the house of Israel of their sins he said, "They will not hearken unto thee"; "Behold I have made thy face strong against their faces, as *adamant*, harder than flint." (Ezek. iii, 9.)

B.C. 518. Thus speaketh the Lord: "They refused to hearken, yea they made their hearts as an *adamant* stone." (Zech. vii, 12.)

FLINT (*Khalomēsh*).

In the English translation the word flint occurs seven times in the Old Testament, though in Is. v, 28, and Ezekiel iii, 9, it is simply *tsur*, a rock, in the original, while in the other passages it is *khalomēsh*, which is conjectured to signify flint by K. But the rendering of the S. is unquestionably the right one, being in all cases general as *πέτρα*, a rock, but never *πέτρος*, a stone, "Who brought thee out of the rock of *flint*." "He made him to suck honey out of the *rock*." [Hebrew, *khalomēsh*.] (Deut. viii, 15; xxxii, 13). "He putteth forth his hands upon the *rock*." [Hebrew, *flint*.] (Job. xxviii, 9.) "Which turned the rock into a standing water, the *flint* into a fountain of waters." (Ps. cxiv, 8.) "I have set my face like a *flint*." (Is. 50, 7.)

SALT (*Melakh*).

B.C. *circum* 1917. In the days of Amraphel, King of Shinar, Arioch, King of Ellasar, Chedorlaomer, King of Elam, and Tidal, king of nations, these made war with Bera, King of Sodom, with Birsha, King of Gomorrah, Shinab, King of Admah, and Shemeber, King of Zeboiim, and the King of Bela, which is Zoar. "All these were joined together in the vale of Siddim, which is the *salt sea*." (Gen. xiv, 3.)

B.C. 1898. The sun was risen upon the earth when Lot entered Zoar; then the Lord destroyed the cities of Sodom and Gomorrah and all the inhabitants of the plain. "But his wife looked back from behind him, and she became a pillar of *salt*." [Was incrustrated.] (Gen. xix, 26.)

B.C. *circum* 1490. "Every oblation of thy meat offering shalt thou season with *salt*, neither shalt thou suffer the *salt* of the covenant of thy God to be lacking from thy meat offering; with all thine offerings thou shalt offer *salt*."

B.C. *circum* 1040. "David gat him a name when he returned from smiting of the Syrians in the *valley of salt*, being 18,000 men."

In the days of David "Abishai, the son of Zeruiah, slew of the Edomites in the *valley of salt* 18,000." (II Sam. viii, 13. I Chron. xviii, 12.) Two accounts of same battle.

B.C. 896. The men of Jericho said unto Elisha, The situation of this city is pleasant, but the water is naught. "And he said, bring me a new cruse, and put *salt* therein, and they brought it to him. And he went forth unto the spring of the waters, and cast the *salt* in there, and said, Thus saith the Lord, I have healed these waters; so the waters were healed." (II Kings ii, 20, 21.)

B.C. *circum* 827. Amaziah, King of Judah, slew of Edom in the *valley of salt* 12,000." (II Kings xiv, 7.)

B.C. *circum* 630. As I live, saith the Lord of hosts, the God of Israel, surely Moab shall be as Sodom, and the children of Ammon as Gomorrah, even the breeding of nettles, and *salt* pits, and a perpetual desolation." (Zeph. ii, 9.)

B.C. 519. Darius made a decree to facilitate the progress in the erection of the temple, that of the King's good, even of the tribute beyond the river, including that which was necessary "for the burnt offerings of the God of heaven, wheat, *salt*, wine, and oil, according to the appointment of the priests which are at Jerusalem, let it be given them day by day without fail." (Ezra vi, 9.)

B.C. *circum* 457. Artaxerxes made a decree to all the treasurers which were beyond the river that whatsoever Ezra the priest should require of them should be done speedily, including "*salt*, without prescribing how much." (Ezra vii, 22.)

#### SALT SYMBOLICALLY.

Overwhelmed with grief, Job exclaimed, "Can that which is unsavoury be eaten without *salt*?" (Job vi, 6.)

B.C. 957. There was war between Abijah, king of Judah, and Jeroboam, king of Israel. The former set the battle in array with 400,000 chosen valiant men of war, the latter with 800,000 chosen mighty men of valour. And Jeroboam stood upon mount Zemaraim, which is mount Ephraim, and said Hear me, thou Jeroboam, and all Israel, "Ought ye not to know that the Lord God of Israel gave the kingdom over Israel to David for ever, even to him and his sons by a covenant of *salt*." (2 Chron. xiii, 5.)

#### SULPHUR (*Gophrēth*) AND BITUMEN (*Zepheṭh*).

B.C. 1898. "The Lord rained upon Sodom and Gomorrah *brimstone* (sulphur) and from the Lord out of heaven." (Gen. xix, 24; xiv, 10.)

## GOLD, SILVER, IRON, LEAD, TIN.

Although mention is made of several minerals with reference to the Garden of Eden, it by no means implies that their existence there was known before the Flood. "A river went out of Eden to water the garden; and from thence it was parted, and became into four heads. And the name of the first is Pison, that is it which compasseth the whole land of Havilah, where there is *gold*, and the *gold* of that land is good: there is bdellium (*bēdulakh*, by some considered a transparent gum of sweet scent; rendered *āv.ḡpaξ* in the Septuagint, which is considered by Keferstein to signify noble garnet), and the *onyx* stone" (sardonyx? T., beryl? K.). (Gen. ii, 11, 12.)

Job shows his acquaintance with mines, saying, "Surely there is a vein for the *silver* (margin: mine) and a place for *gold* where they find it. *Iron* is taken out of the earth, and *brass* (*nekhusheth*, copper) is molten out of the stone. He setteth an end to darkness, and searcheth out all perfection, the stones of darkness and the shadow of death." As for the earth "the stones of it are the place of *sapphires* (*lapis lazuli*), and it hath *dust of gold* (gold ore). There is a path which no fowl knoweth, and which the vulture's eye hath not seen: the lion's whelps have not trodden it, nor the fierce lion passed by it. He putteth forth his hand upon the rock, he overturneth the mountains by the roots; he cutteth out rivers among the rocks, and his eye seeth every precious thing; he bindeth the floods from overflowing, and the thing that is hid bringeth he forth to light." (Job xxviii, 1, 6-11.)

It is certain that Job, living as he did in the great alluvial plain near the mouth of the Euphrates, had no personal knowledge of the mines situated in mountainous countries; his accounts of them were derived from others. This passage is the graphic poetical conception he formed of mining operations, beautiful, but perhaps the English translation does not do him justice.

COPPER, IN ALL CASES *nekhusheth*.

Copper, erroneously translated brass, occurs in 120 verses of the Old Testament, besides being arbitrarily mentioned four times as steel.

## COPPER AS PERSONAL PROPERTY.

Copper and iron are the only two metals of which the extraction from their ores by metallurgical processes is

recorded before the Flood. It will be desirable to suspend allusions to the close reasons for adopting the true signification copper, which is the only correct translation of the Hebrew word *nekhusheth*, as *opheret*, or *bronze*, does not occur in the *Old Testament*; they had better be stated later on, showing how the error originated.

Tubal Cain, of the seventh generation from Adam, "was an instructor of every artificer in *brass* and iron" (Gen. iv, 22). Nor is it possible to imagine that the trees could have been felled and worked to build the enormous Ark, without the use of these metals, which were likewise required for the nails and sundry other fittings.

B.C. 1452. When the children of Israel spoiled the Midianites—the descendants of Ishmael—they were commanded that "the gold, the silver, the *brass*, the iron, the tin, and the lead, everything that may abide the fire, ye shall make it go through the fire, and it shall be clean." (Numb. xxxi, 22.)

B.C. 1444. Joshua blessed the half tribe of Manasseh, and spake to them, saying, "Return with much riches unto your tents . . . with silver, and with gold, and with *brass*, and with iron." (Josh. xxii, 8.)

B.C. *circum* 1120. The Philistines took Samson, "and put out his eyes, and brought him down to Gaza, and bound him with fetters of *brass*." (Judg. xvi, 21.)

B.C. *circum* 1063. "There went out a champion out of the camp of the Philistines, named Goliath, of Gath, whose height was six cubits and a span, and he had an helmet of *brass* upon his head; and he was armed with a coat of mail, and the weight of the coat was 5,000 shekels of *brass*; and he had greaves of *brass* upon his legs, and a target (margin: gorget) of *brass* between his shoulders." (I Sam. xvii, 5, 6.)

B.C. 1014. Solomon had twelve officers over all Israel, which provided victuals for the King and his household. "The son of Geber in Ramoth-Gilead, to him pertained the towns of Jair, the son of Manasseh, which are in Gilead, to him also pertained the region of Argob, which is in Bashan, three score great cities, with walls and *brases* bars" . . . (I Kings iv, 13). See also I Kings xiv, 27; II Kings xxv, 7, and Ezek. xxvii, 13.

#### COPPER WITH REFERENCE TO THE TABERNACLE.

B.C. 1491. The Lord spoke unto Moses, saying, Speak unto the children of Israel that they bring me an offering: "this is

the offering that ye shall take of them, gold, and silver, and *brass*." (Ex. xxv, 3); also xxvi, 11; xxxvii, 2-19, etc.

At the taking of Jericho, Joshua commanded that all the silver and gold, and vessels of *brass* and iron are consecrated unto the Lord; they shall come into the treasury of the Lord. And they burnt the city with fire, and all that was therein; only the silver and the gold, and the vessels of *brass* and of iron they put into the treasury of the house of the Lord." (Josh. vi, 19, 24.)

B.C. 1042. David made him houses in the city of David, and prepared a place for the ark of God, and pitched for it a tent . . . The singers Heman, Asaph, and Ethan, were appointed to sound with cymbals of *brass*." (1 Chron. xv, 19.)

#### COPPER IN CONNECTION WITH THE TEMPLE.

B.C. *circum* 1040. David smote Hadarezer, King of Zobah, unto Hamath: from Tibhath, and from Chun, cities of Hadarezer, brought David very much *brass*, wherewith Solomon made the *brassen* sea, and the pillars, and the vessels of *brass*.

"David prepared iron in abundance for the nails of the doors of the gates, and for the joinings, and *brass* in abundance without weight. David called for Solomon his son, and charged him to build an house for the Lord God of Israel, and said, "I have prepared for the house of the Lord 100,000 talents of gold, and 1,000 talents of silver, and of *brass* and iron without weight, for it is in abundance. Of the gold, the silver, and the *brass*, and the iron there is no number." Furthermore, David said, "I have prepared with all my might for the house of my God . . . *brass* for the things of *brass*." When he assigned to Solomon all the metal for the Temple he gave, "of *brass*, 18,000 talents." (1 Chron. xxii, 3, 14, 16; xxix, 2, 7.)

In the account of the building of the Temple by Solomon we find mention of Hiram (or Hiram) king of Tyre, and of his son, also called Hiram: we would now speak of Hiram the first and Hiram the second. The latter sent Solomon the son of a widow, a cunning head artificer, technically acquainted with metal work and textile industries, whose name was likewise Hiram, which might have been common at Tyre. No one must suppose that the king would have gone to Jerusalem leaving his throne, to work as the superintendent of the building of the temple!

In reference to the molten sea, an article on weights and measures, by an atheist writer, appeared in the *Westminster Review* for 1832, scoffingly tending to prove that Solomon or

his historians know no nearer proportion of the circumference of a circle to the diameter than three to one. The writer's honoured father, Lt.-Col. Thomas Best Jervis, of the Bombay Engineers, F.R.S., then a young man in India, heartily took up the matter to sustain the accuracy of the inspired narrative. He showed that the Jewish cubit (Heb. Amma, as the mother of all measures) being the 72 millionth part of the earth's circumference, the capacity of the molten sea divided by 2,000 gives the contents of the Jewish bath; and since the Roman measures of capacity were derived from the Temple of Jerusalem, the bath held exactly 60 Roman pounds of distilled water.

He proved by the higher mathematics that the brazen sea was of an oblate spheroidal form, *i.e.*, the half of a solid generated by the revolution of an ellipse on its conjugate axis, the conjugate remaining fixed, because the depth is stated to be half the length of the transverse, the mutual relation of the several numbers implying as perfect a knowledge of the ratio of the diameter to the circumference as we now possess. In one instance, it is said, "it contained 2,000 baths," in the other "it received and held 3,000 baths," where the superadded expression *makhzik* is derived from the root *khazak*, to hold, to overpower, to prevail over, employed when David prevailed over Goliath, intimating something heaped up. A vessel of the form mentioned would contain precisely one-half more heaped corn than water. The first instance gives the liquid capacity of 2,000 baths, the second a dry measure of 3,000 baths.\*

B.C. 1001. "Solomon made a *brazen* scaffold of five cubits long and five cubits broad and three cubits high, and had it set in the midst of the court, and upon it he stood and kneeled down upon his knees before all the congregation of Israel, and spread forth his hands to heaven." (II Chron. vi, 13. See also *ibid.* xxiv, 12.)

#### COPPER CARRIED AWAY FROM THE TEMPLE.

B.C. 588. At the siege of Jerusalem by Nebuchadnezzar "the pillars of *brass* that were in the house of the Lord, and the bases, and the *brazen* sea that was in the house of the Lord the Chaldeans brake, and carried all the *brass* of them to Babylon, the chaldrons also, and the shovels, and the snuffers, and

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\* Captain Jervis, *Records of Ancient Science, exemplified and authenticated in the Primitive Universal Standard of Weights and Measures* Calcutta, 1835.

the bowls, and the spoons, and all the vessels of *brass* wherewith they ministered, took they away; the two pillars, one sea, and the 12 *brasen* bulls that were under the bases, which king Solomon had made in the house of the Lord; the *brass* of all these vessels was without weight. And concerning the pillars, the height of one pillar was 18 cubits, and a fillet of 12 cubits did compass it, and the thickness thereof was 4 fingers, it was hollow: and a chapter of *brass* was upon it; and the height of one chapter was 5 cubits, with network and pomegranates upon the chapters round about; all of *brass*." (Jer. lii, 17, 18, 20, 22; see likewise parallel passage in II Kings xxv, 13, 14, 16, 17.)

#### COPPER IN RELATION TO IDOLATRY.

B.C. *circum* 726. Hezekiah did that which was right in the sight of the Lord. "He removed the high places, and break the images (margin: statues), and cut down the groves, and break in pieces the *brasen* (copper) serpent which Moses had made, for unto those days the children of Israel did burn incense to it, and he called it *nehushtan* (*i.e.*, a piece of copper)." (II Kings xviii, 4.)

B.C. *circum* 538. At the great feast which Belshazzar gave to 1,000 of his lords, the golden vessels taken from the Temple were brought in, and they drank wine in them. And they praised the gods of gold, and of silver, and of *brass*, etc. (Dan. v, 4, 23.)

#### COPPER PROPHETICALLY.

B.C. 1451. Before his death Moses blessed each of the tribes of the children of Israel separately. Of Asher he said, Let Asher be blessed with children, let him be acceptable to his brethren, and let him dip his foot in oil; "thy shoes shall be iron and *brass*." (Deut. xxxiii, 25.)

B.C. *circum* 712. "Thus saith the Lord to his anointed, to Cyrus, whose right hand I have holden, to subdue nations before him. I will go before thee, and make the crooked places straight; I will break in pieces the gates of *brass*, and cut in sunder the bars of iron." (Is. xlv, 2.)\*

B.C. 519. In a vision Zechariah "lifted up his eyes and looked, and behold there came four chariots from between two mountains, and the mountains were *brass*." (Zech. vi, 1.)

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\* See also ref. to *brass*, Numb. xxi, 9; Job xli, 27; Psa. cvii, 16; Ezek. ix, 2; xxiv, 11; Dan. ii, 32, etc.; iv, 15, 23; vii, 19; x, 6.



## COPPER SYMBOLICALLY.

B.C. 1451. After coming down from Mount Sinai Moses proclaimed to the assembly of the children of Israel, these are the commandments, the statutes, and the precepts which the Lord your God commanded to teach you, therefore thou shalt keep the commandments of the Lord thy God, to walk in his ways and fear him, for the Lord thy God bringeth thee into a good "land, whose stones are iron, and out of whose hills thou mayest dig *brass*." (Deut. viii, 9.)

## COPPER SYMBOLICALLY, ERRONEOUSLY RENDERED STEEL IN THE ENGLISH TRANSLATION.

It is difficult to understand the reason why the word steel has been erroneously applied in the following four passages instead of brass (copper) in the English translation, the more so as in two of the passages iron is likewise mentioned and correctly rendered. In the Septuagint version the iron and brass are clearly translated in both cases as *σιδηρος* and *χαλκος*. It is superfluous to add that copper swords and weapons were used before iron ones. Even in the prehistoric lacustral stations on the lake of Neuchâtel, the weapons were of copper, tempered almost as hard as steel, an art in which ancient nations excelled, but which has been long lost, although competent men have recently endeavoured to discover the process. Moreover the Phœnicians, Romans, and other people subsequently employed bronze, or copper alloyed with tin, but brass, an alloy of copper and zinc, was a very late discovery, the ores of zinc having been unknown to the ancients. Diodati translates rame (copper) in the Italian version; in Ostervald's French version it is rendered airain, but in that of Martin it is acier, in Jer. xv, 12, and in the other passages airain; Luther translates eherne, except in Jer., where he gives Erz, both which words are employed sometimes for copper, and at other times for bronze or brass; in Dutch version stal (steel), except in Jer., where it is rendered koper; the Vulgate uses "æneus."

## FINE COPPER, PRECIOUS AS GOLD.

Much conjecture arises as to what is here meant, and nothing can be decided satisfactorily, for the description is vague.

B.C. *circum* 457. Before starting for Babylon at the end of the captivity, to return to Jerusalem, Ezra separated twelve

of the priests, to whom he weighed the silver and gold, and the vessels of the house of God which the King, his counsellors and his lords, and all Israel there present had offered, "and two vessels of *fine* copper, *precious as gold.*" (Ezra viii, 27.) The words in the Septuagint read *σκεύη χαλκοῦ στίλβοντος αγαθον διάφορα ἐπιθυμητὰ ἐν χρυσίῳ*, vessels of good and excellent glittering copper, desirable as gold: they are variously interpreted: the Vulgate gives *Vasa æris fulgenti optimi duo, pulcra ut aurum*, as beautiful as gold; the French translation of Martin, *d'un bel airain fin, brillant comme l'or, et aussi précieux que l'or*; Luther's German version, *Ehernen köstliche Gefässe, lauter wie Gold*; precious brass (or copper) vessels, pure as gold; the Dutch translation is clearer, *twee vaten van blinkend goed koper, begeerlijk als goud*, two vessels of brilliant copper, desirable as gold.

Brass appears by no means to fulfil these requirements, nor even bronze, it seems to indicate a beautiful alloy of copper and gold, of peculiar brilliancy, such as has ever been made with marvellous perfection in Japan, and perhaps obtained from thence.

#### IRON, BARZEL, AS PERSONAL PROPERTY.

Tubal Cain, "an instructor of every artificer in brass and *iron*," lived long before the Flood. (Gen. iv, 22.)

When the Israelites spoiled the Midianites, among the metals they were commanded to purify by passing through the fire mention is made of *iron*. (Numb. xxxi, 22. See *ante* under copper.)

B.C. 1451. The Lord spake unto Moses in the plains of Moab, by Jordan, near Jericho, saying, "There shall be six cities for refuge, which ye shall appoint for the manslayer . . . both for the children of Israel and for the stranger, and for the sojourner among them, that everyone that killeth any person unawares may flee thither. And if he smite him with an instrument of *iron*, so that he die, he is a murderer: the murderer shall surely be put to death. But if he thrust him suddenly without enmity, or have cast upon him anything without lying in wait, or with any stone wherewith a man may die, seeing him not, and cast it upon him, that he die, and was not his enemy, neither sought his harm, the congregation shall deliver the slayer out of the hand of the revenger of blood." (Numb. xxxv, 16.)

In recounting to the children of Israel all God's marvellous deliverance of them he said, "Only Og, king of Bashan,

remained of the remnant of the giants : behold his bedstead was a bedstead of *iron* ; is it not in Rabbath, of the children of Ammon ? Nine cubits was the length thereof, and four cubits the breadth of it." (Deut. iii, 11.)

Moses commanded the children of Israel, "When ye be gone over Jordan ye shall set up these stones in mount Ebal. There shalt thou build an altar unto the Lord thy God, an altar of stones : thou shalt not lift up any *iron* tool upon them." (Deut. xxvii, 5.) Joshua built this altar in mount Ebal, as Moses commanded, "an altar of whole stones, over which no man hath lift up any *iron*." (Josh. viii, 31.)

As has been mentioned under brass, at the taking of Jericho the children of Israel were commanded utterly to destroy everything, but only the metals, including "*iron*, are consecrated unto the Lord, they shall come into the treasury of the Lord, and the vessels of brass and of *iron* they put into the treasury of the house of the Lord." (Josh. vi, 19, 24.)

B.C. 1444. The children of Joseph answered Joshua that the tract of country allotted to them in mount Ephraim was not enough for them, "and all the Canaanites that dwell in the valley have chariots of *iron*. Joshua spake unto the house of Joseph, even to Ephraim and to Manasseh, saying, Thou art a great people, and hast great power ; thou shalt drive out the Canaanites, though they have *iron* chariots, and though they be strong." (Josh. xvii, 16, 18). Joshua blessed the half tribe of Manasseh, and spake to them, saying, "Return with much riches unto your tents . . . with silver, and with gold, and with brass, and with *iron*." (Josh. xxii, 8.)

B.C. *circum* 1425. "The Lord was with Judah, and he drave out the inhabitants of the mountain, but could not drive out the inhabitants of the valley, because they had chariots of *iron*." (Judg. i, 19.)

B.C. *circum* 1316. The children of Israel again did evil in the sight of the Lord, and the Lord sold them into the hand of Jabin, King of Canaan, that reigned in Hazor, the captain of whose host was Sisera. "And the children of Israel cried unto the Lord, for he had 900 chariots of *iron*, and 20 years he mightily oppressed the children of Israel." (Judg. iv, 3. See also *ibid.* iv, 13 ; I Sam. xvii ; II Kings vi, 6 ; Ezek. xxvii, 12, 19 ; II Sam. xxiii, 7.)

#### IRON IN RELATION TO THE TEMPLE.

B.C. 1015. "David prepared *iron* in abundance for the nails of the doors of the gates and for the joinings" of the temple.

See under gold for the account David gave Solomon of the materials he had prepared for the erection of the Temple, which included "brass and *iron* without weight." Then the chief of the fathers offered willingly, including "100,000 talents of *iron*." (I Chron. xxii, 3, 14, 16; xxix, 2, 7.)

Solomon sent to Hiram, King of Tyre, requesting him to send him a man cunning to work "in *iron*" and in other metals. To which Hiram replied that he had sent Solomon a man skilful to work "in *iron*," etc. (II Chron. ii, 7, 14.)

B.C. 1012. In the 480th year after the children of Israel were come out of Egypt, Solomon began to build the Temple. "And the house when it was in building was built of stone made ready before it was brought thither, so that there was no hammer or axe, nor any tool of *iron* heard in the house while it was in building." (I Kings vi, 7.)

B.C. 856. About three centuries after the building of the Temple it greatly required repair, on account of the injuries it had sustained from enemies of the Jews, and King Joash concerted with Jehoida the priest to collect the needful money, which they paid to such as did the service of the house of the Lord, "and such as wrought *iron* and brass, to mend the house of the Lord." (II Chron. xxiv, 12.)

IRON SYMBOLICALLY. Job xl, 18; xli, 7 (*passim*).

Complaining of the cruel reproaches of his friends, Job cried, "Oh that my words were now written! Oh that they were printed in a book! that they were graven with an *iron* pen and lead in the rock for ever!" (Job xix, 24.)

Zophar the Naamathite said to Job as a reproach, "Knowest thou not that the triumphing of the wicked is short, and the joy of the hypocrite but for a moment, he shall flee from the *iron* weapon, and the bow of steel (copper) shall strike him through." (Job xx, 24.)

The Lord spake unto Job out of the whirlwind, saying, "Behold behemoth, which I made with thee, his bones are as strong pieces of brass, his bones are like bars of *iron*. Canst thou draw out leviathan with an hook? Canst thou fill his skin with barbed *irons*, or his head with fish spears? The sword of him that layeth at him cannot hold, the spear, the dart, nor the habergeon (margin: breastplate). He esteemeth *iron* as straw, and brass as rotten wood" (Job xl, 18; xli, 7, 27.)

Altogether iron is mentioned in 82 verses of the Old Testament.

LEAD, *Uphoreth*, AS PERSONAL PROPERTY.

B.C. 1452. After the spoiling of the Midianites, among the metals which the children of Israel were commanded to go through the fire, it has been seen that mention is made of "the lead." (Numb. xxxi, 22.)

B.C. 588. Among the products with which Tarshish traded in the fairs of Tyre mention is specified of "lead." (Ezek. xxvii, 12—see under precious stones.)

Lead is extremely abundant in Spain, besides all which the Phœnicians brought by sea to Tarshish from Cornwall and Brittany.

## LEAD SYMBOLICALLY.

B.C. 1491. "Pharaoh's chariots and his host hath he cast into the sea. Thou didst blow with thy wind: they sank as lead in the mighty waters." (Ex. xv, 10.) Also Job xix, 24; Jer. vi, 29; Ezek. xxii, 18; xxvii, 12; Zech. v, 7, 8.

TIN, *bedel*, AS PERSONAL PROPERTY.

B.C. 1452. As already quoted, all the metal taken by the children of Israel when they spoiled the Midianites they were commanded to purify, by making it go through the fire; and among the rest was tin. (Numb. xxxi, 22.)

B.C. 588. Tarshish traded in the fairs of Tyre with tin. (Ezek. xxvii, 12.)

The Sanscrit name is *kytira*; much tin is found in Malacca, and the Phœnicians are conjectured to have procured it thence.

Tin mines exist in Portugal, but besides it is well known that the Phœnicians obtained their tin from Cornwall, the ancient Cassiterides, a name derived from the Greek *κασσίτερος*, tin. The tin mines of central France then supplied the prehistoric dwellers of the lacustral towns of Helvetia, and ingots of metallic tin have been found in them near the town of Neuchâtel, in the lake. It would appear that the Phœnicians were the first people to discover and employ bronze, the alloy of tin with copper, so far back as the time of Moses, since the Midianite merchants must have obtained from them the tin of which we read, doubtless to make bronze. There is not the slightest shadow of probability that the Jews ever employed tin in all their history: the words lead and tin do not occur in the New Testament.

## TIN SYMBOLICALLY.

B.C. *circum* 760. "Hear, O heavens, and give ear, O earth; Wash you, make you clean; put away the evil of your doings"

from before mine eyes; cease to do evil, and I will turn mine hand upon thee, and purely purge away thy dross, and take away thy *tin*." (Is. i, 25.)

B.C. 593. "The house of Israel is to me become dross: all they are brass and *tin*, etc. As they gather silver and *tin*, etc., into the midst of the furnace to melt it: so will I gather you in mine anger and my fury." (Ezek. xxii, 18, 20.)

#### GENERAL DEDUCTIONS.

The generic word for gold is *zohov*, poetically *khorūts*; *kethem* is pure gold; *poz* and *zohov zukok* signify refined gold, and *zohov tohūr*, clean, pure gold; *toūraiph* is a refiner; *keseph nivkhar*, choice silver.

Alas! Abraham contracted in Egypt the (to him) useless passion of amassing great wealth of the precious metals, a lesson too faithfully learned throughout all ages by his descendants and non-descendants. Amongst the most ancient arts was that of extracting and refining the precious metals. Job speaks of God trying him, to come forth as gold. The working of them was familiar to the Israelites in Egypt, for they were so skilful in casting the golden calf, even in the wilderness.

At the fourth International Geographical Congress, at London, 1890, Mr. Bent exhibited the model of a most interesting group of stone buildings in Mashonaland, with which the writer was so remarkably impressed, from their wonderful analogy to the Phœnician *nuraghi* he had visited in Sardinia, that he pointed out the fact to him. Mr. Nicol Brown speaks of hundreds of ancient ruined structures in proximity to hundreds of shallow gold mines, less than 100 feet deep, and which are being now sunk still deeper on the same lodes. The ruins of ancient gold-smelting furnaces have been identified, even the crucibles and blowpipes with traces of gold still adhering to them, and Mr. Bent figures an astragalus-shaped ingot mould, corresponding to the *wedge* of Ophir, perhaps weighing a talent of gold? Mr. Brown, amongst others, is fully convinced that this is the Ophir whence Hiram procured the gold for Solomon; and the expression *wedge* clearly points out the acquaintance that Tyre possessed of the mining and metallurgy of gold. No wonder that Tyre should heap up gold as the mire of the streets. At the present time not a trace remains of the ancient native population, entirely exterminated, for in *none of the many languages* of South Africa is there a word signifying gold.

The gold of Ophir is mentioned by Eliphaz and Job; four times in connection with Solomon, and once with Jehoshaphat; once in the Psalms, and once in Isaiah as fine gold and the *wedge* of Ophir.

The gold of Sheba—somewhere south of Abyssinia—is mentioned by David in his prayer for Solomon, and allegorically of the glory of the church in Isaiah: the merchants of Sheba took gold to the fairs of Tyre.

God speaking by Jeremiah says that the idols of the heathen were made of silver from Tarshish and gold from Uphaz, and in a vision Daniel saw a certain man whose loins were girded with fine gold of Uphaz. Gold was also obtained from Parvaim, and especially through Tarshish, whence came gold, apes and peacocks. Caranza points out the abundance of peacocks in Andalusia, the apes were from Africa.

*Pure gold* was exclusively employed for the tabernacle by special command given to Moses by God for all which pertained to His worship: for the ark, the mercy seat, the table, with all the vessels upon it, the candlestick and its accessories, the altar of incense, the chains and bells of the ephod, the chains of the breastplate, the plate with the signet; in all these passages the original reads *zohov tohūr*, clean, pure gold.

David valued the judgments of the Lord more than much fine gold. The righteous are compared to fine gold (*kethem*), and refined gold (*poz*) in the lamentations of Jeremiah, while Solomon declared the gain of wisdom to be better than fine gold (*khorūts*, pure gold), choice gold (*poz*, refined gold) and choice silver (*keseeph nivkhar*), and to this latter he compares the tongue of the just.

Silver (*keseeph*) was early refined in a clay cupel, and melted to oxidize and separate the lead as *dross*, or litharge; David speaks of silver *tried* in a furnace of earth and of his being tried as silver is *tried*. In two passages Solomon mentions the *fining-pot* for silver, and the *furnace* for gold, and alludes to the residual litharge adhering to the broken cupel, as a *potsherd* covered with silver *dross*: he also refers symbolically to the separation of the litharge, saying, "Take away the *dross* from the silver, and there shall come forth a vessel for the *finer*. God says of the wicked thy silver is become *dross*. *Reprobate* (rejected) silver shall they call them; and elsewhere, I have *refined* thee, but not with silver, I have chosen thee in the furnace of affliction. The Lord foretold by Zechariah, I will refine Jerusalem, as silver is *refined*, and try them, as gold is *tried*.

God commanded His chosen people purity in everything: purity of food, unmixed woven clothes, washing from uncleanness, and purity in the metals they employed, as symbolical of purity of heart. The refining of metals is frequently mentioned and applied spiritually, while other nations, such as the Phœnicians and Midianites, employed alloys. The smelting of these when obtained from pagan nations is always enforced; for alloys, like whatsoever mixture, symbolized sin. Pagan nations employed the precious metals, principally on account of their superior value, for their idols; not for the sake of purity, for they likewise had idols of less value of brass, iron, stone and wood. On their leaving Egypt, the Jews were commanded: "Ye shall not make with me gods of silver, neither shall ye make unto you gods of gold." (Ex. xx, 23.) See also Ps. cxv, 4; Is. ii, 20; xl, 19; Zech. xiii, 9.

The weights of the metals offered to Moses for the making of the tabernacle were: gold 1,750 shekels; silver 100 talents 1,775 shekels; brass (copper) 70 talents 2,400 shekels, after the shekel of the sanctuary, double the ordinary one.

Mention is made of gold in 383 verses of the Old Testament; of silver, in 263 verses; of iron in 82; of lead in 7; of tin in 4.

The thanks of the meeting having been passed to the author, the Chairman invited discussion.

#### DISCUSSION.

The SECRETARY (Professor HULL, F.R.S.) said he would have great pleasure in conveying the thanks of the meeting to the distinguished author of the paper. He had himself, at the request of Mr. Spottiswoode, some years ago, tried to determine the representatives at the present day of the precious stones of Aaron's breastplate; but without much success. Of one stone, "the diamond," he felt confident that the translation ought to have been *rock crystal* or *quartz*, as the diamond (adamant) being the hardest of all stones, it must have been used for engraving the names of the tribes on the other stones. Then again it was remarkable that the turquoise was not mentioned, although the turquoise mines were



worked at Sarabit-el-Khadim in the Sinaitic peninsula by the Pharaohs before the Exodus. These mines are in the "Nubian Sandstone" formation, and have been investigated and described by the officers of the Ordnance Survey of Sinai, in their magnificent volumes, and more recently by Professor Flinders Petrie. The turquoise being a blue stone, it was probably the same as that designated as the "sapphire." The author had bestowed great labour on this paper—and probably there is nothing more to be said on the subject.

#### REMARKS BY LIEUT.-COLONEL MACKINLAY.

With reference to the words "a land whose stones are iron" (Deut. viii, 9), it has been remarked that no iron ore is to be found in Palestine; but the promised land extends from the Nile, the Mediterranean Sea and Lebanon to the Euphrates (Gen. xv, 18, Deut. i, 7, xi, 24), and in that larger district it is most probable that iron ore exists.

The metals lead and tin are only alluded to nine and five times respectively in the Scriptures; but gold, silver, brass (or copper) and iron are often mentioned, gold about 400 times, silver some 260 times, brass (or copper) and iron a little more and a little less than 100 times each respectively. This order of value is observed in the image in Nebuchadnezzar's dream, also apparently in Is. lx, 17, and in the tabernacle in the wilderness the first three metals come in the same order.

Gold and silver have long been known as the noble metals, because they do not oxidize, etc. Gold is the emblem of glory: thus we find the boards of the tabernacle covered with gold and the vessels within also of gold; the heathen made gods of silver and gold (Is. ii, 20, Ps. cxv, 4), and a crown of pure gold is set on the King's head (Ps. xxi, 3).

Silver has pre-eminently been used for money (the French word *argent* being synonymous with money): Joseph was sold for 20 pieces of silver, the Lord Jesus for 30 pieces of silver. Each Hebrew was redeemed with half a silver shekel (Ex. xxx, 13-15); thus silver stands typically for redemption or atonement, and we find that much of the silver of the atonement money was used for the sockets on which the gold-covered boards of the tabernacle rested

(Ex. xxxviii, 25-27), thus indicating that Jehovah's glory, revealed to man, is founded in atonement.

Brass (or copper) and iron indicate judgment, hard affliction, severity and strength; thus the serpent made by Moses and raised up on a pole was of brass: and the brazen sockets of the outer court of the tabernacle, Ex. xxvi, 37, xxvii, 10, speak of judgment. "Your heaven as iron and your earth as brass" (Lev. xxvi, 19), denotes severe afflictions; breaking and ruling "with a rod of iron," (Ps. ii, 9, Rev. ii, 27) indicates severity; "bones like bars of iron" (Job xl, 18), and "gates of brass and . . . bars of iron" (Ps. cvii, 16) denote strength.

#### STATEMENT BY THE AUTHOR, JULY 14TH, 1905.

Dr. Pumpell, in excavating the abundant ruins of Anan, near Askabad in Turkestan, found beads of lapis lazuli, carnelian and turquoise. This dates back to the remotest antiquity, but I do not know of sapphires in any remains of Assyrian, Egyptian, Greek or Roman cities. Askabad is not far from the Caspian Sea. It is not far from Central Asia, where I believe many once great cities lie buried under blown sands of what was, in the earliest ages, the great inland sea of Central Asia. Surely, as at Nineveh and Babylon we shall shortly learn an immense deal about their building materials, as well as their economic mineralogy. Possibly these cities may be even partly antediluvian.