ON SOME EVIDENCES

AS TO THE VERY

EARLY USE OF IRON,

AND ON CERTAIN

OLD BITS OF IRON IN PARTICULAR.

BY

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ON SOME EVIDENCES

AS TO THE VERY

EARLY USE OF IRON, ETC.

THE object of this paper is to show that a considerably remoter archæology can be claimed for the employment by man of iron than has hitherto been generally accepted. That iron was amongst the very earliest, if not in fact the earliest, of the metals with which man was acquainted, we have abundant *literary* evidence. Until lately, however, that has stood alone, unconfirmed by any *cotemporary* testimony. Now, however, we are in a position to shew, from two kinds of cotemporary proof, that iron was well known to man, in some parts of this earth at least, during the very remotest ages which it is possible with any degree of certainty to reach. The two kinds of evidence to which I allude are—

1st. That of the hieroglyphs.

2nd. Certain material specimens.

These two evidences appear now not only to confirm each other, but what is more important still, establish the solid truth of that literary testimony which in these latter days has come to be doubted; and although not yet complete, a further confirmation of the extremely ancient uses of iron may confidently be expected ere long as one result of researches into traditions and the comparison of myths,—the inquirers therein engaged having already so well succeeded in evoking little grains of truth out of whole mountains of myth.

When examining the works of those authors who have written on the history of iron, I have frequently noticed the scantiness of their attempts to indicate what is until now absolutely ascertained, as distinct from that which is handed down as tradition concerning the use of that metal in pre-historic ages; and I am disposed to believe such defect merely as a result of the trust which those authors appear to have placed in the teachings of a certain modern school, which, going dead against all literary testimony, declares for, and only for, the extremely high antiquity of copper and its alloys. When, too, certain researchers into the "Antiquity of Man"—supposing him to have been evolved by successive spontaneous efforts from an extremely low type of organic existence—claim that the appearance of iron

on the scene marks so decided a step on the road to a higher civilization, it is strange, indeed, that their inquiries into the remotest limit of time, when man became an iron-using animal, bear no stamp upon them indicative of having been directed into the earliest ages of which, and in countries where, we have positive cotemporary testimony—actual cotemporary fact to rest upon—rather than that a continued trust should be vouchsafed to the very uncertain records and theories as concerning other countries and still later ages, but founded only on mere probabilities.

Writers on what has hitherto been defined as the early history of iron we have had in abundance, since the time when Layard deposited in our British Museum the metallurgical trophies of his excavations in that Interamnian plain where once stood the Assyrian Nineveh and Babylon; or since Rhind, after exploring the tomb of Sebau, wherein he is reported to have discovered, "on the massive doors of the inner repositories, hasps and nails, still as lustrous and as pliant as on the day they left the forge,"* contended that iron was extensively used in Greece between the epoch of the Homeric poems (from 900 B.C. to 1000 B.C.) and the full historic period of Greece, and that within about the same interval, if not probably with an earlier commencement, the same metal was more or less completely displacing bronze in Egypt. It is inferred by Rhind—at least so I gather from Dr Percy's remarks—that Sebau was born about B.C. 68, and died B.C. 9; but we shall hereafter see that iron was known to and used by the Egyptians many centuries earlier, also that, before the time of the Persian invasion under Cambyses, there was enough iron in the country, as Belzoni has pointed out, to make instruments of agriculture with. Plate I. is a full-sized picture of a sickle† found by Belzoni under

* *Metallurgy: Iron and Steel.* By John Percy, F.R.S. London. 1864.

† Extract from *Narrative of the Operations and Recent Discoveries within the Pyramids, Temples, Tombs, and Excavations in Egypt and Nubia, etc., etc.* By G. Belzoni. A.D. 1821. Published by Murray.

"Two other articles were found in this excavation, of which one is a tombstone, and the other *an iron sickle*" (p. 162). . . . .

"But the iron sickle, to which I would call the attention, was found under the feet of one of the sphinxes on its removal. I was present; one of the men took it up and gave it to me. It was broken into three pieces, and so decayed that the rust had eaten even to the centre. It was rather thicker than the sickles of the present time, but exactly of the common shape and size of ours. It is now in the possession of Mr. Salt. The question is, At what time were these statues placed there? They could not have been deposited subsequently to the age of the Ptolemies; for it appears that since the time of Cambyses, who

the feet of one of the sphinxes at Karnak,—a sufficient proof that, at about B.C. 600, the blacksmith's art was well understood and practised in Upper Egypt; so that whilst the testimony I hope to adduce may be no refutation of Rhind's view in regard to iron displacing bronze at the particular time he mentions—for it is quite within the limits of probability that when alloys were discovered iron may have for a time fallen into disuse—yet the evidence to be hereafter dealt with will, I venture to believe, shew that to Egypt, and not Greece, must our attention be addressed for the solution of all problems bearing on the most ancient metallurgy.

By the distinguished leader in another branch of modern investigation the true history of iron has had a thick veil cast over it. I allude to what Professor Max Müller, who, reasoning on a purely philological basis, has propounded; but on examining his great work, the *Science of Language*, it is easy to see that he has been largely influenced by M. Morlot's conclusions, for he quotes M. Morlot extensively; and from the use of certain words in the *Odyssey*, concludes that the Greek language was spoken before the discovery of iron, and that iron certainly was not known previous to the breaking up of the Aryan family. But Professor Max Müller has overlooked apparently what may be gathered as to the early use of iron from another great branch of the human family—namely, the Semitic—to which branch both modern Coptic and ancient Egyptian belong, as indeed he himself has pointed out.* The testimony of the ancient Egyptian language, as well as modern Coptic, have of late thrown a flood of light on the subject of this inquiry. Yet, before passing on from Professor Max Müller, I wish to bring to your notice—for I should fail in my duty were I to omit doing so—another still more remarkable error into which he has fallen, by trusting it would seem, too exclusively to language-science. This error occurs in the following sentence:—"In the Homeric poems, knives, spear-points, and armour were still made

destroyed the gods of Egypt, the country has never been invaded, so as to compel the people to conceal their idols; and it is evident that these statues had been hidden in a hurry, from the irregular and confused manner in which they lie. Now, as the sickle was found under the statue above mentioned, I think it a sufficient proof *that there was iron in the country long before the invasion of the Persians*, since the Egyptians had enough to make instruments of agriculture with. Sickles of the same form are to be seen in many agricultural representations in the tombs," etc., etc. (p. 163).

* *Lectures on the Science of Language* (p. 316). London, 1866. First Series. Longmans.

of copper; and we can hardly doubt that the ancients knew a process of hardening that pliant metal, *most likely by repeated smelting and immersion in water.*"*

Now, what exactly the phrase "repeated smelting" may mean, as used in this connection, it is difficult to assert; but as *smelting* involves *heating*, I conclude that the phrase should rather be "repeated heating." But whether I am correct or not in that inference is of no consequence; for, as a pure matter of certainty, it is well known that, unlike iron, copper is *not hardened* by immersion or cooling in water, but, on the contrary, it is *softened* thereby; indeed, it is the constant practice of coppersmiths and other craftsmen, when desiring to soften that metal or its alloys, to heat it and cool it in water, whilst it is hardened by rolling, beating, or pressing; and one of these latter operations was doubtless not unknown to the Greek makers of knives and spear-heads in copper.

The paucity of researches bearing on the knowledge and use of iron in pre-historic ages can, as I have already hinted at, be scarcely any other than the direct outcome of that dogma propounded by the Danish and Swedish antiquaries—Nillson, Steenstrup, Forchammer, Worsaäe, and others—which teaches that men began to use tools of stone, then bronze, and lastly iron.

As to the beginnings of man, in *some* parts of the world at least, to do his work with stones, it is no business of ours just now to enter upon, nor, indeed, does there seem occasion to do so, for the conclusions in that connection appear, so far as an *incomplete* testimony can go, well founded. But concerning the further question, as to whether bronze and iron came *universally* to be employed in the order of succession assigned to them by the progressive developists, amongst each of the sections of mankind now grouped according to the character of their language into the Aryan, Semitic, and Turanian families, we have, I believe, sufficient grounds to question.

It is asserted, as I have already mentioned, that the appearance of iron on the scene is an index to certain guides of our own times, that a higher civilization prevailed than where bronze is present, as may be gathered from the following passage of Sir Charles Lyell's writings, when quoting M. Morlot,† he says:—"The next stage of improvement that is manifested by the substitution of

* *Lectures on the Science of Language* (p. 230). London, 1868. Second Series. Longmans.

† *Bulletin de la Société Vaudoise des Sciences Naturelles*, tom. vi., p. 292.

iron for bronze indicates another stride in the progress of the art. Iron never presents itself except in meteorites in a native state; so that to recognize its ores, and then to separate the metal from the matrix, demands no small exercise of the power of observation and invention."* To the metallurgist, however, who is conversant with the art and science of extracting metals from the ores, and of compounding them together as alloys, the picture at once presents a different view; and it is indeed some satisfaction to know that the bronze and iron order of succession does not receive the assent of our leading living metallurgist, Dr. Percy.

That school, however, which claims the higher antiquity for the alloy bronze seems to infer that because no iron specimens are pointed out so old by centuries, perhaps by thousands of years, as this spear-head, that chisel, this bowl, or that hatchet (and I am not aware that any one has yet proved that an iron specimen has been found in the whole world which could be pronounced even so old, not to mention older, than any one of the many bronze relics of which such a legion exist; indeed, when we reflect upon a certain peculiarity inherent to the metal iron, and, for our present considerations, practically absent from the alloy bronze, it does appear scarcely possible that a specimen of metallic iron should be found belonging to nearly so early an age as that to which even tolerably late bronze specimens belong; for we need only to be reminded that iron, when exposed to the action of the air or moisture, even in a very few years, becomes converted into an oxide, and so entirely, that it is often not possible to recognize whether it had previously been reduced to the metallic condition or not), iron could not have been previously used.

The Proto-Egyptian remains, monuments, etc., in Lower Egypt are allowed by all men of all creeds to be the oldest extant relics of the works of the human race, (some of them not only the most stupendous, but the most perfect in mechanical excellence that we can ascertain to have at any time been erected on this earth, and but for which inherent quality they would long since have passed out of the reach of our eye-witness—as many others of a lower order of mechanical construction, and of far later date, have passed away, even so that their place can nowhere now be found), and confronting these primeval structures with the bronze and iron succession dogma, as educed more especially from Scandinavian philosophy—how does the dogma fit the facts before us

* *The Geological Evidences of the Antiquity of Man, &c.*, by Sir Charles Lyell, Bart., F.R.S. London, 1863.

in respect of Proto-Egyptian testimony. Methinks I hear the supporters of that dogma re-echo, "Exactly;" "for bronze, it has been said, was compounded of such proportions of the two metals that the resulting alloy was so hard that it would cut stone just as well as the steel chisels and jumpers of to-day; and therefore it must have been used in those extremely early erections." This is, however, I am disposed to believe, rather a begging of the question, and specially illogical. For we may surely in all fairness ask, that since bronze is so slowly oxidizable, if it really was used in Lower Egypt, on these the very earliest works of man on the earth, should we not find some specimens of it in or about these said monuments? Yet, so far as I have been able to ascertain, *not a single bronze relic* has been found throughout the whole Nile valley which can *with certainty be pronounced so old as either the material or hieroglyphic testimony which we now possess regarding iron.*

But, to turn again to the question of the priority of iron, how does the investigation result? Not, as we should expect, from the bronze and iron succession doctrine, but precisely the reverse of that; for not only are iron instruments depicted in the tomb pictures of the 4th dynasty at Memphis, but at Memphis itself: among the monuments there metallic iron has been found, and is now in this country of ours. Not only is metallic iron found in that very locality to-day, but remarkably so, it has been found in the very oldest building of all there—by universal accord the very oldest building in the whole earth; not in that particular building either, in such a way as to have been placed there by accident or intention, at a time subsequent to the erection, but in such a way that it could have been placed there when and only when the structure was in course of erection. Now, it may perhaps appear startling to be told that, after a lump of malleable iron was removed by blasting it out from the solid masonry of the Great Pyramid by Col. Howard Vyse, thirty-five years ago, and which has been ever since deposited in the British Museum, I have altogether failed to meet with an allusion to it by any writer on the history of metallurgy. This piece of iron to which I refer was not dug up amongst any rubbish or concreted mass of matter at the foundations of the Pyramid which have there accumulated, but near the top of the building, as the following passage and certificates, quoted from Howard Vyse's *Pyramids of Gizeh* testify.

"Mr. Hill discovered a piece of iron in an *inner* joint, near the mouth of the southern air-channel, which is probably the oldest

piece of wrought iron known.* It has been sent to the British Museum, with the following certificates:"—

"This is to certify, that the piece of iron found by me near the mouth of the air-passage in the southern side of the Great Pyramid at Gizeh, on Friday, May 26th, was taken out by me from an *inner* joint, *after having removed, by blasting, the two outer tiers of the stones* of the present surface of the Pyramid; and that *no joint or opening of any sort was connected with the above-mentioned joint*, by which the iron could have been placed in it after the original building of the Pyramid. I also shewed the exact spot to Mr. Perring on Saturday, June 24th.

"J. R. HILL.

"CAIRO, *June 25th*, 1837."

"To the above certificate of Mr. Hill I can add, that since I saw the spot at the commencement of the blasting, there have been two tiers of stones removed, and that if the piece of iron was found in the joint pointed out to me by Mr. Hill, and which was covered by a large stone, partly remaining, *it is impossible it could have been placed there since the building of the Pyramid.*

"J. S. PERRING, C.E.

"CAIRO, *June 27th*. 1837."

"We hereby certify that we examined the place whence the iron in question was taken by Mr. Hill, and we are of opinion *that the iron must have been left in the joint during the building of the Pyramid, and that it could not have been inserted afterwards.*

"ED. S. ANDREWS.
JAMES MASH, C.E."

"The mouth of this air-channel had not been forced—it measured $8\frac{7}{8}$ inches wide by $9\frac{1}{8}$ inches high—and had been effectually screened from the sands of the desert by a projecting stone above it."

Since then, the Great Pyramid is absolutely the oldest building on every testimony, both that of Herodotus, the hieroglyphs, and astronomy, as proven by the researches of Lepsius, Wilkinson, Fergusson, Herschel, and Smyth; and whereas iron is found there and bronze is not; and whereas it is doubtful whether any bronze relics found near Jeezeh are so old as the Pyramid, I think the proof is clear to the most obstinate, that for iron we must claim an antiquity far higher than that hitherto assigned to it. Yet some will doubtless object to such a conclusion, seeing that it is only a *single* specimen which, so far, has been found. It must not, however, be forgotten that had not this specimen been in the

* Lord Prudhoe is said to have brought from Egypt an ancient iron instrument; and I thought that I had perceived the remains of an iron fastening in the chamber containing the sideboard or shelf in the great temple at Abou Simbal. In fact, *stone could not have been quarried without metal, which must, therefore, have been in use in the earliest times.* The smelting of metals seems to have been an antediluvian art.

position which the certificates I have read to you point out, that is, walled in, removed from contact with the corroding action of the atmosphere and moisture, but in an exposed position, even it could not have come down to our day; so that if, as doubtless there may have been, numerous tools of iron, or perhaps, nay, almost certainly steel, left in that locality by the Pyramid builders, it is beyond doubt that unless enclosed, as the specimen under notice was, not one of them would have lasted until now, even in that driest of climates—Egypt.

Before, however, we do, from the evidence afforded by this particular specimen of iron from the Great Pyramid, commit ourselves to certainly assigning it to be of cotemporary date with that monument's erection, we have, in order to act fairly towards all parties, to ask ourselves whether it is not probable that it may have been surreptitiously dropped into the place by some wily Arab worker, just after the stones surrounding its site were blasted away—for some persons will doubtless be found sceptical on that head—when remembering the cunning with which modern Arabs are reported to drop fragments of pottery and burnt brick into Nile mud excavations, on purpose to find them afterwards, so as to entitle them to baksheesh from the exploring parties. If this Pyramid piece of iron had been found so recently as the times when the Nile mud excavations were carried on, wherein Arab sagacity was evoked to practical wrong-doing in the prospect of reward, I for one should be disposed to place little trust indeed in its testimony; but whereas it was removed from the Pyramid some twenty years before the time when Hekekyan Bey and Mr. Leonard Horner began sinking pits and boring in the Delta, and in whose day it would appear that the Arab trick was developed; and whereas the finding of metallic specimens in the Pyramid was no part of Howard Vyse's inquiry, as the finding of pottery specimens in the Delta was of the later investigators,—it does not look in any way reasonable to suppose that the iron found its way there so surreptitiously; and as a positive argument against the validity of that suggestion, the very condition of the piece of iron itself may be noticed, as shewn by figs. 1 and 2, Plate II.*—namely,

* This Plate, as well as Plate I., show the iron specimens full size, and have been copied from photographs specially prepared to illustrate this paper.

My friend, W. Petrie, has been kind enough to spend much time, at my request, in the examination of this piece of iron from the Great Pyramid; and in writing me lately regarding it, he says,—"Thickness originally, probably $\frac{1}{8}$ inch. In some parts it is now $\frac{1}{8}$, including the scale of rust, and in other parts it thins off to nothing. The side having the label upon it is much

the fact of its having pieces of nummulite limestone—indeed, the trace of a nummulite itself—of which very stone the Pyramid is built, still adhering to it; and this condition of the piece of iron certainly looks like valid evidence of its having been built into the Pyramid, and therefore cotemporary with the erection of that monument. Yet we still require evidence from other sources to ratify our conclusions, and which is happily forthcoming. But, before speaking of that further evidence, I wish to consider another matter.

It is asserted by many persons now-a-days, who, it would appear, are but little versed in metallurgic science, that iron indicates a further acquaintance with metallurgic art than bronze indicates. This, I believe, is a conclusion not only erroneous, but one which no practical metallurgist would assent to. Looking broadly at the face of metallurgic science, it is scarcely possible to point out a simpler and more readily occurring result, than the reduction of iron ores to the metallic condition, in the manner wherein that was effected prior to the modern invention of cast iron. We must remember that there is not a tissue of evidence that cast iron was known to the ancients, although certain writers, and amongst them a well known member of this Society, Mr. James Napier, has written, that the *reduction* of iron ore is performed by mixing the oxide of the metal "with coal or other carbonaceous matters, and subjecting them to a heat of sufficient intensity *to fuse them.*"* Now, it is well ascertained, as the result of a very long experience, that iron may be reduced from the oxides to the metallic state without fusion; indeed, in the most perfect blast furnace operations, the iron is reduced by carbonic oxide before the charge reaches that portion of the furnace where fusion takes place (the smelting zone of Scheerer). When fusion does take place, we get from the

rougher than the other side; and on this side is a trace of a nummulite, in lighter colour than the iron, concreted on it; and there is also a nodule of stone, $\frac{1}{6}$ inch diameter, projecting from the surface, and sinking into the rusty mass. Judging from general appearances and weight, not more than half of what now remains of it consists of rust, the remainder is probably yet metallic. The colour of the rust is the usual dark-brown or blackish, not reddish; and it is a very hard and solid kind of rust, like the magnetic iron ore. It has evidently been flexible, tough wrought-iron."

* *Ancient Workers and Artificers in Metal.* By James Napier, F.C.S., &c. London, 1856. P. 132.

And Sir Charles Lyell, as if borrowing his information from Mr. Napier, goes somewhat farther, when he writes—"To *fuse* the ore requires an intense heat, not to be obtained without artificial appliances, such as pipes inflated by *the human breath*, or bellows, or some other suitable machinery."

furnace either cast iron or crude steel, the iron being combined with a portion of the carbon of the charge. From what we know of the most ancient methods of reduction, the *fusion* of the metal was by them impossible. Hence the attempts in modern times to extol the difficulty of iron-making, by supposing its fusion to have been necessary, and therefore raising it high above the state of knowledge requisite for the more complex operations of forming an alloy out of two dissimilar metals, are not only incorrect but extremely misleading. The same author, to whom I have already referred, even goes so far as to say that "the smelting and manufacture of iron is surrounded with so many difficulties, and needs so many requirements and such skill, that we would expect it to have been amongst the last of the metals that were brought into use." Now, from what has been said, and from what follows, it will, I believe, be admitted that not only is iron the very first metal which we should expect to find brought into use, merely on account of the simplicity by which it is reduced from its ores—namely, by heating the oxides in contact with carbon, and maintaining that contact for a length of time sufficient to allow the carbon, by a process analogous to that of cementation, to attack the oxygen to the innermost parts of the lumps of ore, resulting finally in a mass of malleable iron or a crude steel, ready to be re-heated and hammered into any shape desired. Whilst I have been thus led to point out the tendency towards erroneous conclusions to which Sir Charles Lyell and Mr. Napier have helped us, yet I must, in due courtesy, acknowledge that the latter gentleman upsets his own conclusions by showing, from literary and monumental proof, that the use of iron was at least coeval with bronze, if not anterior to it; and in so far he has helped much those who reason from the metallurgist's point of view; for, quoting Sir Gardner Wilkinson, Mr. Napier says:—"Iron and copper mines are found in the Egyptian desert, which were worked in old times; and the monuments of Thebes, and some of the towns about Memphis, dating more than 4,000 years ago, represent butchers sharpening their knives on a round bar of metal attached to their aprons, which, from its blue colour, can only be steel."*

Sir Gardner Wilkinson himself, too, as late as 1847, when the third edition of his famous five volume work† was published, has written—"The most remote point to which we can see opens with a nation

* "*The Ancient Workers in Metal*" (p. 133). London, 1856.

† "*The Manners and Customs of the Ancient Egyptians*," p. viii., Preface. London, 1847.

possessing all the arts of civilized life already matured." Which passage contrasts strikingly with another in the same volume (p. 59),—"It was about the same period, B.C. 1406, that some suppose the use of iron* to have been first discovered in Greece; but whether it was already known in Egypt or no, is a question hitherto unanswered. We are surprised at the execution of hieroglyphics cut in hard granite and basaltic stone, to the depth of two inches, and naturally enquire, what means were employed—what tools were used? If the art of tempering steel was unknown to them, how much more must our wonder increase? and the difficulty of imagining any mode of applying copper to this purpose adds to our perplexity." It is singular that so faithful and fair-dealing an author as Sir Gardner Wilkinson, one, too, so pre-eminently versed, after his long residence in Egypt, as to the facts relating to its history, and writing, too, so many years after the deposit of the Great Pyramid iron specimen in the British Museum, and being in general so exact a scholar in the hieroglyphs, should assert that "whether iron was already known in Egypt *or no, is a question hitherto unanswered.*" Since, however, Wilkinson, Lyell, Morlot, and certain Swedes and Danes have published their views to the world, Egyptological research has not stood still; on the contrary, it has been prosecuted with continued energy, resulting, in so far as our present purpose is concerned, with some striking corroborations of the use of iron, not only so early as the Great Pyramid age, but much earlier still; for we find, as it has been so learnedly set forth by Mr. Basil H. Cooper,† that there is well ascertained hieroglyphic evidence of iron being known in Egypt even so early as the sixth or seventh monarch of the *first* dynasty.

Mr. Cooper says,—"It must, I think, be conceded . . . that supposing iron to have been known to the Egyptians . . . its employment in the construction of those Titanic erections, the Pyramids, . . . is far more probable than the hypothesis that none but bronze tools were used. And this, I venture to think, can be satisfactorily demonstrated.

"The proof is based on the extremely significant Coptic word for iron, as illustrated and explained by the mode in which it is written

* "Hesiod (in his Opera et Dies) makes the use of iron a much later discovery. In Theseus' time, who ascended the throne of Athens in 1235 B.C., iron is conjectured not to have been known, as he was found buried with a brass sword and spear. Homer generally speaks of brass arms, though he mentions iron."

† *Trans. Devonshire Association for the Advancement of Science, Literature, and Arts.* 1868.

in the hieroglyphical inscriptions, and on the occurrence of that word as a component element in the name of an Egyptian Pharaoh belonging to the first dynasty. The modern Egyptian word for iron is, in the Sahidic dialect, which is considered to be the purest Benipi, or, with a slight change in the final vowel, Benipe. In the hieroglyphical form of the language it is the same. . . . Its first element is BA or BE (in the Coptic BO), meaning 'hard-wood,' or 'stone;' and the two letters which spell the word are often accompanied in the hieroglyphical inscriptions by a picture of the squared stone, such as those of which the pyramids were built. At other times, as if to remind us that the word originally meant 'hard-wood,' and that it was only in process of time that it came to denote 'hardware' in general, including such stone hardware as was going in very early times, the picture illustrating the spelt word was a branch or sprig. The middle syllable in the word Benipe consists of the letters NI, with a very short vowel. It is a preposition, answering to the English 'of.' The last element in the composite word is the syllable PE, which is the Coptic word for heaven, or the sky. And that this is really its signification here is proved incontrovertibly by the pictures with which this syllable is wont to be accompanied in the hieroglyphical orthography of the word Benipe; for it is the picture invariably used to denote the heaven, or the sky, and is employed for no other purpose. Properly, it represents the ceiling of a temple, which was regarded as itself a representation of the sky, the true ceiling of the true and original temple; and the picture is accordingly wont to be emblazoned with stars. Hence," says Mr. Cooper, "the signification of the entire word Benipe, . . . although it could not for some time be conceived why the Egyptians should have called iron by so singular a name as 'stone of heaven,' 'stone of the sky,' 'sky-stone.'"

"Some time afterwards, however, it occurred to me that this was the very name which would naturally be given to the only iron with which men were likely to meet in a natural state. There is but one exception to the rule that iron is never found native, like gold and some other of the metals; that exception is in the instance of *meteoric iron*, which might surely be called with propriety "the stone of heaven, or of the sky." "Moreover—and I have to thank my friend Mr. Pengelly for reminding me of the fact, and so materially helping me to shape out my crude speculation—meteoric iron needs no preparatory process, as does that procured from ores, to render it workable. In short, we may be sure, especially with the light thrown on the matter by this invaluable Egyptian word,

bright with the radiance of that heaven which enters into its composition, that with this wondrous matter from another sphere than our own the working of iron began."

Whether Mr. Basil Cooper be right or not in his final conclusion, that meteoric iron was the first used, I think we scarcely have sufficient evidence to convince us, although it looks extremely probable; but that the hieroglyphic testimony is at one with all the other evidence, no one, I should suppose, would now dispute; and especially when we find that in Lower Egypt, in the very earliest times, the inhabitants worked so perfectly in granite, diorite, and others of the very hardest stones, for which copper or bronze tools would be useless, the result of all the testimony which I have adduced is to add another link to the completion of that chain of evidence which in Lower Egypt pre-eminently proves the extremely high intellectuality of man in the earliest ages which we are able, with certainty, to fathom.

In conclusion, I have to record my obligations to the Directors of the British Museum; and especially to the keeper there of the Oriental Antiquities, the learned Dr. Birch, for affording me the opportunity of having photographed, under Dr. Birch's superintendence, the specimens of iron referred to in this communication; and to my friend W. Petrie I am much indebted for frequent visits to the British Museum, and for personally applying to the Directors, and procuring their permission to photograph the iron relics.

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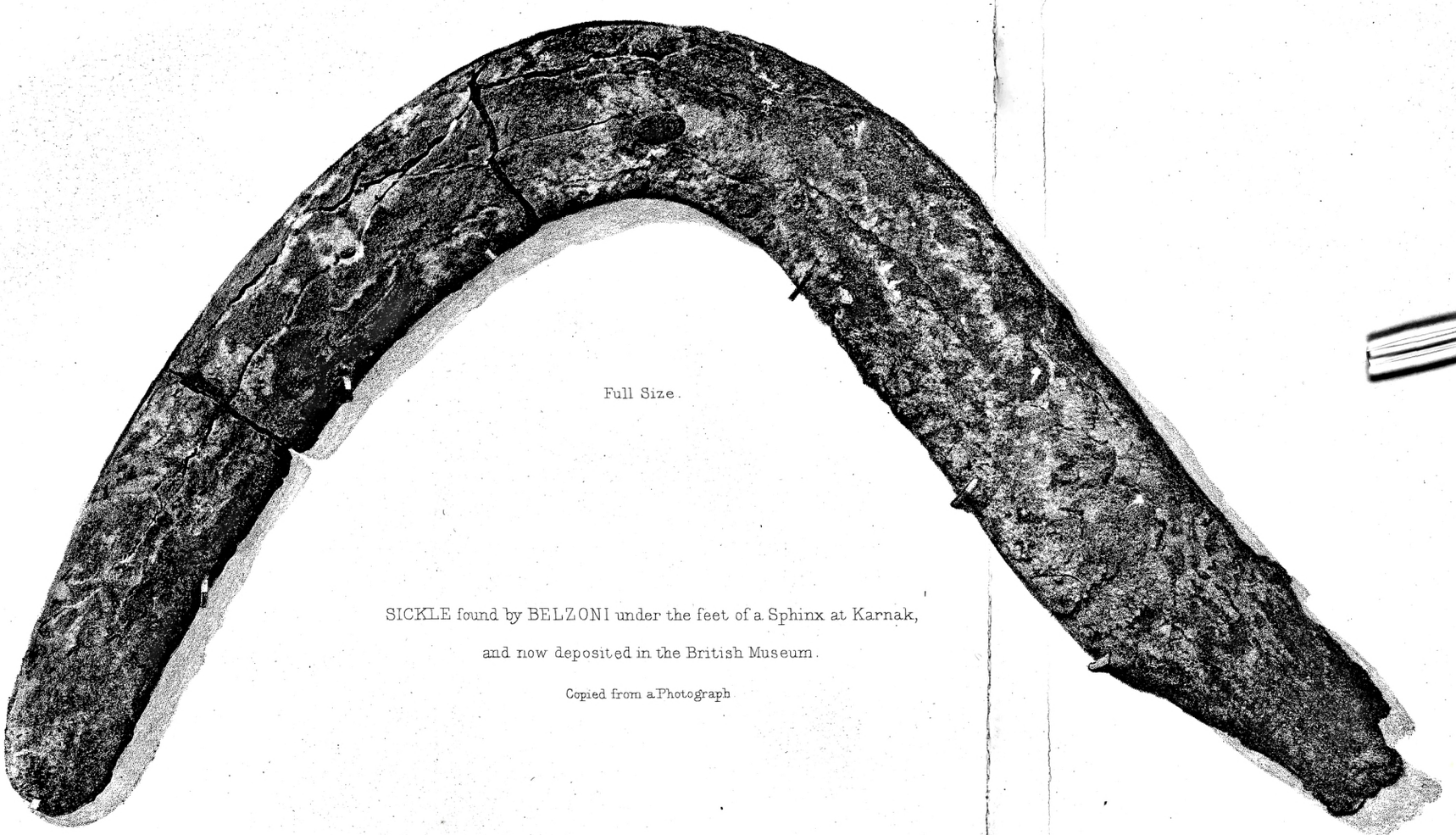
PLATE I



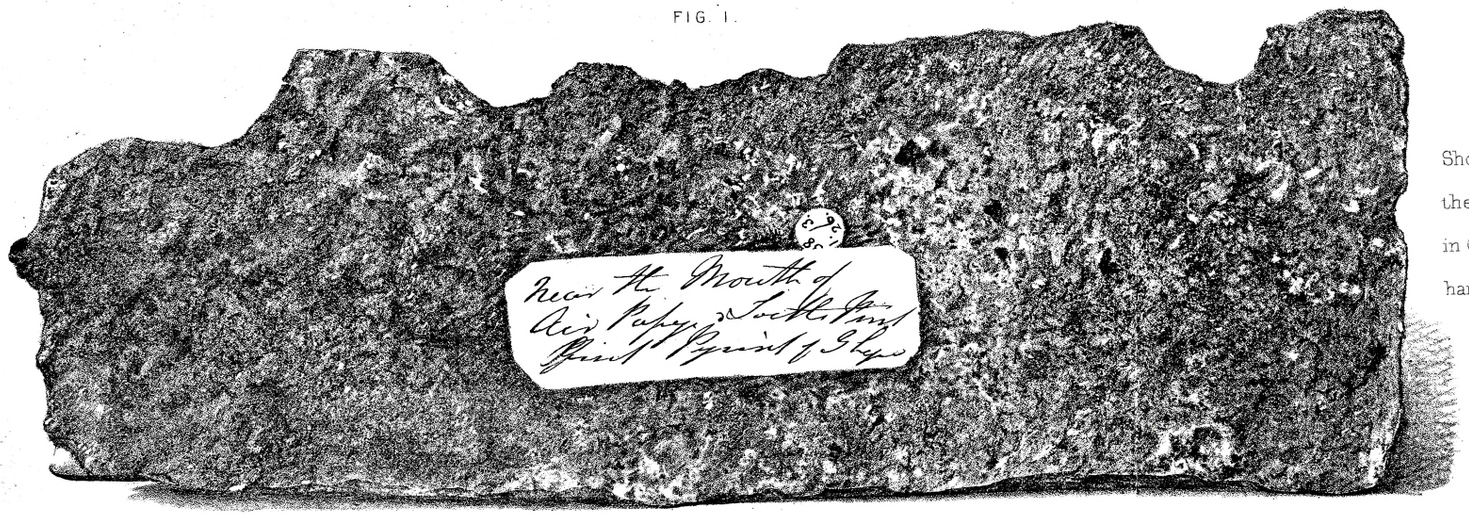
Full Size.

SICKLE found by BELZONI under the feet of a Sphinx at Karnak,

and now deposited in the British Museum.

Copied from a Photograph

FIG. 1.



Showing one side with the descriptive label in Col. Howard Vyse's handwriting.

PIECE of IRON removed by blasting from the solid masonry of the Great Pyramid.

Full Size.

Copied from a Photograph.

FIG. 2.

Side reverse to that shown by Fig. 1.