REMARKS ON JADE.[1]

By JAMES HILTON, F.S.A.

During the last ten years antiquaries have frequently had their attention directed to the subject of jade, and the natural question has often been asked—"What is jade?" Jade is a stone or rock of rare occurrence in nature, being found in veins traversing certain granite, gneiss, syenite, schistose, and metamorphic rocks; the surrounding conditions require the investigation of much that is positive, negative, and doubtful, in the endeavour to define its character and to give an exhaustive answer. The question is one that concerns the mineralogist, the art collector, and the archæologist, and with a view to assist investigation I propose to bring together, (I believe now for the first time), some of the opinions of the leading authorities who have recorded current facts and scientific researches. It will be seen, however, that much obscurity pervades the subject, and that confusion has been caused by the too general application of the name "jade" to numerous kindred mineral substances; indeed, it must be confessed that it is sometimes difficult to determine which of them is jade, and which not. But inasmuch as the identity of jade, the one substance distinct from the others, is necessary for the solution of some intricate archæological questions, it is obvious that care is needful in pursuing the investigation, and in coming to a conclusion on matters appertaining to it, or to any jade or jade-like object that may engage the notice, either of the archæologist, or mineralogist.

Almost without exception the literature which I shall mention is easily accessible, and may be consulted in the

[1] Read at the Monthly Meeting of the Institute, 3rd May, 1888.

library of the British Museum, and therefore, and also for the sake of brevity, I shall make only pertinent extracts, and indicate where more extended information is to be found. The subject is, in fact, too extensive to be disposed of in the space of a few pages. I would first refer to the article on jade in the recently published ninth edition of the Encyclopædia Britannica, vol. 13, which gives a general answer to our question, and also a table of the analysis of various rock substances that have usually passed under the name of jade. Taking two of them for example to show the component parts, a specimen of white *jade* from China gave these proportions:—Silica, 58; magnesia, 27; lime, 12; alumina, 0; a specimen of another stone *jadeite* gave silica, 59; magnesia, 1; lime, 2; alumina, 22. This broadly shows the difference between two of the substances which I shall mention later on. The specific gravities respectively being 2.97 and 3.34.

If analysis be true it is also true that jade may be distinguished from every other stone material; the test of analysis, combined with specific gravity[1] and microscopical examination, will afford a definite answer to the question as to any particular specimen; but the processes are troublesome and hardly within the means of ordinary inquirers to conduct. Outward resemblance between jade-like substances cannot be relied on; the great hardness of jade is a characteristic quality, but is not conclusive; colour, too, is an imperfect guide. Jade is pure white; it is also pale green passing through various gradations of pure green into dark green, and almost into black; besides these there are other tints of grey and yellow, and, as is alleged, blue, but I have not seen any. Some of the jade-like stones also partake of these colours. Jade is not transparent,[2] it is described as having a waxy,

[1] Specific gravity, or the comparative weight of a substance compared with an equal bulk of pure water at a given temperature, is most important, and it can be ascertained without damage to the specimen, however valuable it may be. The processes of analysis are more or less destructive to the specimen. The specific gravity of white jade from China is about 2·97; of green jade from New Zealand, 3·2; of green jade from a Swiss lake-dwelling, 3·02; of jadeite from China, 3·34; of chloromelanite, 3·41; of fibrolite, 3·18. This shows that jade is lighter relatively with the other minerals.

[2] There is, however, a worked object, a small bottle, like fractured glass, or flawed rock-crystal, in the British Museum Mineral Gallery, which is admitted to be jade. Some one has called it "camphor jade" from its appearance; it may be described as transparent. The specimen is unique, or most unusual.

or oily, or resinous appearance on the surface, it takes a good but not a brilliant polish, it is tough, fine grained, and compact; a steel knife, for instance, makes no impression on it as it does on marble or other softer stone. Jade is described along with some kindred rock substances in a well-known work, "Elementary Introduction to the Knowledge of Mineralogy," by William Phillips, second edition, 1819. I find, however, that in the later edition of 1852 of the same work, at page 650, jade, under the name of "nephrite," is relegated to the appendix, among "minerals the composition of which is unknown or doubtful, and which are imperfectly described." Recent investigators, however, have placed on record some more satisfactory information, and the name "jade" is now applied to a particular mineral substance among the great variety that bear some sort of resemblance to each other, and which have had, it is said, more than a hundred different appellations of uncertain signification.[1] The French mineralogist Damour gives the following list of materials used for the formation of ancient stone implements,—quartz, agate, flint, jasper, obsidian, fibrolite, jade, jadeite, chloromelanite, amphibolite, aphanite, diorite, saussurite, and staurotide; and even to these many other varieties of rock might be added by the scientific mineralogist. The mineral serpentine bears a strong resemblance to jade in appearance, but it is not quite so hard. I exhibit one, out of several ornamental works in this material which I possess, mostly of yellow tint, of Eastern design, though of unknown origin. Pebbles are brought from the island of Iona (Scotland), also of a yellow or pale green tint, which used to pass as jade, but really belong to the serpentine class of mineral.

An inspection of the specimens in the mineralogical gallery of the British Museum at South Kensington will help to answer the main question, assisted by the official "Guide." That concise handbook states that jade or nephrite is essentially a silicate of magnesium and calcium; one of the characters useful for the recognition of jade is its specific gravity, and that is generally about 3·0 in the green, and about 2·9 in the cream-coloured varieties. Specimens may be seen in case No. 24d, on the south

[1] Professor Fischer has collected nearly 150 synonyms of jade.

side of the gallery. Among them is an oval basin of pure white jade, very thin and beautiful, and of great value; also the rare object of "camphor jade" before alluded to. Case No. 27ab, on the north side of the gallery contains the specimens of jadeite, which the "Guide" states to be essentially a silicate of sodium and aluminium, and one of the green stones which, under the name of jade, are wrought into ornaments in China; from that mineral, however, it is distinguished by its chemical composition, structure, and higher specific gravity, the latter ranging from 3·1 to 3·4. The specimens differ from jade in tone of colour and in being more mottled and splotched with bright emerald green. Other jade-like minerals which I have mentioned may be traced by means of the index to the "Guide" book.

The word "jade" is regarded as a corruption of an old Spanish expression, signifying the supposed medicinal properties of the stone we are now considering. The Spanish appellation seems to have been a corruption of the Chinese name passing through a Dutch pronunciation of it,[1] until we get jade as the English word, which I find in use in 1730 to indicate the mineral substance; but certainly the word in our language had a very different signification 200 years earlier.

The next authority worthy of notice is Macmillan's Magazine for May—October, 1871, vol. xxiv., p. 452, where there is an interesting article on the jade quarries of the Kuen-lun Mountains, in the north west region of China. Another work, "Visits to High Tartary, Yarkand, and Kashgar," by Robert Shaw, 1871, page 473 contains further information on the quarries which produce jade, and which, as it is stated, were abandoned by the Chinese, when they lost the territory some years ago through rebellion and unsuccessful war. It was from the places described that the supply of jade was obtained for the fine carved objects, with which many of us are acquainted in museums and private collections. The same quarries were again mentioned in 1874 in the Journal of the Geological Society of London, vol. xxx, p. 568, by Dr. Ferdinand Stoliczka, the naturalist attached to the Yarkand Mission.

[1] See letters dated 3rd, 6th, 9th Jan. 1880, from Major Raverty and others in the *Times* of the period.

He describes the desolate mountain region and what he saw there, and expresses his belief that the Chinese had used these quarries for the last two thousand years. A translation in two large folio volumes, of a work by J. Nieuhof, published in 1673, (an embassy from the Dutch East India Company, to the Emperor of China), describes at p. 414, of vol. ii., the stone called "Yu," the Chinese name for what we call Jade. It was dug out of the mountains of "Caskar" with incredible trouble, partly from the hardness of the stone and partly from the "desolateness" of the place. It was farmed to one merchant, and the produce was allowed to be sold after the emperor had taken the most choice pieces for himself; people going there took a whole year's provision with them. It is mentioned that the stone was used by the Chinese at least two hundred years before the birth of Christ. The translator applies to it the names used by traders, jasper and marble; he does not use the word jade which probably was not then known. He says however that the stone is "no jasper." The locality is doubtless that which the more recent travellers have described.

A new stimulus was given to the inquiry, by the discovery a few years ago, of a worked flake of jade, a tool of some sort, in the drift or gravel of the Rhone Valley, near Geneva, in Switzerland. This gave rise to some exceedingly interesting letters in the *Times* at the end of 1879, and early in 1880, by Professor Max Müller, Mr. B. M. Westropp, Dr. G. Rolleston, Professor Nevil Story-Maskelyne, and others, as to the source and origin of the object. It is one belonging to a class which particularly comes within the consideration of archæologists under various names, as flake, implement, scraper, tool, arrow head, weapon, hatchet, axe, and celt, besides other specific forms. They occur as rough looking chips up to a smooth and shapely weapon. The letters may be followed in the *Times,* or more conveniently in Dr. Schliemann's work "Ilios, the city and country of the Trojans," London 1880. That author having found at Hissarlik, in the deposits and ruins belonging to the prehistoric period, more than five hundred implements of various hard stone, with "axes" of jade and jadeite, supplemented his own observations

thereon by a reprint (at page 466) of the correspondence and editorial article in the *Times;* the whole forms a valuable contribution to the history of jade. At page 240, he quotes Mr. Davies of the British Museum who examined thirteen of the "axes," and ascertained their specific gravity to be between 2.91 and 2.99; whereupon Dr. Schliemann says concerning these axes, that "consequently all are of jade"; he also quotes a remark from Professor Maskelyne that, "your thirteen Hissarlik jade implements are to me of the highest interest; they are so, for the reason that now for the first time I have seen true white jade as the material of a stone implement, and that too in association with the regular green jade which is not so rare a material." The author says, at the same page, that it is a very great probability that the Kuen-lun mountains produced the mineral of which these implements are made, and that they came from Khotan, in China, by a process of primeval barter and trade moving along Asiatic routes towards the spot where he found them. He quotes also the work of, and special communications from Professor Fischer, and Keller's "Lake dwellings of Switzerland." And again Professor Story-Maskelyne himself speaks of this particular "single celt of fine white jade, just such as might have been dug from one of the pits above the Kara Kash river or fashioned from a pebble out of its stream."

Jade implements have been found among the prehistoric remains in Brittany, and concerning them it is remarked by Dr. Schliemann at page 240 of "Ilios," the work already quoted, that "associated with these implements some stones of turquoise or callaïs have been discovered; this mineral is not found *in situ* in Europe, and thus we have additional evidence of the probability of these substances having been procured from Eastern countries. He also mentions another celt of white jade being found in Crete, but of this one I do not find any particulars.

On the 21st January, 1880, Mr. W. H. Cope read a paper on jade before the British Archæological Association, which was published in their Journal, vol. xxxvi., p. 63, with illustrations; numerous carved works of jade being also exhibited by him. Writers now came forward actively, a leading article appeared in the *Times* of the 15th

January, 1880, giving much food for thought about jade, in a kind of summary of the then current information. The *Guardian* of 4th February, 1880, took up the subject in an article on "Jade tools and Aryans," in a suggestive and instructive manner. The *Morning Post* of the 12th September, 1887, had a leading article, pleasantly, but not quite accurately written on the subject, occasioned by the mention of jade in England's newly acquired territory of Burmah, as one of the natural productions of that country. In the *Times* of 19th March, 1888, there is a telegram from Rangoon of 17th March, mentioning that a Government expedition sent to inspect the jade mines had done so after much local hostile opposition; the mines consist of large open pits mostly flooded with water, in the hills about 2500 feet above the sea; the jade is both white, and of the green colour so much valued by the Chinese. We may look forward to an accession of jade carvings from this source, but it can hardly be imagined that anything equal to the old Chinese work will be produced. Antiquaries must beware of imitations.

Jade objects having been found in the investigations of the lake dwellings of the ancient inhabitants of Switzerland, some interesting considerations were laid before the Anthropological Institute in a paper by Mr. H. M. Westropp and published at page 359 of their Journal for 1881, Vol. x. This paper was instigated by the letters published in the *Times*, and the author discourses on the origin and antiquity of the implements as connected with the ancient inhabitants of that country, but does not accept the theory that they have an Eastern origin; the discussion thereon is one of the examples of confused facts and opposing opinions to be met with in jade literature. The same class of objects are treated of in an important work, "The Lake Dwellings of Switzerland and other parts of Europe," by Dr. Ferdinand Keller, second edition, translated by J. E. Lee, F.S.A., 2 vols., London, 1878. In vol. i, p. 195, on the subject of jade and jadeite implements, the author considers it probable that migratory tribes brought with them their valuable commodities, such as their weapons, from some distant Eastern localities; that their migrations must have extended over a great length of time, and that many genera-

tions, perhaps centuries or even ages, would be required before the implements could thus reach the Swiss lakes. He disavows the supposition that these people could have had commercial relations with the jade producing countries.

In a work by Sir John Lubbock, "Pre-historic Times," published in 1878, this remark concerning the jade implements found at the Swiss lake-dwellings occurs at page 82:—"The material was supposed to have been procured from a conglomerate formation in Switzerland, but the most careful investigations have not confirmed this view. Though perhaps it would not yet be safe to conclude that these jade axes were introduced from the East, no European locality for jade or jadeite has yet been discovered and it is perfectly possible that they may have passed from hand to hand, and from tribe to tribe by a sort of barter." It has been alleged that jade implements have been found in Ireland, but facts in support are yet wanting, and great doubt has been thrown upon the allegation by Professor Rolleston in writing to the *Times* from Oxford on 29th December, 1879. Another writer, Mr. Westropp, apparently relies on the allegation and suggests that in the case of this, and other finds, rocks indigenous to Ireland may have supplied the material, notwithstanding the negative statement as to the existence of jade rock anywhere in Europe. It is mentioned in the Archæological *Journal*, vol. xvi, 194, that two stone celts were exhibited at a meeting in January, 1859, one being about 8 inches in length and described as of "greenstone passing into flint," and found in the north of Ireland. This indication is vaguely suggestive of jade, and goes no further than the outward appearance of the object; analysis would have identified the substance whether jade, or other rock to which a definite name could be assigned.

On the authority of an important work, "The ancient stone implements, weapons, and ornaments of Great Britain," by John Evans, F.R.S., &c., 1872, it seems certain that none made of jade had up to that date, been found in this country. The author remarks at page 58, "the materials of which celts in Great Britain are usually formed are flint, chert, clayslate, porphyry, felstone, serpentine, and various kinds of greenstone, and of

metamorphic rocks." Here we have no mention of jade; several are mentioned which might be mistaken for jade; —one of "green honestone" was found in Yorkshire, and one in Cumberland; several of greenstone, one being 5¾ inches long, were found near Malton; one said to have been found in Burwell fen, Lincolnshire, is described as mottled pale green in colour, the material apparently a very hard diorite, the labour bestowed on its manufacture must have been immense; a large celt 11¾ by 4 inches found in Cornwall, now in the Antiquarian Museum at Edinburgh, is of stone of a jadeite character; one said to have been found near Brierlow Buxton, is of a green jade-like stone, but so fibrous in appearance as to resemble fibrolite; other analogous specimens are alluded to, and the learned author observes —"Both with the English and continental specimens, there appears to be considerable doubt as to the exact localities whence the materials were derived from which they are formed. Instruments for which such beautiful and intractable materials were selected, can hardly have been in common use; but we have not sufficient ground for arriving at any trustworthy conclusion as to the purpose for which they were intended;"—one short celt 3¾ inches long made of this jade-like material in his collection has evidently been much in use, and was once considerably longer. I exhibit to the meeting a celt found at Bennington in Hertfordshire, made of a hard green stone not jade, though of a jade-like appearance. It was recovered from a heap of stones picked off from the fields; such heaps in rural places should always be searched for ancient stone and flint objects, an occasional find will reward the archæologist; finds are always possible, and are not infrequent. It is admitted that up to the present time, neither jade rock *in situ*, nor ancient jade implements have been found in Great Britain, while other stone weapons, etc., so found are innumerable.

The Germans have been busy in the discussion I believe in the *Allegemeine Zeitung*, and in a work by Dr. A. B. Meyer, "Jadeit und Nephrit objecte," published at Leipsic 1875, referred to in Max Müller's correspondence in the *Times* already mentioned. A second edition of this work was published at Stuttgart, 1880.

Some roughly formed arrow-heads were found in 1868-70, along with other stone implements artificially formed, in a cave at Mentone, associated with a complete skeleton judged to be that of an ancient prehistoric man. The material of the arrow-heads was analysed and pronounced to be jadeite ; it is also stated that jadeite is found *in situ* no nearer than China, but doubts as to the precise nature of the jadeite and the identity of these objects with the Chinese mineral so called, renders opinions as to the origin of the objects inconclusive. The narrative will be found in the *Journal* of the British Archæological Association for 1880, Vol. xxxvi. p. 361. A scarabæus of jade comes to us from Egypt where jade rock is unknown. Jade objects are mentioned as being found with ancient remains in Mexico, and at the River Amazon in South America; other American finds were also reported last year, but precise information is wanting. Some bright green worked specimens from Mexico, now in the mineral gallery of the British Museum, have passed as jade, but they are of jadeite. A green jade object, a celt, engraved with a Gnostic formula in Greek characters is preserved in the Christy collection in the British Museum, it is supposed to have come from Egypt and to belong to the fourth century A.D., but its earliest history is unknown. It is figured and described in the Archæological *Journal* xxv, 103 ; see also vol. xxi, p. 56, where another green jade axe, found in Normandy, is alluded to. A big tortoise carved in jade is preserved in the mineralogical gallery of the British Museum at South Kensington, it is about nineteen inches in length, of a bluish gray colour and highly polished, a laborious work of art; it was found in a water reservoir near Allahabad in India; its earlier history is unknown. In the same gallery is an immense "water-worn" mass of bright green jade, found some years ago near Lake Baikal in Asiatic Russia, its extreme dimensions are 4 feet long by 2 feet high, its weight is more than half a ton; it bears on the surface a good polish which follows all the inequalities. It seems to be a travelled boulder without any history, its shape may be natural, but the polish cannot be otherwise than artificial; here also, in case 24, are some unshapely hand-specimens likewise

polished, and doubtless artificially so. Other erratic blocks and pieces of jade and jadeite have been discovered in Northern Germany, at Schweinthal, near Leipzig; and Potsdam, near Berlin; water-worn pieces have been found in Lake Neuchatel, Switzerland; unworked jadeite has been found at the Morbihan in Brittany; also, a small piece at Monte Viso; others are recorded in Meyer's work. It is stated that jade implements are occasionally found along the coast of British Columbia, especially along the Fraser and Thompson rivers. It has been disputed whether they are of local origin, or transported from Asiatic sources. Dr. G. M. Dawson, of the Geological Survey of Canada, has contributed to the Canadian Record of Science a paper, in which he adduces evidence to prove that the material was worked in the locality, boulders of jade having been found in the Valley of the Fraser, although the mineral is not yet known to occur *in situ* in British Columbia. I have been unable to compare this statemeut with the authority quoted, but I find that Dr. Dawson has written much to prove the glacial condition of the country causing the transport and deposit of vast quantities of foreign stones and boulders there.

One more authority on jade should be mentioned, the work entitled "Wanderings in China," by Miss F. C. Gordon Cumming, 1886. It gives some interesting information about such jade objects and manufacture as came under her own observation. See vol. i, pp. 40, 43, 64, 67, 254, 297; vol. ii. pp. 272, 279, 182. She mentions artificial human eyes made of jade; and an object made of blue jade of a bright tint preserved in a temple, but which was not seen by her. A work, by the Rev. J. Edkins concerning Pekin, is somewhere quoted, which mentions that because of its colour, "to heaven alone is offered a piece of blue jade," cylindrical in shape and a foot long, formerly used as a symbol of authority. It would seem that this particular object of so rare a colour, is the same as that which the authoress heard of at Pekin. I have not met with any other mention of blue jade, or any specimen of it, and it is quite open to doubt whether the object is not of some blue artificial material, rather than of jade. Except in this particular instance

I never met with any mention that religious signification was attached to jade; it formed part of the ornamental accessories of the dress of Chinese priests, and it is probable that amulets and charms were made of it, which had a special value in the estimation of the owners. Its value rested in the idea or fancy for ornament rather than utility.

In the South Kensington Art Museum there is an important collection of Chinese carved works in jade, Chinese visitors hold it in high estimation. And in the Indian Section of the same Museum there is, besides numerous sword and dagger handles, an exceedingly fine collection of Indian carved works in jade, comparatively modern, (about the year 1600), many of the pieces being studded with gems, diamonds, rubies, and emeralds; and although the design is manifestly different from those which are known to have been produced in China, the material probably came from the quarries of China, or possibly from Burmah. The word "jade" is officially applied to all these museum objects; doubtless it is correct, and distinguishes the material from serpentine or soapstone, or other simulating stone of the baser sort. Besides these public collections there are several private ones, both in London and Paris, containing thousands of beautiful and unique jade objects of Chinese art and antiquity, showing that whatever general character of design they may possess in common, there is no invariable similitude of form and ornament among them such as is seen in moulded or machine-made articles. The word "jade," as already alluded to, is of European origin, quite modern compared with the knowledge of the material in China where the stone was an article of tribute to the rulers of the empire, who were jade-fanciers as early, it is stated, as the year 2737 B.C., or more than 4600 years ago.[1]

Carved works in jade very seldom bear marks whereby a date is indicated, such as are often seen on old porcelain, and even those on Chinese porcelain are often false

[1] This expression of remote chronology may excite surprise, but it is nevertheless credible when we consider that the great collection in the British Museum of Assyrian tablets inscribed in the cuneiform characters, carry us back to an ascertained date of 2220 years before Christ, and even to dates earlier than this Chinese period.

or falsified marks. It is true, however, that some few jade works are inscribed with a short poem or a sentiment which may afford some clue to a date; and a few others bear Chinese characters denoting either a dynasty or a cycle of 60 years, these would probably belong to the sixteenth century, or downwards to the nineteenth. All such marks are very rare, and can only be interpreted by persons who have mastered the thousands of Chinese characters and ideographs; and even these marks may be as unreliable as those on the porcelain. My observations apply equally to Chinese and Indian carved jade. The marks on jade are engraved, those on porcelain are painted. There are hundreds of works in jade without inscriptions or date marks, some few in particular are to be seen in the Asiatic gallery of the British Museum (Bloomsbury) to which great antiquity is attributed, without marks even to suggest a date. Imperial and other seals made of jade bear signs which may denote a date, but they are sometimes falsified by the Oriental dealer in curios.

A chronological period of art might be looked for in the style or design of a jade carving, but we may well suppose that among an unchanging people such as the Chinese have been, all the characteristics of Chinese design may have remained without change continuously through a dozen centuries down to the present.

A recent French work "L' art Chinois, par M. Paléologue, 1887," in a chapter on jade at p. 155, gives no fresh information, but it erroneously states that "le jade est un silicate d' alumine et de chaux."

Jade stone is said to be softer when taken fresh from the quarry than it is as we know it in the carved works brought from China. Of this we have no tangible proof, though the suggestion derives some support from the experience of workmen in the granite quarries of Cornwall, who say the same of the stone under their treatment. Nevertheless, jade can never be regarded as a soft stone; that quality, if at all correct, can only apply to the condition of fresh jade, relatively with the same mineral after exposure to the air. On this point travellers are not in accord; Schlagintweit states that the hardness of jade when freshly broken in the Kara-Kash quarries was considerably

less than that assumed after a *short* exposure. Stoliczka says the same of jade after a *long* exposure. Be this as it may, another traveller has observed that the Chinese artist prefers to work on a stone taken from the bed of a torrent because the rough knocking about would test the firmness of the material, possessing as it does many natural flaws, and so diminish the risk of its falling to pieces while undergoing the process of conversion into an elaborately carved object, occupying many years to complete.

A notable event in the history of Chinese jade is the destruction of the Emperor's Summer Palace in the vicinity of Pekin, the concluding scene of the war of 1860. Among the plunder taken principally by the French soldiers there were an immense number of carved jade objects; much also was destroyed or lost. This shows faintly what must have been the magnitude of the Emperor's collection; it was, in fact, the chief source which supplied the jade now to be seen in European cabinets and museums. Constantly do we see objects of great beauty catalogued and labelled as having that origin. Many of the objects in the superb collection bequeathed to the South Kensington Museum by the late Mr. Arthur Wells have that origin. The reminiscences of eye witnesses with whom I have conversed fully confirm the narratives of plunder and destruction which appeared in the *Times* of 31st December, 1860, and make us grieve at such an ignominious conclusion of a war which opened China to the outer world. The value set upon jade in China in olden times is illustrated by some translated extracts from a native poetical work, about the date 1670—1680, quoted in *Notes and Queries* the 1st vol. for 1880, p. 213; they are worth referring to. At the present day personal ornaments of jade are much sought after by Chinese women who can afford them, while glass imitations are seen in use by those who cannot. All classes, indeed, from the Emperor downwards, indulge in jade ornaments.

I have already stated that so far as is at present known, no true jade has been detected *in situ* in Europe. It may be added that the localities in the world which are known to produce jade are few, and they are far away from Europe and from each other, for instance, China, Burmah,

New Caledonia, some Pacific Islands, and New Zealand. It cannot be imagined that the last named remote insular country produced any of the jade objects that we recognize as having belonged to ancient prehistoric European man; but, as we now know, jade of a remarkably rich green colour is found there *in situ*, and was worked by the primitive natives into formidable weapons of war called "Meri," and objects of veneration called "Tiki," long before the country was discovered by European navigators in 1642. It is fortunate that some information was gained from the natives, before their intercourse with the nations of the world had obliterated from memory the ancient traditions; the Journal of the Archæological Association, vol. xxxvi, pp. 63, 120, 242, gives valuable and interesting information gathered from the natives twenty five years ago. The grotesque jade objects called Tiki seem to have been connected with ancestor worship and mythology, and perhaps they were also regarded as symbols of right to lands of the tribe. Other specimens and weapons of jade are described in the "Official catalogue" of the New Zealand exhibition at Dunedin, in 1865; two Meris in particular are mentioned as having belonged to several native chieftains in succession, and many a native enemy had been slain by them. An important collection is now placed in the newly arranged ethnological gallery of the British Museum, which fully illustrates the objects of ancient warfare and ornament in green jade; among them is a specimen of the stone which has the appearance of being split horizontally, flat on both sides and about an inch in thickness, sufficient for the formation of a "hatchet" nearly a foot in length with thin edges, and strong enough to prevent its breaking under the force of a blow given in combat, or in its use as a cutting instrument for hollowing out a canoe. The jade is now known in the country as "greenstone," a name which is used by European geologists to indicate a certain rock of igneous and intrusive character and of a very different composition from jade. The native New Zealander made his "meri" of other material besides jade, such as any hard stone, heavy wood, and the blade bone of the whale; there were no quadrupeds indigenous to the islands to supply other bones. The

jade "meri" may have been a token of tribal authority or rank, at all events a chief would be likely to possess the best and most costly weapon that could be procured by any means, or by inheritance from remote ancestors. They are now very difficult to procure in the country. The bone of the albatros is sometimes attached by a cord to the "tiki," to pass through a loop when worn as a neck ornament, but it is not adapted to the making of weapons larger than arrow heads. Of the method by which the jade objects were formed and finished by the natives but little is known; some material harder than jade itself must have been used for the purpose, and it is said that quartz was used for the cutting and sand for the grinding down and finishing, metal being unknown to the primitive New Zealander; he had, however, plenty of time on his hands for any tedious process. In the Colonial Exhibition of 1886, there was a great quantity of New Zealand jade in the rough state. The mineral collections at South Kensington and at the Jermyn Street museum exhibit both natural and worked specimens. Modern experience, notwithstanding all the mechanical and other appliances to assist the lapidary, proves that prolonged time is required for fashioning the remarkably tough and hard stones such as jade, diorite, or obsidian used for the ancient weapons; an experimental attempt to drill a hole through a piece of diorite 1½ inches thick, by the same means probably used by the New Zealander, led to the conclusion that several months of daily work would be required, and that to make a perfect "meri" would occupy many years of diligent work. In the Indian Museum there is a most beautiful object in white jade, No. 02.506; one event in its history is that it occupied three generations of a family of jade workers, for 85 years to produce it, working in the palace of the Mogul princes of the period.

Archæologists are concerned with jade more particularly as a help whereby to trace the migrations of, or communications between, the tribes of primitive mankind of whom no history exists. For the present, however, the amount of evidence of such migration to be derived from jade is very limited, but what is known carries with it suggestions not to be neglected. In accounting for the

presence of jade implements among ancient remains in countries where that stone is not naturally found, modern investigators infer that ancient man brought these implements with him, or obtained them or the material from its only known source—*i.e.*, the northern regions of China. That is the sum and substance of the theory. If analysis shows that a particular implement is made of jade identical with that of China, there is no reason why the theory should not be accepted; if analysis proves the stone to be of some other kind which is common to other regions, the Chinese theory must be put aside, as no more can be asserted than that some ancient man conveyed the object from some distant region that cannot be identified. In either case it is impossible yet to say with accuracy by what route the object travelled, notwithstanding Dr. Schliemann's suggestions, and all the rest remains a matter of interesting conjecture to be solved when more evidence can be collected in aid of the open question. Much has been written on the subject in the fair endeavour to arrive at true inference through facts, without dispelling the mystery which surrounds this strange mineral. It signifies little in an artistic view, whether the object under notice be jade, jadeite, or other kindred stone, but in the archæological view it is obvious that the considerations are of a different nature and for a different purpose.

There is a theory that boulders and erratic blocks, such as those above alluded to, have supplied the material for making some of the stone implements found in Europe. It involves some intricate geological considerations, but briefly, the supposition is that the action of ice during the ancient "glacial period" of our globe, transported jade-stones, along with an infinite variety of others, from some distant northern regions; scientific investigators are satisfied thus to account for the presence of stones, where no similar rock exists *in situ*, jade may therefore be regarded as subject to the like conditions. The observations already offered about jade in British Columbia are within the scope of this theory, the reasoning applies equally to any locality which shows undoubted marks of glacial action. The precise nature of the stone, whether it be jade, jadeite, or other kindred mineral, is not affected by the theory.

I would now invite attention to an alleged occurrence of jade in Europe. Last year after the Salisbury meeting of the Institute, several members went to Brittany to inspect the megalithic remains at Carnac and its neighbourhood. A narrative of their proceedings appeared in the *Athenæum* of 3rd September, 1887, and this was transferred to the pages of the Archæological *Journal*. I was not with the party, and much to my regret, because jade came conspicuously under the notice of the visitors. At page 432 of No. 176 of the *Journal* (vol. xliv), we read, to the effect that in the museum of the Count de Limur, who as a mineralogist ranks in France second only to M. Damur, our archæologists were enabled to study numerous specimens of jade, jadeite, and fibrolite from all parts of the world, collected for the purpose of illustrating the hatchet heads which have been found (broken up) beneath the tumuli, dolmens, and menhirs. The Count de Limur himself discovered a vein of jade some nine years ago a few miles from Vannes, and only four years ago he discovered fibrolite in Brittany. "In confronting the various jade implements found in prehistoric tombs with the specimens of jade broken off recently from a rock in the same country, the Count insisted strongly on the identity of the two materials, though it must be admitted M. Damur is of the opposite opinion. Moreover, there still remain magnificent specimens of oriental jade, together with chloromelanite, amber, and callaïs, which must have been obtained by the aboriginal inhabitants of the country by barter from some sea-faring folk, or have been brought with them in prehistoric times in their migration from their eastern home."

A specimen of the "vein of jade" rock (a green coarse grained stone) was sent to the Institute, and which I ventured to declare was not jade, but recommended that it should be examined by an expert; accordingly it reached the hands of Mr. Davies, the gentleman who examined the objects found by Dr. Schliemann at Hissarlik, already mentioned. His obliging report I am enabled to give, as follows:—"I have had a section prepared of the rock you left, and have examined it under the microscope. It consists principally of abundance of crystals of a pale

coloured augite, some quartz, and a felspar which is highly decomposed. The rock is certainly not jade; it is one which would need an examination of many specimens, and a study in the field before one could venture to suggest a name for it."—Again, "I have re-examined the rock with a better light, and find that what I supposed to be a pale coloured augite is hornblende; the rock is, therefore, a quartz diorite, which has been a common material for the making of implements. I return the specimen."[1] Had this been of jade how easy it would be for the archæologist to name the locality which might have supplied the material for the jade weapons that have caused so much speculation as to their Eastern origin. The other examples in the Count's Museum mentioned in general terms are, no doubt, important for comparison with others, even if they be not all of jade, or if they do not settle the question as to the country from whence the material was originally derived.

POSTSCRIPT.—Referring to the observations at pp. 198-199, about the rarity of "marks" on carved jade objects; after these pages were in type the writer of these "remarks" carefully examined, by permission, the "Wells" collection of jade at the South Kensington Museum, and the "Guthrie" collection at the Indian Museum, and found among the hundreds of objects less than ten bearing engraved characters, which might be a guide in assigning to them a date of some kind.

At page 196 a scarabæus of jade is alluded to. A similar example in yellowish jade, regarded as of archaic Assyro-Phœnician work, and found at Beirût, is in the collection of the Rev. Greville J. Chester, now exhibited at the rooms of the Institute. See the "Quarterly Statement" of the Palestine Exploration Fund, vol. for 1886, page 49.

[1] Mr. Hilton exhibited this identical specimen to the meeting, together with many objects of Chinese jade from his own cabinet, in illustration of some of his remarks on the subject.