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The Petrography and Archaeology of English Honestones

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Some major English sharpening stones well established by the 19th century are outlined and their use in earlier times is discussed where appropriate. Stratigraphically, Roman hones would appear to differ from the hones used from late Saxon times onward, and from late Saxon times until the Industrial Revolution hone types changed very little. English honestones and touchstone artifacts are arranged into six petrographic types, and the archaeological stratigraphy of these types at 14 recent excavations is outlined. One hone type, the Norwegian Ragstone, would appear to have been in use for upward of a thousand years.

Introduction

Although many natural stones can be used for honing metal tools, some are greatly superior to others in their honing properties, and for this reason were widely traded. Petrographically, a good natural honestone consists of a hard mineral, commonly quartz or in some cases garnet, set in a softer matrix. The hard mineral grains are almost always angular in shape, whilst the softer matrix in which they are set is frequently micaceous or calcite-bearing. The action of honing involves the hard mineral tearing metal from the blade being honed. Good sharpening stones whether they are whetstones, honestones, or grindstones will all have a microscopic structure similar to this.

In terms of shape, the whetstones are fashioned, and include the scythestones, slipstones and batts. Hones are generally regarded as flat sharpening stones and are often used wet with oil or water, but the term hone is also used as a general term to include all sharpening stones.

Modern (second half of the 20th century) honestones having hard steels to contend with are made of very hard artificial minerals, e.g. the Carborundum "crystolon", and the alumina "India stone", but earlier in this century before the advent of Carborundum honestones were made of natural stone.

There is a considerable literature on 19th century honestones and the quarries from which they were obtained are well known. Amongst the stones used during the 19th century and before, were Coal Measures Sandstone and Norwegian Ragstone. But perhaps the most prized hones in use in the last century were the Arkansas Stone and the Turkey Stone. The American Arkansas stone (novaculite) is a soapy grey-white stone with conchoidal fracture. It is often fashioned into flat hones and slip stones and is still used as a finishing hone with oil. An account of this stone is given by Griswold (1892). The Turkey stone from Izmir (Smyrna) Turkey, is a banded grey-green stone,

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very fine grained and believed by Griswold (1892) to have been in use in southern Europe since Classical times. It too is an oil stone and like Arkansas stone is still in use as a finishing hone. Page (1874) and Griswold (1892), give reviews of the sharpening stones used in England in the late 19th century; they mention the Devonshire Batts, the Yorkshire Coal Measures Sandstone and Ganister hones, the mica schist Ragstones from Norway, the Turkey oilstone, the German razor hone, the Arkansas stone, the Welsh oilstone, the Leicestershire oilstone ("Charley Forest" oilstone), and the Water-of-Ayr or Snake stone. The sources of these and some other 19th and 20th century hones compiled from the data of Page (1874) and Griswold (1892) are given in Figure I.

Some Major Sharpening Stones of the 19th and Early 20th Century from Northwest Europe

Devonshire Batts

The Devonshire batts were sufficiently well known to be mentioned by Vancouver in 1808. They were grey micaceous sandstone scythestones, more or less rectangular in shape with bevelled corners and tapered at the ends, and approximately 31 x 4 × 3 cm. Fitton (1836) says that the Blackdown Pits known to produce the batts were of considerable importance at that time and that many English scythestones were obtained from the Blackdown Hills between Punchey Down and Upcot Pen (some 8 km north-west of Honiton). When newly made in 1836, the stones were some 10–12 in long, and l-2 in wide, which is comparable with the metric dimensions given above. This hone was still widely used according to Woodward (1887). The stone is a quartz-muscovite-tourmaline grit. An examined specimen from Humberside was associated with 16th century levels.

Coal Measures Sandstone scythestones

The Coal Measures Sandstones sharpening stones were known early in the 19th century and Farey (1811) listed over 50 quarries where they were obtained.

The better known Coal Measures Sandstone hones of the late 19th and early 20th centuries are tapered, cylindrical whetstones or scythestones. They were known to be produced from three quarries. (i) Telacre quarry, Flintshire, produced a rounded, pale grey micaceous sandstone hone some 30 cm long by 3·5 cm diam. at the widest point, from the Gwespyr Sandstone of the Lower Coal Measures. (ii) Bowmans quarry, Ackworth Moor Top, Yorkshire, produced a grey-blue micaceous sandstone hone some 27 x 3·5 cm from the Ackworth Rock of the Middle Coal Measures. Grindstones were also produced from this quarry. (iii) Normanton quarries, Yorkshire, produced a grey micaceous sandstone hone from the Woolley Edge Rock of the Middle Coal Measures. The hones were tapered and more or less rectangular with bevelled edges some 28 × 3·5 x 3·5 cm.

Welsh Oilstone

This hone was mentioned by Woodward (1887) and is a smooth, black, very fine grained slaty hone obtained from the Caradoc Beds (Ordovician), near Beddgelert, north Wales.

Leicestershire Oilstone ("Charley Forest" oilstone)

This is a very fine grained pale grey stone containing quartz, muscovite and opaque material. It was obtained from the Whittle Hill Company's quarry, Charnwood Forest, Leicestershire.

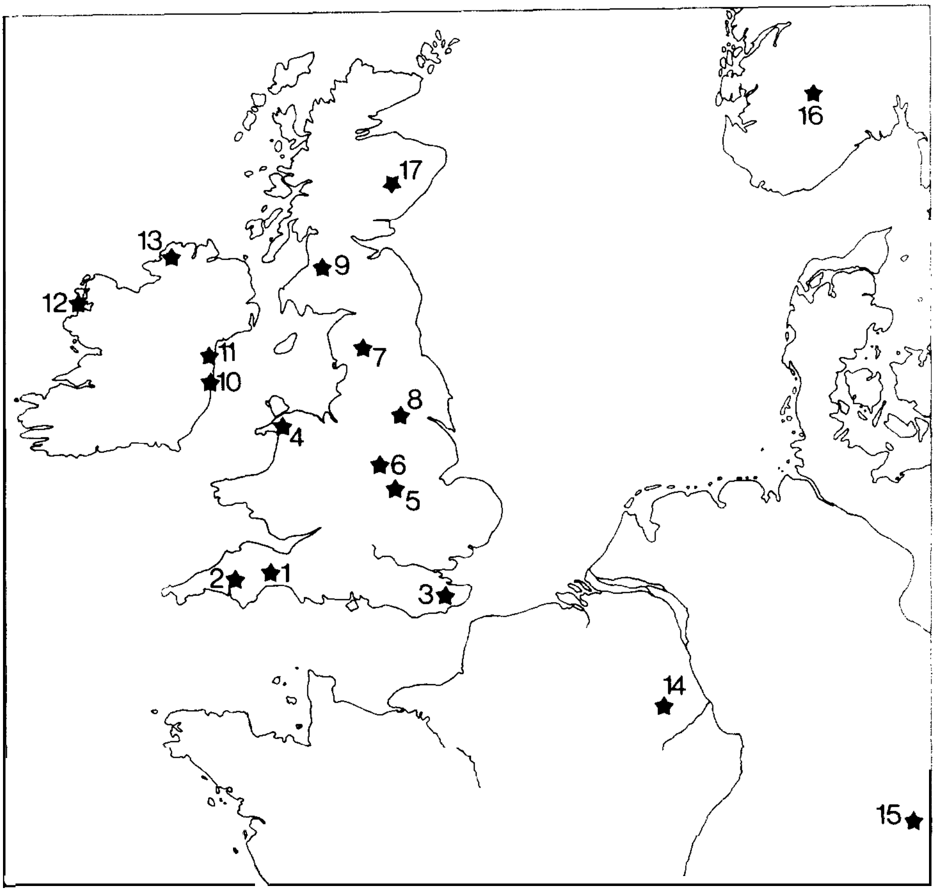

Figure 1. The sources of some hones and rubbing stones from north-west Europe in use in the 19th century according to Page (1874), Griswold (1892), Barrow (1904), Morey & Dunham (1953) and Woodward (1887). (1) The Devonshire Batts-obtained from the Upper Greensand of the Blackdown Hills, Somerset-Devon border. (2) The Tavistock Oilstone. (3) The Kentish Ragstone-a glauconitic ostrocod limestone from the Hythe Beds (Lower Greensand), Kent. (4) The Beddgelert, or "Welsh Oilstone" (other Welsh hones are known from the last century, and of these the "Crown Hone" obtained from near Corwen, Merioneth, is perhaps the best known). (5) The Charley Forest" stone from Charnwood Forest, Leicestershire. (6) The Uttoxeter Sandstone hone. (7) The Whetstone from Upper Longsleddale, Cumbria. (8) The Yorkshire Coal Measures Sandstone scythestones. (9) The Water-of-Ayr or Snake Stone. (10) Howth, Dublin Bay, Ireland. (11) Drogheda. (12) Clare Island. (13) Killicreen, Donegal. (14) The Belgian, or Salm Chateau Hone, Ardennes, Belgium. (1.5) The Ratisbon Razor Hone, from Regensburg, Bavaria, Germany. (16) The Norwegian Ragstone, from Eidsborg, Telemark, Norway. (17) The Honestone Series, Allt Bronn. near Braemar, Aberdeen, Scotland.

Water-of-Ayr Stone (Snake Stone or Tam o'Shanter Stone)

Three varieties of this stone are known: (i) a pale blue-grey fine grained stone, (ii) a pale grey spotted stone, and (iii) the Snake Stone proper, which is a faintly banded, blue-grey, spotted stone, used more as a rubbing stone than as a hone. The Water-of-Ayr stone is a band of Coal Measures Sandstone hardened by contact metamorphism. It is an even grained spotted hornfels.

Norwegian Ragstone or Norway Rag

This stone occurs in two facies, one a grey-blue schist, and the other a more silver-grey variety. It is a fine grained quartz-muscovite-biotite-chlorite-magnetite schist obtained from quarries at Eidsborg, Telemark, Norway.

Ratisbon Razor Hone

This is a dark yellow very fine grained hone, found associated with a blue or purple slate from Regensburg, Bavaria, Germany.

These better known hones, and some other possibly less well known additional hones from the 19th century, are listed in Figure 1.

Honestones in English Archaeology: The History of the Problem

Reference was made by Dunning (1938) to hones of grey schist which could not have come from southern England, and which dated from the 12th century; Oakley, in the same work, suggested, on archaeological rather than on petrographic grounds, that they may have been derived from northwestern France, but Michel Levy also in the same work, was non-committal on the provenance of the schist hones. Morey & Dunham (1953), using petrographic techniques for the first time, recognized four types of honestone artifacts from Yorkshire and the south of England: (a) metamorphic rocks, which on mineralogical and petrographic grounds included the "schist hones", (b) argillaceous and siliceous sediments of Lower Palaeozoic type, (c) sediments of Millstone Grit type. and (d) calcareous sandstone of Cretaceous age which included the "Kentish Rag".

Ellis (1969) published an account of a petrographic examination of over 150 honestones with ages from Roman to recent and the corresponding archaeological dates were given by Evison (1975). Ellis (1969) recognized four main classes of hones : Type I, metamorphic rocks; type II, greywackes; type III, sandstones; and type IV, sandy limestones. Within these classes he recognized numerous subgroups. The types recognized earlier by Morey & Dunham (1953) agreed reasonably well with the Ellis groups, but because Ellis examined more hones he produced a more comprehensive work and this was the first systematic examination of hones from archaeological sites in England. In this work, Ellis attempted to erect a honestone classification analogous to the system of stone axe groups which is now widely used. In the early 1970s Ellis & Moore (in press) examined large amounts of well dated hone material from the Winchester excavations spanning ages from Roman to recent. The data accumulated from these Winchester excavations and other excavations of the last eight years form the basis of this paper.

Ellis (1969) recognized in the sample he examined, that no fewer than 67 types of honestone had been in use in England since Roman times. But the examination of a yet greater sample which included material from Bristol, Kingston-upon-Hull, York, Oxford, Northampton and Winchester, suggested that the hone "types" commonly used were probably only about five or six in number; these were perhaps Ellis's type IA,,,, $IB_{(1)}$, $IIB_{(6 \text{ or } 7)}$, IIA/IIIB and some members of types IVA and IVB. In the Winchester study the classification of the hones into exact Ellis types was not pressed for it was becoming clear that many of the types overlapped to some extent, and whilst the general classification into e.g. types IVA, IVB and IVC held good, further subdivision was more difficult. Indeed, statistically, the single occurrence of an Ellis type (Figure 2, below) is not very meaningful, and such occurrences have been grouped here as "others" and comprise the secondary hones, the makeshift hones, and facies variations of the more easily recognized types. The Coal Measures sandstone hones, so well known from the 19th century, also present certain difficulties. Here there are reasons for considering that many of the types that Ellis erected are facies of the Coal Measures Sandstone: most are poorly sorted, deltaic, angular sandstones or grits, and they all contain an opaque black material which is perhaps coal. They probably make up the minor peaks at types $IIB_{(7)}$ and $IIIB_{(1)}$ in Figure 2. Broadly speaking whilst the honestone types erected by Ellis (1969) are valid petrographically, some of the single occurrences may have been derived originally from masonry. Ellis & Moore (in press) in the Winchester excavation reports on Roman Hones suggested the concept of primary and secondary hones. Primary hones are those quarried and traded as hones often over considerable distances, e.g. the Norwegian Ragstone, whereas secondary hones are pieces of masonry or other stone that happened to have honing properties, and were only used as hones when the building into which they were built was in due course demolished. By this means hones other than highly desirable types came into use. It is conceivable that hones in this category make up some of the single types in Figure 2. A consideration of Figure 2 suggests that Ellis's type IA,,,, $IB_{(1)}$, and $IVB_{(1)}$ are genuine types of honestone. The Coal Measures Sandstone types, including the Pennant Grit are more of a problem, and it has been found convenient to group these together in Figure 2 (inset) and Figure 3 as Coal Measures Sandstone types.

Norwegian Ragstone

The Norwegian Ragstone mentioned by Page (1874) and Griswold (1892), and Ellis's type IA,,, are without doubt one and the same rock. This rock also corresponds to the schist hone of Dunning (1938) and was included by Morey & Dunham (1953) in their type I. The petrography and Norwegian provenance of this rock is discussed by Ellis (1969); briefly, the Norwegian provenance of this rock was based on petrographic comparisons and on a single isotopic age determination obtained by the K/Ar method on muscovite. The petrography, and the 950 ± 30 million year date suggested a provenance in southern Norway, as metamorphic rocks of that age do not occur in Britain.

Isotopic age determinations apart, it is very likely that Norway was the source of this abundant schist in medieval levels. Griswold (1892) in his preamble on the Arkansas novaculite was familiar with it, and knew it as "Norwegian Rag", and quarries at Eidsborg in Telemark had long been known locally to produce hones. An account of the Eidsborg quarries and hones was given by Falck-Muus (1920) who traced the history of the industry back to the Middle Ages. Two facies of Norwegian Ragstone are described by him, the so called "Hardstein" which is a blue-grey schist, and "Blautstein" which is more silver-grey. Both are quartz-muscovite-biotite-chlorite-ore schists, and they may contain accessory amounts of tourmaline, feldspar and zircon, but there is a quantitative difference in the mineralogy of the two facies; blautstein contains more muscovite and ore, and less quartz and calcite than hardstein (Table 1). Falck-Muus (1920) mentions that at the time of writing, hardstein only was exported, but both are met in archaeological material.

The excavation of the 12-13th century Klastad ship by Christensen (1970) showed that the ship was carrying, amongst other things, about 50 honestones. Almost certainly this number is too high for the personal use of the crew, and it seems reasonable to assume that they were for trading purposes. The Klastad ship evidence would suggest that sea-borne trade of the Eidsborg material was established by the early Middle Ages. Modal examination of this material together with its silver-grey appearance suggest that it was probably blautstein.

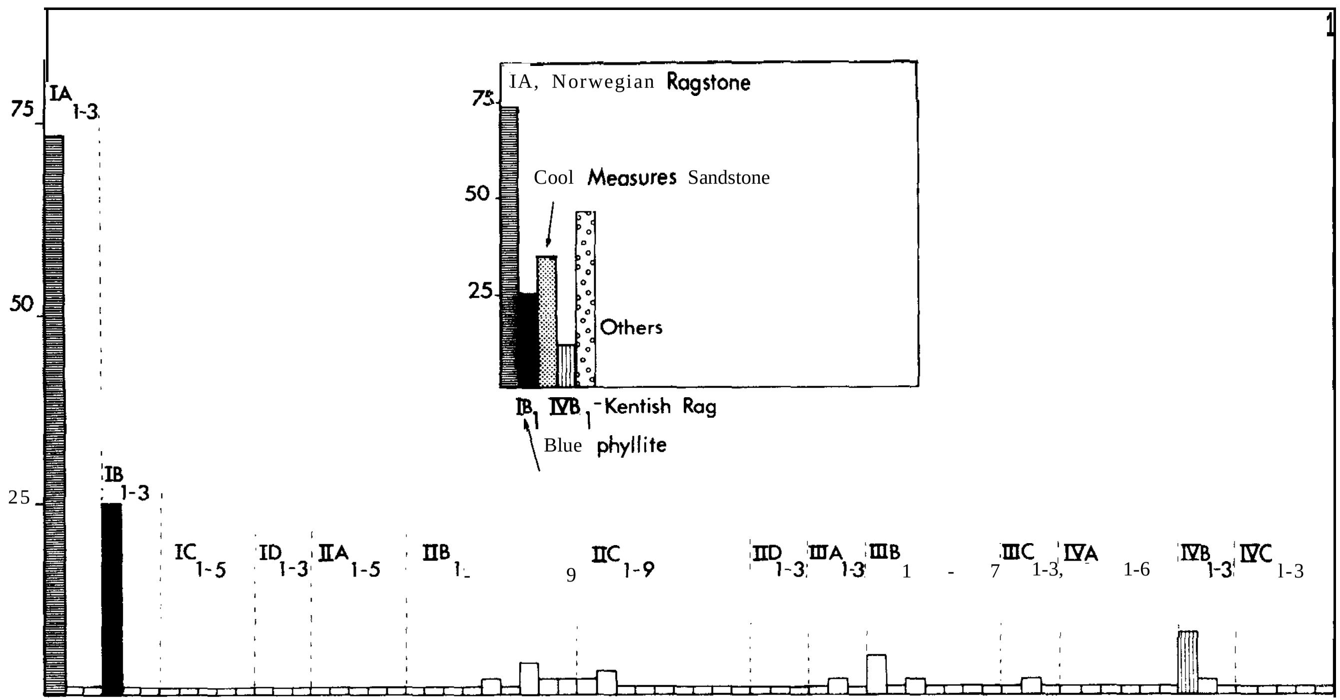

Figure 2. The frequency of occurrence of the archaeological hone types of Ellis (1969). Inset, a convenient treatment for the hone types showing Ellis types IA,,,. IB(1), and IVB(1) transferred from Figu-e 2 below. Representatives of types IIB and IIIB make up the Coal Measures Sandstone types, the single occurrences make up the "others".

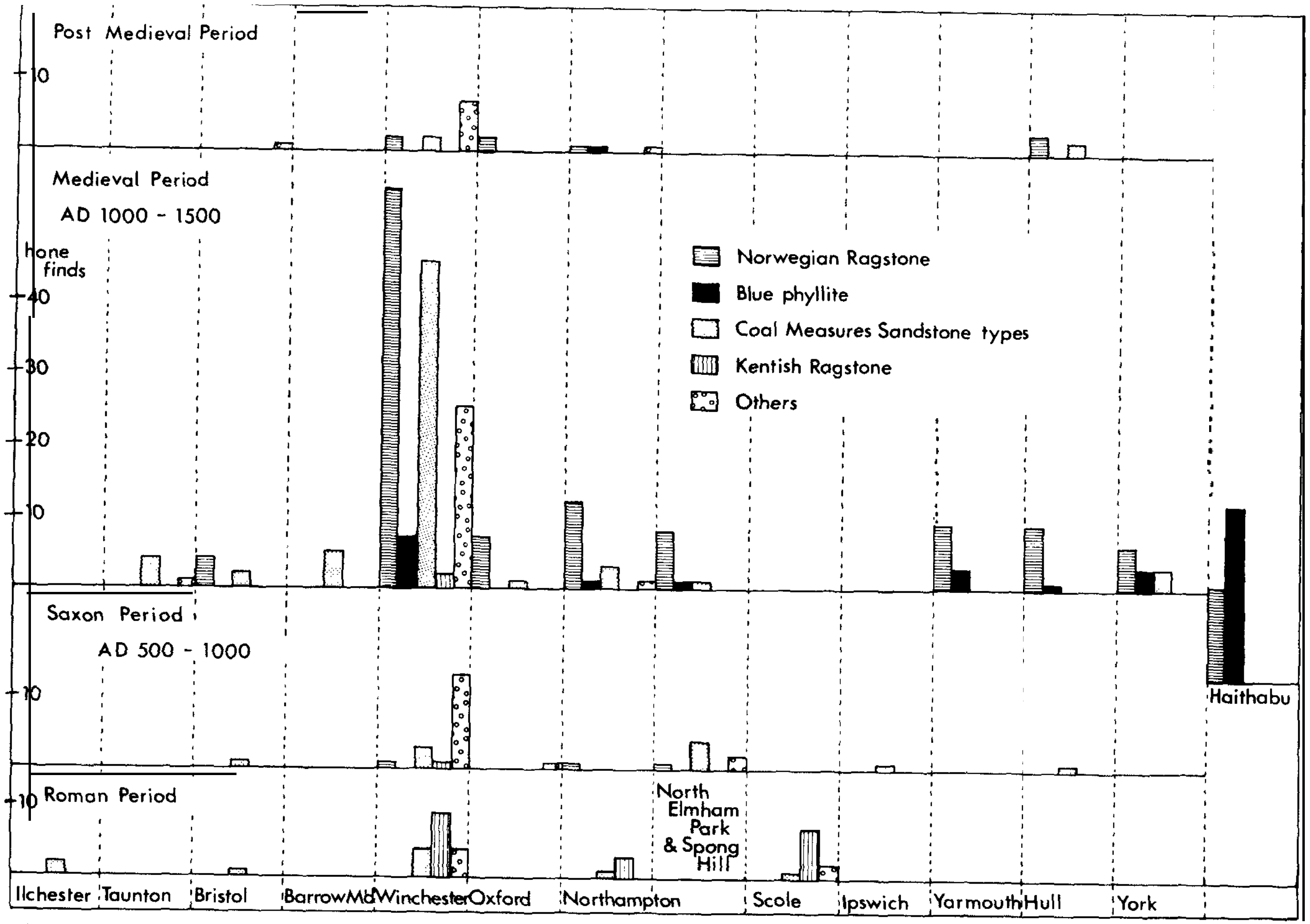

Figure 3. The stratigraphy of the honestones from 14 archaeological sites, 15 sites if Spong Hill (early Saxon) and North Elmham Park (late Saxon and medieval) are considered separately, examined in the last eight years. The diagram shows the use of Kentish Ragstone in Roman times, the small scale beginning of Norwegian Ragstone use in Saxon times (post-first Danish invasion), its position of dominance by medieval times except perhaps in the south-west, and its continuation into the post-medieval period. The Haithabu material was 9–10th century, not strictly contemporary with the English divisions and is accordingly offset in the diagram.

Table 1. Mineral percentages of Norwegian Ragstone and Klastad Ship material

	Blautstein BM 1977, P3(2)	Hardstein BM 1977, P3(1)	Klastad Ship material
Quartz	47.9 %	60.3	52.6
Muscovite	45.2	32.8	41.7
Biotite	1·8	0·8	0·3
Chlorite	0·2	0.05	0·2
"Ore"	4.6	2.8	5·0
Calcite	nil	2.6	nil
	99.7	99.4	99.8
Points counted	1089	1857	1275

Blue Phyllite

Blue Phyllite (Ellis's type $IB_{(1)}$; a quartz-mica metasiltstone) is often associated with the schist hones and its petrography and occurrence are discussed by Ellis (1969). Recently this hone type has been identified as occurring in the medieval period from London, Winchester, Hull, Yarmouth, York and Northampton, and it appears also at Haithabu (Hedeby), Germany. Because of its distribution in England and because the commonly associated schist hones are Norwegian, Ellis (1969) suggested a Norwegian provenance for this hone, but the scarcity of the blue phyllite hones in Norway (Christensen, personal communication), and its abundance in Hedeby, could suggest a German or more central European provenance for this hone type.

Both the Norwegian Ragstone and the blue phyllite are good examples of primary hones.

Coal Measures Sandstone Types

At numerous horizons throughout the Coal Measures in Britain there are developments of sandstones. These provided hones and grindstones in the 19th century and hones almost certainly in earlier times. An example (BM 1977, P17) which is a soft, grey, visibly current bedded sandstone with minute black specks, was fashioned into a grindstone some 56 cm diam. and 9·5 cm thick. In thin section this rock is seen to be composed of more or less angular quartz, occasional strips of muscovite, some plagioclase feldspar, chlorite, and rock fragments including quartzite, black opaque material (possibly coal debris), and fibrous turbid material which is probably a mixture of clay minerals.

Farey (1811, p. 435) mentions the virtues of Coal Measures Sandstone hones and grindstones thus . . . "*The Grit-stone Rocks, interposed between the Coal measures of this district,* [North Anston Quarry and again South Anston, Yorkshire] . . . *several of them contain beds of uniform and sharp Grit, whose cement, though hard and firm, does not fill the interstices between the particles or grains of Silex, and such are used for the making of Grindstones, . . . in all the south-east part of England where no such kind of stone is found: . . .*". He goes on to outline thirty quarries in Derbyshire, Yorkshire, Cheshire, and Warwickshire where grindstones were obtained, thirteen quarries where scythestones were obtained and eight quarries where whetstones were won in England, including the Charnwood Forest stone marked in Figure 1, and it does seem that Coal Measures Sandstone sharpening stones were well established by 1811.

Because of their variability, the Coal Measures Sandstone hones, which include the Pennant Grit hones, are difficult to classify by the Ellis (1969) system, but clearly fit somewhere into types II and III.

Ellis (1969) reported a type of hone which is petrographically a sandstone tending to greywacke. In thin section it shows abundant angular quartz grains, decomposed feldspar, muscovite, and rock fragments including some fibrous ferruginous and carbonaceous material, some weakly pleochroic biotite, and possibly tourmaline. Ellis identified this material from Romano-British sites in Devon, Dorset, Hampshire and London. More recently it has been identified from Winchester in medieval levels (Ellis & Moore, in press *b*) and also from Hull, Northampton, Bristol, and Barrow Mead near Bath. The picture emerges of this particular type of hone (in the Ellis system type $IIB_{(6)}$, or $IIB_{(7)}$/III) being of widespread occurrence in southern England in levels from Romano-British to medieval. This suggests a long period of association with the source, or else a local provenance. The identical rock also occurs at Winchester where it was used for quern-stones as well as hones. This stone matches material from the Pennant Grit.

The Pennant Grit is a variable sandstone occurring in the South Wales, Forest of Dean, and Bristol coalfields where it occurs at the base of the Upper Coal Measures. Pennant Grit has been quarried for a considerable period and it was widely used in the 19th century as a building stone. Like other Coal Measures Sandstone it contains rock fragments and black opaque "coal-like" material. Other Coal Measures Sandstones used as hones, and well known in the 19th and early 20th century, although they may differ from the Pennant Grit in grain size and other details, nevertheless all contain opaque coal-like material.

Touchstones

Touchstones, which include the Lydian Stone, are black, very fine-grained stones, familiar to goldsmiths, and are sometimes found bearing traces of gold. Those specimens which have been examined petrographically fit in the Ellis system at type IID. Not surprisingly archaeologists are reluctant to have touchstones cut for sectioning as they are often small and delicate and pierced for hanging. They range in specific gravity from about 2·4–2·9 and conceivably are from more than one source. A large specimen of Lydian Stone on display in the Geological Museum and believed to have a provenance in Westmorland, has a specific gravity of 2·94. Ellis & Moore (in press c) reported that some of the Winchester touchstones and the comparable black honestones, have specific gravities in the region of 2·5 and could have a provenance in the Bristol Coalfield.

Sandy Limestones

The fourth and last group of honestones of any widespread occurrence at English archaeological sites are the sandy limestones. They make up the largest single hone type used at Roman Winchester and they were used at Scole, Norfolk also during Roman times (Moore, 1977): indeed, they seem to be little used after Roman times.

Morey & Dunham (1953) first suggested that certain glauconitic quartz-bearing limestones came from the Hythe Beds of Kent, and they matched hones from Canterbury with rock samples from Chilmington quarry, Ashford. This "Kentish Rag", they went on to suggest, was a well known rock as a hone from Roman times onwards, and it forms the basis of Ellis's (1969) Type IVB. In thin section it is a characteristic rock, with angular quartz grains set in a matrix of calcite. There are variable amounts of glauconite, occasional traces of alkali feldspar, and reasonably abundant fossil debris, such as echinoid spines and in some cases ostracod tests.

There is however, another sandy limestone which forms the basis of Ellis's (1969) type IVA. It is believed to have a provenance in the Jurassic rocks of the Isle of Purbeck, or slightly further west. It is rarely found other than at Winchester. In Figures 2 and 3 this group are plotted with "others" but future work may reveal it to be a distinct group.

Other Rock Types

This group in Figures 3, 4 and 5 include the single occurrences in Ellis's 1969 report, for subsequent work has not revealed any more representatives. Some of them may prove to be genuine types if future examples come to light, but single occurrences, most of which are probably secondary hones, do not seem to warrant distinction as separate groups. This group includes many secondary and makeshift hones gathered from local glacial deposits.

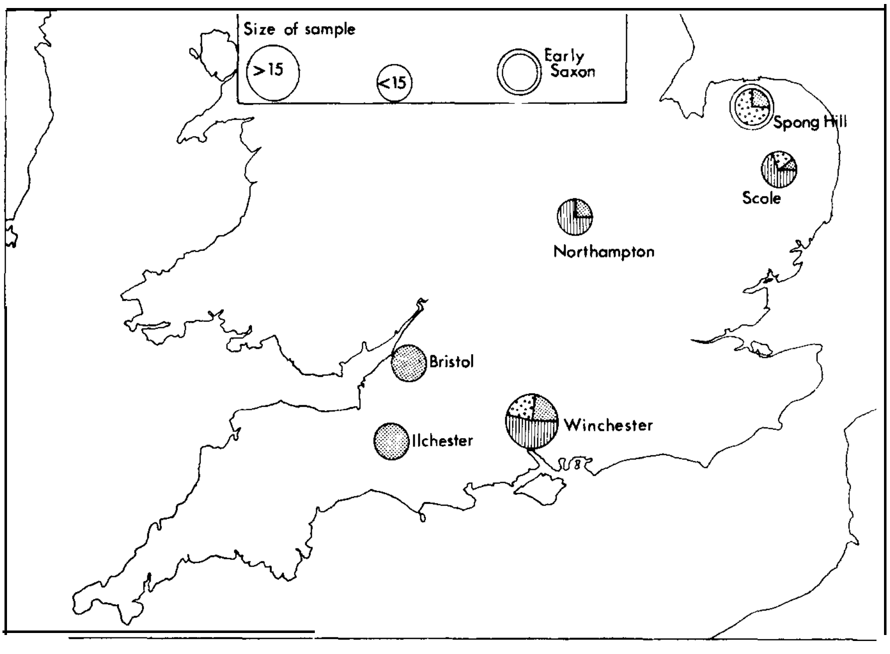

Figure 4. The percentage occurrence of hone types at Roman and early Saxon sites indicated from some recent excavations. Shading as used in Figure 3.

Stratigraphy of the Hones

Figures 3, 4 and 5 are based on the identification of honestones from 15 Roman and medieval sites. In compiling the figures (and the tables of data on which the figures are based and which can be inspected by contacting the author) all hones have been excluded whose dating is uncertain, or where there has been no petrographic examination. The evidence confirms Ellis's 1969 suggestion that Roman hones were made largely from Kentish Rag, or Coal Measures Sandstone, but the schist hones of Norwegian Ragstone are first found in upper Saxon and Anglo-Danish levels. The Norwegian Ragstone seems to have been sought above all other types in the medieval period, certainly in centres of population, and its use continued until recent times. Christensen (personal communication) states that the honestone quarries at Eidsborg were worked until after the Second World War.

The evidence from the important Viking site of Hedeby is also interesting. The honestone finds from Hedeby are all 9th and 10th century, and all prove to be Norwegian Ragstone or blue phyllite, with the latter predominating. The predominance of phyllite types at Hedeby may suggest that the Danish Vikings used a German or central European hone to a greater extent than their Norwegian cousins, for, interestingly, the blue phyllite

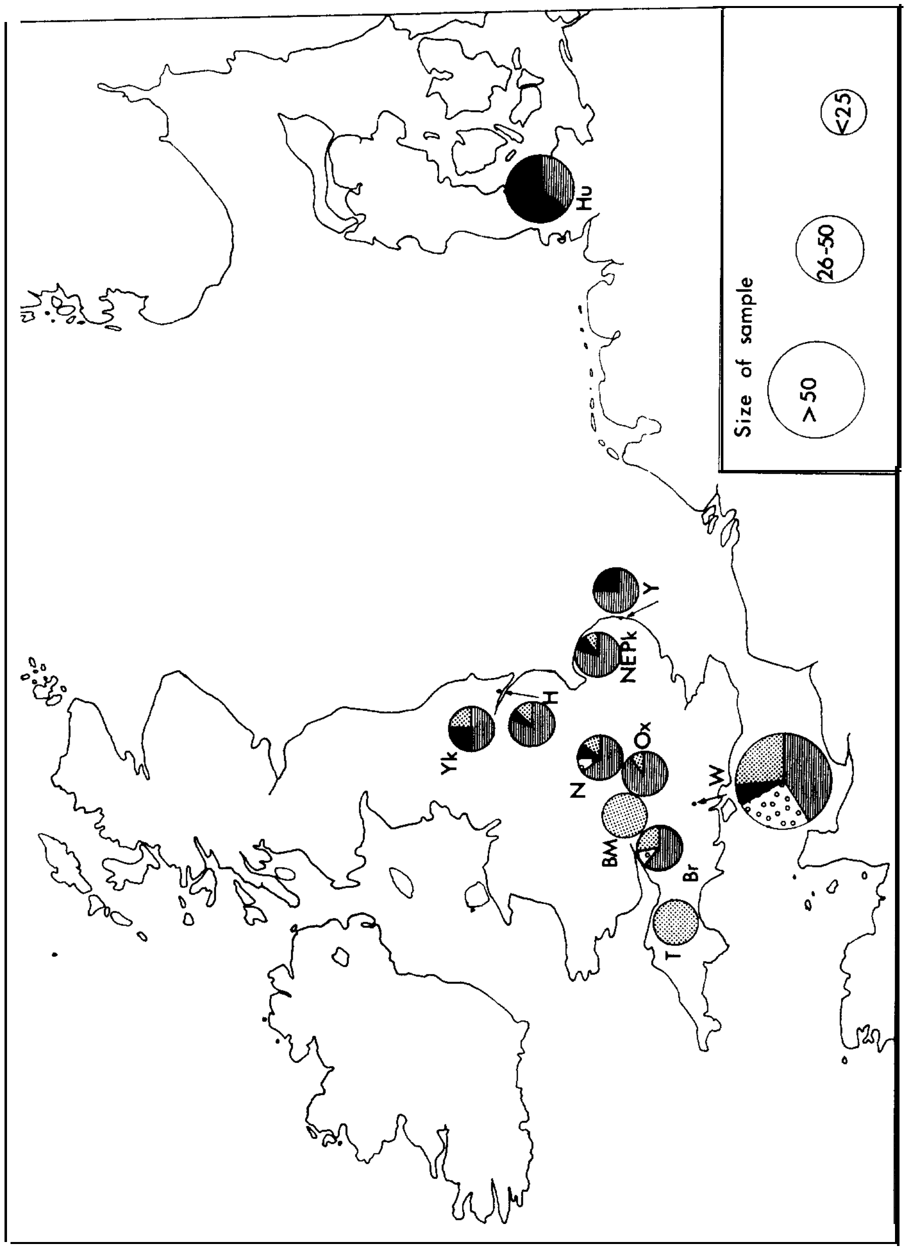

Figure 5. The percentage occurrence of hone types from late Saxon and medieval sites indicated from some recent excavations. Shading as in Figure 3.

hone is in appearance not unlike the rock associated with the well known Ratisbon (Regensburg) razor hone from Bavaria, although the writer has not been able to examine this stone petrographically.

The evidence suggests that Norwegian Ragstone, and to some extent blue phyllite, probably occur all over the Viking world; for example Normandy, Dublin, Scotland, the Isle of Man, the Orkneys, Shetlands, Faroes and perhaps even Iceland and Greenland. It would also be interesting to know if the Swedish Vikings took it to Russia. In an English context it is noteworthy that the Norman Conquest of the mid-l 1th century did nothing to reduce the trade with Norway in Norwegian Ragstone.

There are occasional reports of schist hones being found in a Roman context, but when investigated either there seems to have been the possibility of a medieval date or the stratigraphy is something less than ideal. This would appear to have been the case in the unpublished Thetford excavations of the early 1960s, and Ellis based several of his hone types on Thetford material. This is unfortunate, for the Anglo-Danish township of Thetford, like Hedeby, yielded more blue phyllite hones than Norwegian Ragstone hones and although the petrography is sound enough, the lack of good stratigraphic data at Thetford reduces its value.

Finally, schists are common rock types, and without a thorough petrographic examination a Norwegian provenance can be given only tentatively. For example, a quartz-hornblende-calcite-ore schist hone from Northampton, probably had a Scottish provenance, the presence of hornblende denoting a higher metamorphic grade (amphibolite) than the greenschist facies which is typical of the Eidsborg material. Yet in hand specimen the Northampton schist hone was practically indistinguishable from the Norwegian material.

Conclusions

Of the 67 hone types suggested by Ellis (1969), only about four or perhaps five would appear to be commonly met in English archaeology. These are Norwegian Ragstone, blue phyllite, the Coal Measures Sandstone types, Kentish Ragstone, and perhaps a facies of Purbeck Limestone. The well known and documented 19th century hones, whose sources are known for the most part, are not catered for by the Ellis system and some of these hones, for example the Devonshire Batts, occurred in earlier times.

Stratigraphically, the Kentish Rag hones would appear to be little used after Roman times, and the Coal Measures Sandstone types have steadily increased in use since then; the Norwegian Ragstone hones, from a humble beginning in late Saxon times, reached a position of near dominance in much of England in medieval times and their use lasted until recently. This stone is known to have been carried by Norwegian ships in the 12-13th century AD.

It seems reasonable that the ordinary names, as well as the Ellis nomenclature, where it exists, for hones should be used, the case being particularly strong for Norwegian Ragstone which name was known to Griswold in 1892.

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