

XVI.

NATIVE BANGLES AND ROMAN GLASS.

By ROBERT B. K. STEVENSON, M.A., F.S.A.Scot., Keeper of the Museum.

The need to record a number of specimens that have come to the Museum's notice since the War has led to a study of various aspects of Scottish glass armlets: one might rather call them bracelets or bangles in view of their small diameter, and the presumption that the smallest ones, being only 1.65 ins. across inside, may really have been pendants like those hung from women's torcs in pre-Roman France, and like undoubted jet ring-pendants, from Traprain,¹ and Cairngryffe, Lanarkshire,² for example.

The groundwork of the subject is due to H. E. Kilbride-Jones, whose comprehensive paper in 1938 was entitled "Glass Armlets in Britain."³ He showed that most had been found in Scotland, notably at Traprain Law, assigned them to the late 1st and 2nd century A.D., and distinguished three types: (1) heavy, more than semicircular in section, with an opaque surface layer of yellow and other colours; (2) less heavy, a blunted triangle in section, of transparent glass having inlaid cords or cables, generally white and blue, running lengthwise, and occasionally similar spiral spots; (3) resembling Type 2 in shape, but commonly almost opaque white or yellow throughout, and either plain or ornamented with trailed, and usually marvered, "pot-hook" patterns in blue, white or yellow on those two colours or on others—the various colour combinations forming his sub-types A to J plus a number of exceptional pieces.

The following notes cover three main topics: (a) Additional examples of bangles are gathered together or published for the first time. (b) Some unusual pieces of Types 2 and 3 are shown to be connected very closely with one another. (c) The use of Roman glass as raw material is suggested. • Minor amendments to Kilbride-Jones' paper are put forward in each section. Almost all the specimens discussed are fragments.⁴

For assistance in compiling the lists of bangles I must thank Mrs C. M. Figgott, Mrs J. G. Scott, Mrs F. S. Oliver, Mr W. Bulmer, Mr G. C. Dunning, Mr J. B. Mason, Mr J. B. Calkin, Mr R. Gilyard-Beer, Mr F. Cottrill, Mr E. M. Jope, and the staffs of the various Museums cited.

¹ *P.S.A.S.*, LV, 194, fig. 24; internal diameters 1 in. and 1.05 ins.

² *Ibid.*, LXXV, 217; internal diameter .7 in.

³ *Ibid.*, LXXII, 366-95. Cited here as K-J.

⁴ An asterisk (*) indicates that the specimen is in the National Collection.

(a) *Additional Examples.*

The additions are listed in Table I, with references, but a number of them raise points that require discussion.

**Braidwood*.—This specimen (fig. 1.1) clearly belongs to Kilbride-Jones' Type 1, confined to Scotland and, he argued, belonging to the latter half of the 1st century A.D., of which no two are exactly alike. In this case there are two peculiarities. Firstly, the core is a very dark glass, almost black, the closest parallels to which are rare Type 3 bangles from Traprain Law (K-J, *fig. 7.9). Secondly, over this core were laid broad oblique bands of opaque crimson and white, and then the white in turn was mostly coated with chrome yellow so as just to leave on the surface thin greyish-white lines between the red and yellow. In all other specimens the yellow is applied directly to the core, which is generally a transparent ice-green like Roman bottle-glass, but sometimes whitish and opaque.

Though both ends of the Braidwood piece are broken, one shows that it had a cut surface and a neck or groove round it, as if to receive a metal collar joining it to the next segment. This is such a very common feature of Type 1 bangles—15 out of 22, most of the minority being uncharacteristic in other ways—that it is scarcely possible that collars were only repairs, used after a bangle had been accidentally broken.¹ These ornaments must have been in segments when new, though it is hard to say why, particularly since the obvious interruption of the patterns shows that they were made in longer lengths than the existing segments. These vary greatly, and some with grooves at either end are very short.

**Dod Law*.—Another typical Type 1 segment, with both ends grooved (fig. 1.3), has in addition at one end the semicircular channel of a perforation from outside to in (radial), as if for a stout pin through the presumed metal collar. This is an unremarked feature of some bangles—paralleled on a piece from *Traprain (level M3) and on three to be mentioned below. The surface of the Dod Law bangle has the common red and yellow in stripes, but the core is purple streaked lengthwise with white (see p. 216).

**Unlocalised*, perhaps from Traprain, there is a very curious little piece (fig. 1.4). It is a hybrid between Types 1 and 3, and so demonstrates at least a chronological overlap. Much slighter than is normal in Type 1, it forms a complete but unusually short segment grooved at either end and with a semicircular perforation, in this case from side to side—as on a piece from *Camelon (K-J, fig. 1.11). The surface is coated with Type 1 opaque yellow enamel on which is a spot of the characteristic red, but there seem also to have been Type 3 pot-hooks in blue and a blue line along each lower margin (see p. 215). The core is greenish-yellow semi-translucent glass characteristic of Type 3 B.

¹ K-J, p. 370, after *P.S.A.S.*, L, 105.

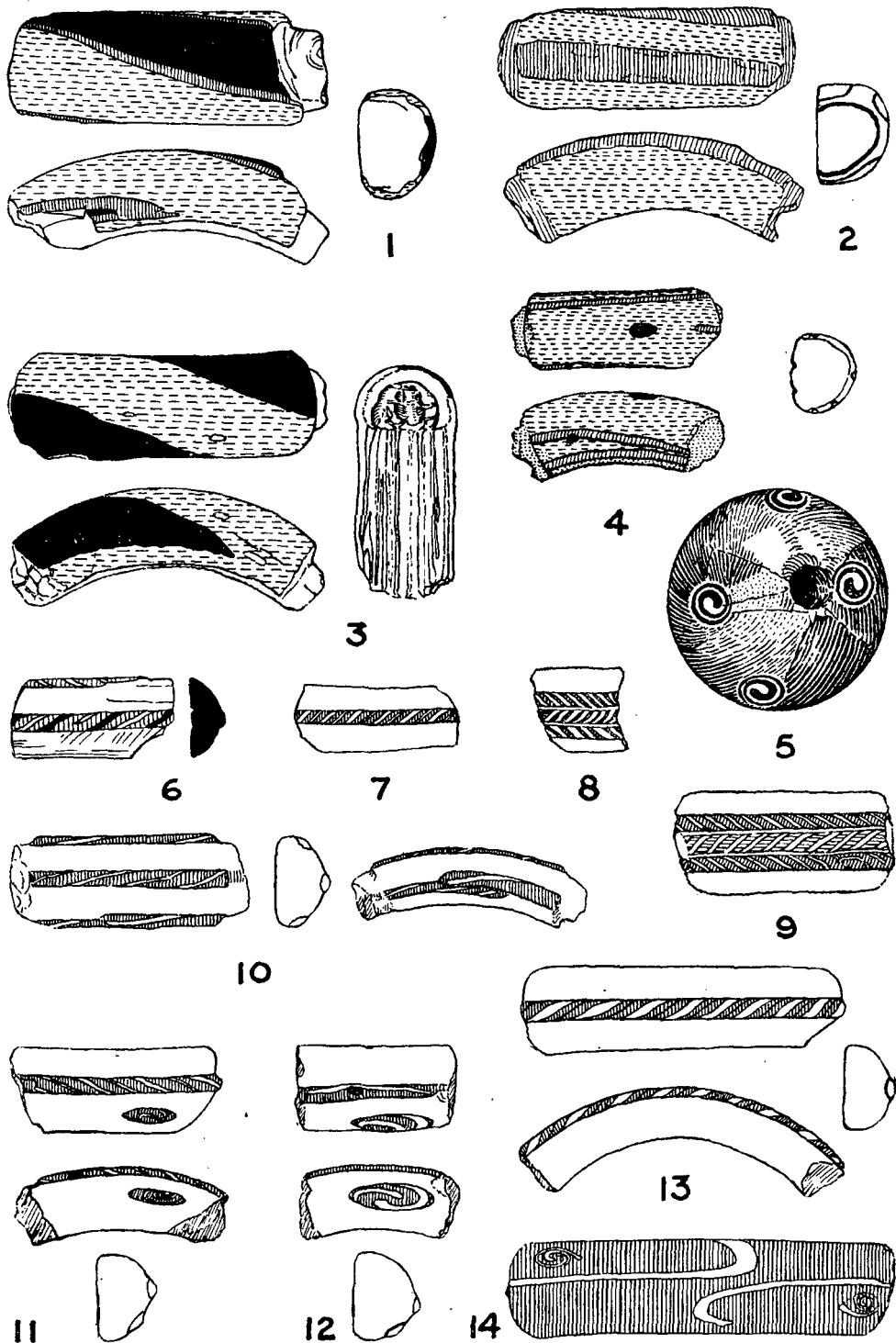


Fig. 1. *Type 1*. 1. Braidwood Fort, Midlothian. 2. Hyndford Crannog, Lanarkshire. 3. Dod Law, Northumberland. *Type 1/3*. 4. Locality unknown. *Bead*. 5. Mochrum Loch, Wigtownshire. *Type 2*. 6. Dunagoil Fort, Bute. 7. Edgerston Fort, Rox. 8. Newstead, Rox. 9. Traprain Law. 10-13. Hyndford Crannog, Lanarkshire. *Type 3/1*. 14. Edgerston Fort, Rox. (All 1/1 except 5, which is 2/1 and has different colour conventions.)

Hyndford.—One of the fragments from this crannog was described by Kilbride-Jones, who placed it in his Type 3 C. It is however surely to be attached to Type 1 because of the heavy cross-section (fig. 1.2) and the broad oblique bands of yellow, once sunk deep into the blue matrix and now almost entirely gone but restored in the drawing. Moreover, both ends are grooved, and one has a side to side channel. Kilbride-Jones' ascription was unfortunate, since he based part of his chronological argument on it;¹ but his main conclusions need not be disturbed on that account. This bangle's core is of the normal "bottle-glass," showing in section slightly opaque papery folds, while the outer surface is a capping of attractive opaque pale blue (see p. 214). There are five Type 2 fragments from Hyndford, and one of these is grooved like Type 1—at both ends. Only one other Type 2 fragment seems to be grooved, from *Traprain (K-J, fig. 3.1), and grooving is unknown in Type 3 apart from the hybrid described above. It is presumed that bangles of Types 2 and 3 were normally continuous rings, and in fact intact specimens are known: Type 2, York; Type 3 A, *Flanders Moss and *Kintore, 3 I, Wall, Staffs., and London.

Distribution.—After adding to Kilbride-Jones' examples the additions in Table I, including some to be discussed in the next section, the distributions of the types of bangle are as shown in fig. 2.² The red and yellow bangles of Type 1 are still virtually confined to SE. Scotland. Types 2 and 3 are seen to be even more widely scattered than he realised, but without significant differences from each other and still preponderantly south Scottish. Despite complete Type 3 I bangles from Wall and London, and a Silchester fragment, most Type 3 I examples are still northern: but only one fragment comes from Traprain. The area north of the Forth, later to be the boundary of Pictland, plainly stood apart in the matter of bangles as it did in other things—the heavy bronze armlets are correspondingly northern, for example. Four out of five northern specimens of Type 1 are, it should be noticed, very different from the southern ones.

Date.—See next section.

Bead.—Though only connected with the bangles by its technique, a rare bead from Mochrum, Wigtownshire, may be illustrated here.³ It has eight blue and white marvered spiral spots, themselves arranged in a spiral round the globular core of ice-green glass (fig. 1.5, twice natural size, drawn like the bangles by Mr J. A. Brown). There is a related *bead, with cord as well as spirals, from Traprain.⁴

Bangles at other Periods.—As a further supplement to the basic paper, it should be mentioned that glass bangles occur in Britain at two other periods: their revivals form a parallel to the mystery of the revivals of Celtic art

¹ K-J, pp. 384 and 391.

² Reference to one from Caithness (*P.S.A.S.*, LXVI, 393) appears to be an error. For the pattern of distribution of dragonesque fibulae, *Ant. J.* 1951-3.

³ *T. Dumf. and Gall. A.S.* (1951), 62.

⁴ *P.S.A.S.*, LVIII, 268-9, fig. 17.

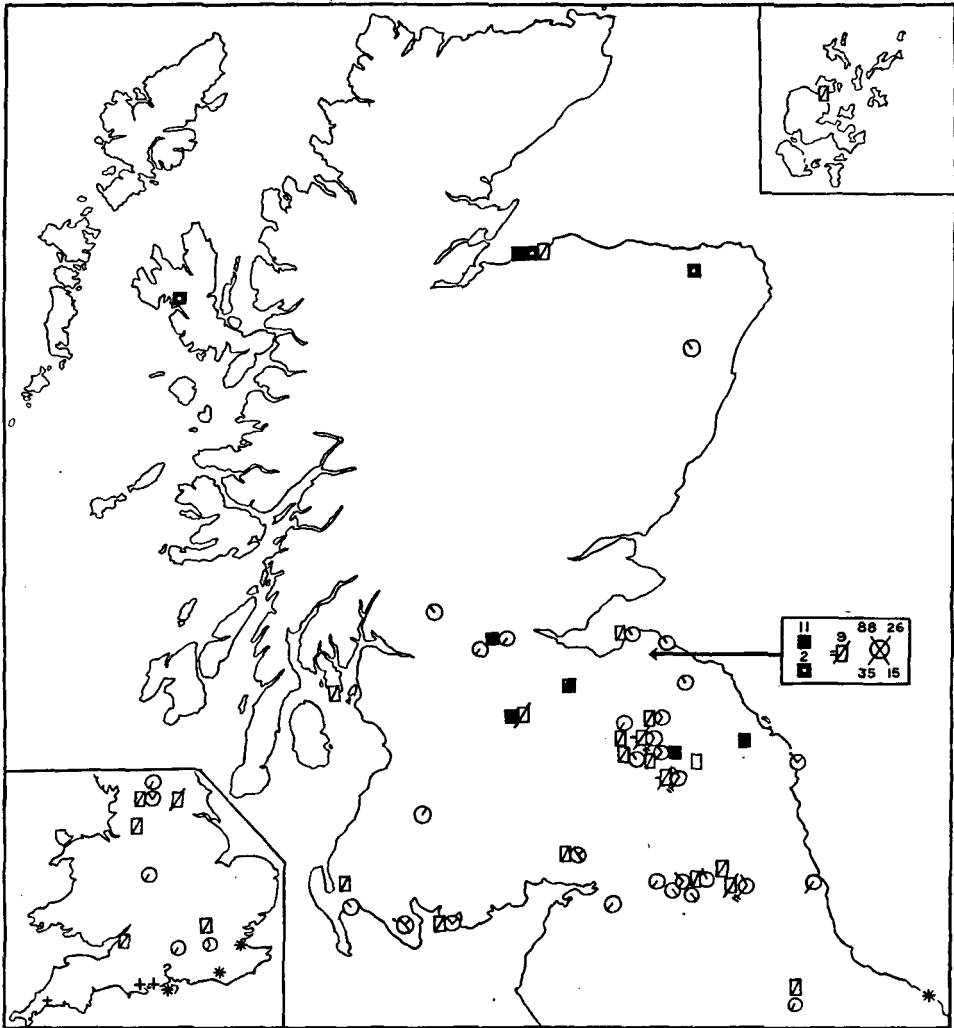


Fig. 2.

GLASS BANGLES IN BRITAIN, AFTER KILBRIDE-JONES, WITH ADDITIONS.

1ST.-2ND. CENTURY A.D.

- Type 1 ▣ Type 2 A B Type 3 ⊗ } one example has
- ◻ "atypical" ▤ "three or more" E-J C-D (prolonged for three or more) ⊙ } white marginal lines.

PRE-ROMAN + POST-ROMAN *

Wilderpool, Lancs., Type 3A and 3D.

forms. Fragments of pre-Roman bangles of Continental type were found in the early iron age fort at Hengistbury, Hampshire,¹ and at Poole, Dorset,² as well as at Castle Dore, Cornwall, cited by Kilbride-Jones.³ The Hengistbury fragments in the British Museum include cobalt with a purple tinge and also reddish purple; one of the latter is so dark as to appear opaque black; there is also a lump of the purple glass from the site.

Three unpublished fragments from two raths excavated by Dr Bersu at Ballacagen, Isle of Man, are again Continental, perhaps 2nd to 1st century B.C.⁴ One is plain and dark blue, while two have "mountainous" cross-sections; one of these has moulded cable patterns and a yellow inner coating that shines through the clear glass. The latter is the only example of this technique found in the British Isles, but as Kilbride-Jones pointed out it was unsuccessfully imitated by an opaque Type 3 A bangle from Kintore.⁵

From an Irish find at Loughy, Donaghadee, Co. Down, possibly of 1st century A.D., come two complete bangles, thin and rounded but very irregular in thickness, one cobalt and the other apparently black (and so mistaken for shale), but probably purple like the Hengistbury glass.⁶

Then, some centuries after they apparently died out in Scotland, bangles somewhat resembling Type 2 appear on a number of Irish later iron age sites, such as Lagore Crannog, Co. Meath (7th-10th century);⁷ there is one instance of a metal copy, from Ballinderry Crannog.⁸ A few post-Roman instances occur in England: one from the Saxon abbey at Whitby is of opaque ultramarine glass;⁹ one of sage green decorated with oblique flutes containing impressed dimples, from Malling Hill, Lewes, may be from a Saxon pagan cemetery;¹⁰ from Chessel Down, Isle of Wight, also an early Saxon or Jutish cemetery, is a related olive-green specimen, complete: its oblique flutes, in threes, contain impressed semicircles and form a chevron pattern between horizontal lines, with "eyes" in the interspaces;¹¹ and from a Jutish grave in the early cemetery at Chatham Lines, Kent, a complete

¹ *Research Report III, S.A. Lond.* (1915), 62-63.

² *P. Dorset N.H. and A.S.*, LVI, pl. iii.

³ *J.R.I. Cornwall, N.S.*, I (1951), App., 68-69 (K-J, p. 394, n.).

⁴ *J. Manx Museum*, v, No. 72. Internal diameters: a, over 2 ins., b-c, 3 ins. (Manx Museum). There are good parallels among the many pieces from the Dürrenberg, near Hallein, Austria: *Mitt. Anthrop. Ges. Wien* (1926), 324-6 and abb. 2.

⁵ K-J, p. 305.

⁶ *P.R.I.A.*, LI, 79; *J.R.S.A.I.* (Kilkenny) (1856-7), 184; *Arch. J.*, XIII, 407-9; xv, 160; internal diameter less than 2.5 ins. (British Museum.)

⁷ *P.R.I.A.*, LIII (1950), 145-6. Differences include circular white spots and loosely twisted white threads, used as well as cables. Where dark blue caps are added to lighter glass they are thicker than in our Type 2 (see p. 215).

⁸ *Ibid.*, XLVII, 45.

⁹ *Archæologia*, LXXXIX, 73; internal diameter 2.2 ins.

¹⁰ *Arch. J.*, xv, 160, and G. Baldwin, *Arts in Early England*, iv, pl. xlv, 1.8; internal diameter 2.75 ins., section almond flattened on one side. (British Museum.)

¹¹ Unpublished; internal diameter 3.15 ins., section slightly almond shaped 1 x .2 in. (Carisbrooke Castle Museum.)

plain light green glass armlet has, like the previous one, an internal diameter more than 3 ins., but a thick plano-convex cross-section like that from Whitby, yet slightly bevelled on the inside.¹

A bangle which may perhaps be Romano-British, but unconnected with the others considered here, was found at Romsey, Hants. It is complete, made of a circular twisted rod of transparent yellow and clear glass fused, with iridescent and amber-coloured weathering.² East Mediterranean parallels suggest to Dr Harden that it is a late Roman or early Arab type.

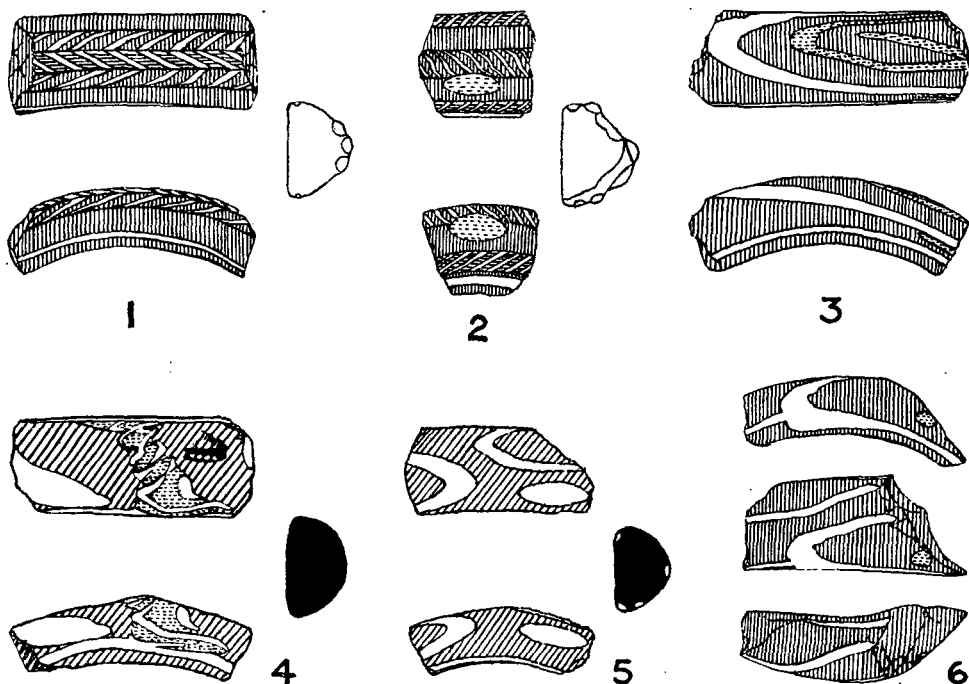


Fig. 3. *White marginal lines: Type 2.* 1. Edgerston Fort, Rox. 2. Piercebridge, Durham.
Type 3. 3 and 6. Edgerston Fort, Rox. 4-5. Newstead, Rox. (All 1/1.)

(b) *Cobalt Blue Glass and White Marginal Lines* (fig. 3).

Kilbride-Jones distinguishes two main kinds of blue in the Scottish bangles: opaque mid-blue and deep translucent cobalt blue. Roughly speaking, the mid-blue is the basic colour of the Hyndford Type 1 piece and of a few Type 3 bangles—3 J. The cobalt blue characterises Type 3 I, and is the blue of most Type 2 cords and spiral spots; it is also prevalent as basic colour among the various pieces that he noted as exceptional and grouped

¹ James Douglas, *Nenia Britannica* (1793), 89, and pl. 14.1; Baldwin Brown, *cit.*, 739-40. (Ashmolean Museum.)

² Unpublished; internal diameter 1 in., thickness .25 in. (Winchester Museum.)

at the end of Type 3 (K-J, fig. 9.2-5).¹ The latter indeed appear to be mid-blue as he says, but at least in the Scottish examples this is due to their pale shade, cobalt glass having been used sparingly, fused in or on an ordinary "bottle-glass" core, through which it is seen to colour the whole.² The Type 3 I bangle from *Camelon (K-J, fig. 8.12) is an instance of this process and has two bands of cobalt in the ice-green core. There are only five cobalt pieces in Type 2, listed in Table II (a). They all have in common an inconspicuous feature not remarked by Kilbride-Jones: a thin white line runs close to the outer edge on either side. This peculiarity is shared by seven cobalt-coloured pieces of Type 3 (Table II (b)). Such a recurrent association of white marginal lines and cobalt-coloured body seems significant, and two fragments of each type have yellow dots in addition. A single workshop may have been responsible for the otherwise varied bangles that combine these features. At any rate they provide confirmation of Kilbride-Jones' conclusion that no sharp chronological distinction should be drawn between Types 2 and 3. The stratification of the Type 3 I piece excavated at Newstead in 1947 should put them back to the end of the 1st century A.D.,³ to which Type 1 is also assigned.

To complete the picture, attention must be drawn to a few cases of yellow or blue marginal lines (Table II (c))—two again on cobalt-capped cores. And there is an exceptional fragment from *Hownam Rings which has six all-white lines (two of them marginal) on an amber-coloured body; a heavier colourless piece with four white lines was found in London (Table I).

(c) Possible Use of Roman Glass.

The observation, discussed in section (b), that a number of cobalt-blue bangles owe their colour to a restricted amount of blue glass in or over a core of the common ice-green, suggested that the blue had a certain scarcity value; though such glass was already used for pre-Roman Continental bangles, and blue beads with white spirals were used in pre-Roman southern England.⁴ Amber-coloured glass seemed scarcer still. It occurs in six instances for Type 2 cable inlays,⁵ and forms the main body of the Hownam bangle. A raised dot of it, unnoticed by Kilbride-Jones, decorates one of the yellow bands of the unique *Monquhitter, Aberdeenshire, bangle, which has an olive-brown core and cords of yellow and olive-brown.⁶ Another and even more curious "Type 1" bangle, from *Dun Beag, Skye (K-J, fig. 1.7),

¹ Type 3 I is best extended to include them, as is done in Table I.

² Independently discussed by Mr Bulmer in *P.S.A.S.*, LXXXIV, 38.

³ *Ibid.*, 37.

⁴ *Research Report XII, S.A. Lond.*, Maiden Castle, p. 211.

⁵ Newstead (2), Edgerston, Traprain, Piercebridge, Manchester.

⁶ Not yellow and white (K-J, fig. 1.12).

has one amber and white cord, the others being rather olive-green.¹ The "yellow" of Kilbride-Jones' Type 3 D is either amber or greenish glass.

The possibility that the bangle-makers sometimes reused scraps of Roman glass for rare colours was strongly suggested by a unique piece of bangle from *Traprain (E, bottom level (3)), which is entirely purple and white marbled glass (K-J, fig. 2.3 ascribed to Type 1). Its glass is strikingly similar to a fragment of Roman pillar-moulded bowl from level M2, and indeed there is no reason to doubt that such a bowl is the origin of that particular bangle. The striped purple and white core of the *Dod Law piece (p. 209) may be presumed to have a similar origin—Dr D. B. Harden has kindly examined these pieces and concurs. In the Dod Law case the maker did not feel that his customers would appreciate the peculiar colouring, and so preferred to coat it with the fashionable red and yellow that seem to be the same as the enamel on Celtic metal-work. On a Type 2 fragment from *Culbin there is a mauve and white cord.

A source of cobalt glass might have been ribbed glass "melon beads," such as are at Newstead nearly as common as similar beads of frit. Roman amber glass from bowls has been found in SE. Scotland at Traprain and Torwoodlee broch. Olive-green Roman glass is not uncommon at Traprain.

Dod Law, while indicating that rare Roman glass was worth salvaging even for the core of a bangle, raises the question how far other bangles had cores of reused material. Is it possible that even the common ice-green was, at any rate not uncommonly, really derived from ordinary Roman bottles?

To test these speculations, samples from bangles and from Roman vessels and beads have been spectrographically examined. I am greatly indebted to Mr W. Ward, A.R.I.C., and Mr J. P. L. Truesdale at the analytical laboratory of Pilkington Brothers Ltd., St Helens, for examining and reporting on the specimens submitted on the Museum's behalf by the British Glass Industry Research Association. Besides Dr Harden, Mr W. Bulmer and Mr D. C. Baird have also assisted this inquiry.

It will be seen from the Report printed as an Appendix that the glass base used in making the bangles and the Roman bottles and beads is similar in composition, and that the trace elements are also similar. Traces of some elements were higher in the ice-green and brown bangles than in the comparable Roman fragments, but the situation was reversed in the blue specimens. Possibly a larger number of specimens of Roman glass would have shown a different result, at any rate in the common ice-green range where much variation in shade is evident; but the reuse of Roman glass in the three cases remains unproven.

¹ This bangle's white capping over ice-green recalls an imitation Type 3 A bangle from Newstead noted in Table I; similar to the latter may be *one from the original Newstead excavations, its peculiarity obscured by papery folds in the core (p. 211).

The more positive results include proof that the rich blues were due to cobalt oxide together with a small amount of copper—specimens with a purple tinge were chosen for examination. A sulphur or carbon compound, of which no trace was detectable by spectrography, is suggested for the brown (amber) colouring. Perhaps most interesting is proof that the white, so common as Type 3 A, etc., is a mechanically aerated form of the common ice-green—it is *not* due to the addition of tin or other element. A few examples from the Borders have a pink tinge not yet investigated. The yellow of Type 3 B is similar to the white, but with the addition of lead oxide: it has not been heated to the temperature at which the lead would combine with the glass and become colourless. The red copper oxide of Type 1 is similarly mixed into a glass base and not chemically combined with it.¹ The main difference between the yellows of Type 1 and of Type 3 probably is that the former has a smaller proportion of glass to lead oxide.

APPENDIX.

Eleven small specimens were received at the Central Analytical Laboratory, Pilkington Brothers Limited, St Helens, in envelopes numbered 1 to 11. Accompanying the envelopes was a list describing the specimens as follows:

1. Roman bottle-glass, pale blue-green.
2. Native bangle, pale blue-green.
3. Native bangle, white.
4. Roman bottle-glass, brown.
5. Native bangle, brown with white lines.
6. Native bangle, white with brown lines.
7. Roman bottle-glass, rich blue.
8. Roman bead, rich blue mixed with pale.
9. Native bangle, rich blue mixed with pale.
10. Native bangle, yellow.
11. Native bangle, with yellow and red coating.

Spectrographic qualitative analyses were carried out by Mr W. Ward, A.R.I.C., Spectrographist of Pilkington Brothers Limited.

EXAMINATION OF THE SPECTRA.

The glass base used in the making of all the glasses was similar in composition. This consisted of the following elements—silicon, calcium, aluminium, magnesium, sodium, manganese, potassium and iron—each present above 0·1 per cent.

Trace elements are similar in all specimens, except that the native glasses would appear to be characterised by the presence of higher traces of lead, antimony and barium. Thus the native bangles numbered 2 and 3 contain higher traces of these elements than does Roman glass numbered 1, also, native bangle (brown with white lines) likewise contains higher traces of these elements than does Roman bottle-glass (brown) numbered 4. On the other hand, this state of affairs

¹ Cf. *Ant. J.* (1953), 69, notes.

is reversed in the cases of the native bangle (*rich blue mixed with pale*) numbered 9—the Roman bead (8) having the higher traces of lead, antimony and barium. The colouring oxides of both bead and bangle were cobalt and a small amount of copper.

No element was detected in the white glasses to account for their opacity. Microscopic examination showed the presence of a large number of small bubbles, and there is no evidence from crystalline structure that the glass has devitrified. Further, the small portion ground in an agate pestle and mortar crushed with an unusually light amount of pressure. It is, therefore, safe to assume that the effect in question was originally produced by aeration or “whipping” (as first suggested by Mr D. C. Baird, F.S.A.Scot.).

No colouring element was detected in the brown glasses, so that the colour would seem to have been imported by the addition of some sulphur and/or carbon compound. It is known that horse manure has been used for such a purpose.

Some of the glasses do show slight variations in iron and manganese contents, which would account for differences in transparency. The use of manganese dioxide as a decolouriser was probably a Roman technique (as suggested by Mr W. Bulmer).

The opaque yellow of sample number 10 would appear to have been produced by the addition of lead oxide in a colloidal form. It also was aerated. There is also about 0.4 per cent of antimony in this glass. Otherwise, the glass is very similar to the Roman glass.

The red layer on sample number 11 is due to copper, probably also in a colloidal form.

TABLE I.—ADDITIONS TO KILBRIDE-JONES' PAPER.¹

TYPE 1.

- *Braidwood fort, Midlothian. Int. diam. 2.25 ins. (See p. 209 and fig. 1.1) *P.S.A.S.*, LXXXIII, 10.
- *Culbin Sands, Moray. Fused fragment: probably ice-green and cobalt core with broad yellow stripe (*cf.* K-J, fig. 1.6, *Traprain level J4). Hyndford crannog, Lanarkshire. (See p. 211 and fig. 1.2.) *P.S.A.S.*, XXXIII, 384-5 and fig. 12. (Now on loan to N.M.A.)
- *Locality unknown, perhaps Traprain Law. Int. diam. 2 ins., breadth .45 in., hybrid Types 1/3. (See p. 209 and fig. 1.4.)
- *Dod Law, nr. Wooler, Northumberland—? from a fort. Int. diam. 2.25 ins. (See p. 209 and fig. 1.3.) *P.S.A.S.*, LXXXVII, 202.

TYPE 2.

Scotland.

- *Archerfield cave, East Lothian. Single cord. *P.S.A.S.*, XLIII, 264 and fig. 5.
- *Birrenswark fort, Dumfriesshire. Single cord, spiral spot. *P.S.A.S.*, XXXIII, 247 and fig. 4.
- *Black Loch crannog, Wigtownshire. Three cords. *P.S.A.S.*, IX, 391.
- *Culbin Sands, Moray. Three widely spaced cords, central white and mauve (see p. 216); fused with NE. Scottish yellow spiral bead. (Donald's Isle, Loch Doon: K-J, p. 390, should probably be deleted. (See *P.S.A.S.*, LXXI, 330, and Type 3 below).)

¹ References in square brackets refer to site but not object.

- Dunagoil fort, Bute. Three cords, central blue, red and white, fig. 1.6. (*Cf.* K-J, fig. 3.2, Traprain.) *T. Bute N.H.S.* (1925), 59. Rothesay M.¹
- Edgerston fort (The Camps), Rox. *a.* Single cord of pale blue with alternate white lines very thin. Int. diam. 2.5 ins., breadth .45 in. *b.* Single cord, white thinner than blue. *c.* See Table II (*a*) and fig. 3. [*P.S.A.S.*, LXVI, 363.] Edgerston House.
- *Gurness broch, Aikerness, Orkney. Three cords: heated fragment rolled into an irregular ball. Excav. 1932—early secondary level within broch. [*R.C.A.M.*, No. 263.]
- *Hownam Rings fort, Rox. Atypical—amber core, six white lines. (See p. 215.) *P.S.A.S.*, LXXXII, 211, 219–20 and fig. 13.
- Hyndford crannog. *a–b.* Single cord. *c–d.* Single cord, spiral spots. *e.* Three cords. (See p. 214 and fig. 1.10–13.) As for Type 1, but figs. 11 and 13.
- Newstead, area of Roman fort, Rox. Surface finds. **a.* Single cord of white and amber. **b.* Three cords, central white and amber, fig. 1.8. *P.S.A.S.*, LXXXIV, 230. *c.* Single cord. Private coll.
- Philiphough, Selkirkshire. Single cord, alternate white lines thin. Hunterian M.
- *Traprain Law. Three cords, central amber and white, fig. 1.9. Quarry find 1954.

England.

- Corbridge (Corstopitum), Northumberland. *a.* Single cord. *b.* Three cords, widely spaced on very pale cobalt blue. Corbridge M.
- Piercebridge, Romano fort, Co. Durham. (See pp. 215, 220 and fig. 3.2.) Piercebridge M.
- Seamills, Romano-British site nr. Bristol. Single cord. Bristol M. [*T. Bristol and Glos. A.S.*, LXVI, 258.]
- York. Type conjectured. *a.* Complete, "green with blue and white lines," in urn, 1873. *b.* Complete, "dark blue striped with white and purple," 1878. *c.* "Fragments of others." *Handbook to Yorkshire Museum* (1891), 103–4. *d.* Single cord, white lines thick and thin. Excav. 1955, St Mary's Abbey—stratified with coin of Nerva under cobble floor. Yorkshire M.

TYPE 3.

Scotland.

- *Donald's Isle, Ayrshire. One 3 B (yellow). *P.S.A.S.*, LXXI, 330.
- Earlston, Berwickshire. One 3 I (cobalt), breadth .35 in.—see Table II (*b*). Hunterian M.
- Edgerston, Rox. Four 3 A (white), and three 3 I, viz. *a.* Highly polished, streaks of cobalt, marvered white pot-hooks, spiral spots raised and polished, fig. 1.14; *cf.* Silchester (below), Newstead (K-J, fig. 9.5) and Traprain (level J4, K-J, fig. 9.4, whose "eyes" are probably a spiral dot and pot-hook end). *b–c.* See Table II (*b*) and fig. 3.3, 6. As for Type 2.
- Faughhill, Bowden, Rox. One 3 A, but with pinkish tinge. Breadth .7 in. Another, narrower, labelled only Bowden. Hunterian M.
- Hedderwick, East Lothian. One 3 A, greenish. Breadth .4 in., flattened (*cf.* K-J, fig. 4.7). Private coll.

¹ A number of other finds also, and slight structural indications, suggest that the vitrified fort had a secondary occupation.

- Huntshaw Camp, Earlston, Ber. One 3 A, pinkish. Hunterian M.
 Newstead, area of R. fort, Rox. One 3 A, pinkish, high keel, breadth .6 in.
 One imitation, 3 A, white capping on ice-green. One exceptional cobalt—
 see Table II (b). Private coll. *Two 3 I, one from early Flavian barrack-
 block, 1947—Table II (b); *P.S.A.S.*, LXXXIV, 37-8, 230.
 Sandyknowes, St Boswells, Rox. One 3 A. Hunterian M.

England.

- Corbridge (Corstopitum), Northumberland. Three 3 A, add. to one in K-J.
 As Type 2.
 Dowkerbottom caves, Arncliffe, Yorks. One 3 F, ice-green with white pot-hooks.
Arch. J., xv, 160. British M.
 Dunstanburgh Castle, north of Alnmouth, Northumberland. Four 3 A, the
 largest pinkish, and one 3 B. *Arch. Æl.*, XIII (1936), 283-4, sections without
 descriptions. Ministry of Works.
 London. a. Friday Street. One 3 A. b. Old Steelyard, Thames Street.
 One complete, 3 I, int. diam. 2 ins., only a little cobalt mixed with upper
 surface of ice-green (not capped), 6 pot-hooks. c. No locality, variant of
 3 F ? (but cf. Hownam, "type 2"), colourless with four parallel white lines,
 int. diam. 2.5 ins. British M.
 Silchester (Calleva), Hants. One 3 I with spiral spots (cf. fig. 1.14). Find
 circs. unrecorded. Reading M.
 Wall (Leticetum), Staffs. One 3 I, complete, 6 pot-hooks (cf. K-J, fig. 7.9),
 int. diam. 2.5 ins. From burial no. 3, with lead tore with biconical terminals
 and unidentified pot. Bantock House M., Wolverhampton.
 Well, Yorks. One 3 (dark green with white lines). In 2nd-4th-century rubbish
 pit. *Yorks. Roman Antiquities Committee, Research Report No. 1* (1951),
 59 and fig. 19. Thorpe Prebend House M., Ripon.
 Wilderspool, Lancs. Two 3 A and one 3 D sage-green on white. *J. Chester
 Arch. Soc.* (1876), 211; *T. Hist. Soc. Lancs. and Cheshire* (1870-1), 170.
 Warrington M.

TYPE UNASCERTAINED.

York. See Type 2 above.

BANGLES OF OTHER PERIODS.

See above, pp. 211, 214.

TABLE II.¹

(a) *Type 2, Cobalt with White Marginal Lines.*

- *Traprain (K-J, fig. 3.3). One cobalt streak and cobalt capping.
 *Traprain (K-J, fig. 3.1). Cobalt capping; yellow dots.
 †Piercebridge (fig. 3.2). Cobalt capping; yellow dots; three cords, outer amber
 and white.²

¹ † indicates references in Table I.

² Mr G. H. Richardson, Piercebridge Museum, kindly informs me that it was found in a latrine with 3rd-4th-century pottery, but that there is 2nd-century pottery from the site. A similar, late 3rd-century context recorded at Verulamium is cited by K-J. Though one might seek persistence, because of the Irish "revival," the Piercebridge fragment cannot be detached from its close Scottish parallels.

- *Newstead (K-J, fig. 3.2). Almost cobalt throughout, purply shade.
 †Edgerston (fig. 3.1). Almost cobalt throughout, purply shade; three cords, central amber and white, int. diam. 2.45 ins.

(b) *Type 3 I, Cobalt with White Marginal Lines.*

- †Newstead (fig. 3.4). Cobalt throughout, purply tinge; instead of pot-hooks a band of white and an oblique white and olive cable.
 †*Newstead (fig. 3.5). Cobalt throughout, white spot, int. diam. 2 ins.
 †Newstead. Cobalt capping, yellow spots.
 †Earlston. Cobalt throughout.
 †Edgerston (fig. 3.6). Mostly cobalt, yellow dot.
 †Edgerston (fig. 3.3). Cobalt capped, instead of pot-hooks a yellow and white inlay like Type 3 C-D.
 Corbridge¹ (K-J, fig. 9.3). Pot-hook ends, not dots as illustration.
 †Corbridge. Cobalt capping over colourless glass; only decoration marginal lines?

(c) *Marginal Lines of other Colours.*

Yellow.

- *Traprain (K-J, p. 390). Type 3. Yellow and white on cobalt capping, thick marginal lines. Level K3.
 *Traprain (K-J, fig. 8.8). Type 3 G. Yellow on ice-green.
 *Torwoodlee (K-J, fig. 8.10). Type 3 H. Yellow on yellow-green.

Blue.

- *Caddonlea (K-J, p. 374). Type 2. Single cord.
 Corbridge (K-J, p. 374). Type 2. Three close-set cords on cobalt capping, marginal lines opaque pale blue.
 †*Locality unknown (fig. 1.4). Hybrid, Types 1/3 (see p. 209). Opaque pale blue lines.

¹ Information from Mr W. Bulmer.