

## NOTES ON A GROUP OF MEDICAL AND SURGICAL INSTRUMENTS FOUND NEAR KOLOPHON.

[PLATES. X.-XII.]

THIS set of instruments and the large beaker were found about three years ago near the site of Kolophon in Ionia.<sup>1</sup> The objects are thirty-seven in number. With two exceptions all are of bronze. The blades of the knives were originally of steel, but this metal has in each case been almost destroyed

by oxidation. The date is uncertain—it may have been before the Christian era but is more probably the first or second century A.D. The glass beaker belongs to a type which is said to occur so late as the fourth century.

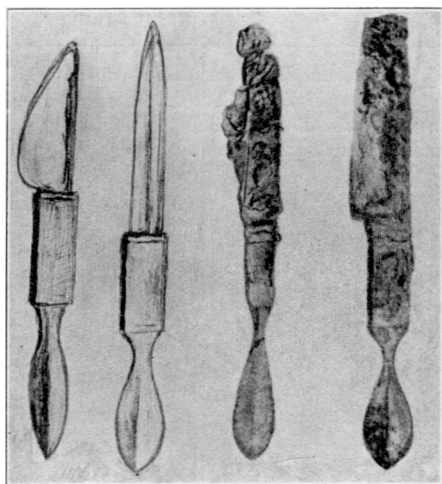


FIG. 1.—SURGICAL KNIVES.

shaven by an iron razor or iron scissors.<sup>4</sup> I mention this superstition as possibly explaining a peculiarity to be observed in surgeons' knives: it will

I. **Knives.**—In ancient times knives were either of stone or of bronze. The superstitious fear of iron lingered even into the Christian era. It was unlawful to introduce an iron implement into any Greek temple.<sup>2</sup> Bronze on the other hand had a special purifying virtue.<sup>3</sup> In Rome it is well known that no iron was allowed to be used in the construction or repair of the Sublician bridge. No Roman priest might be

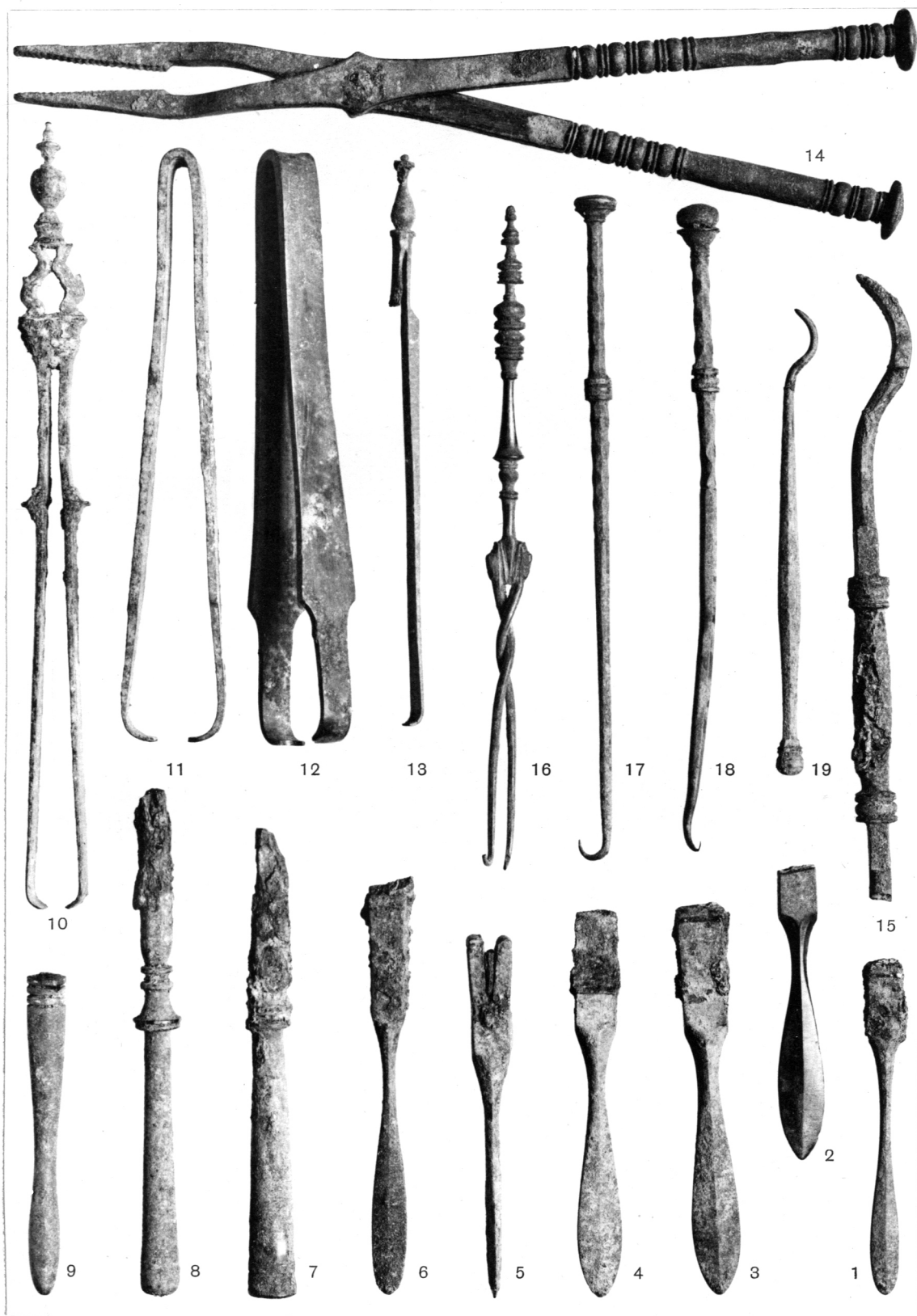
<sup>1</sup> 'They were formerly in the possession of the late Alfred O. Van Lennep, Dutch Vice-Consul at Smyrna, whose life-long connection with the large estate owned by his family near Kolophon gave him exceptional knowledge as to finds made in that district. He told me that he knew these objects to have been unearthed all together, not long before the spring of 1912, at some spot in that neighbourhood ;

exactly where this was he did not know. His scrupulous accuracy makes this, in my opinion, a satisfactory certificate of origin. The set belongs to the Johns Hopkins University in Baltimore, U.S.A.' [Note by W. H. BUCKLER.]

<sup>2</sup> Plutarch *Precepta ger. reipub.* xxvi. 7.

<sup>3</sup> Scholiast on Theocritus ii. 36.

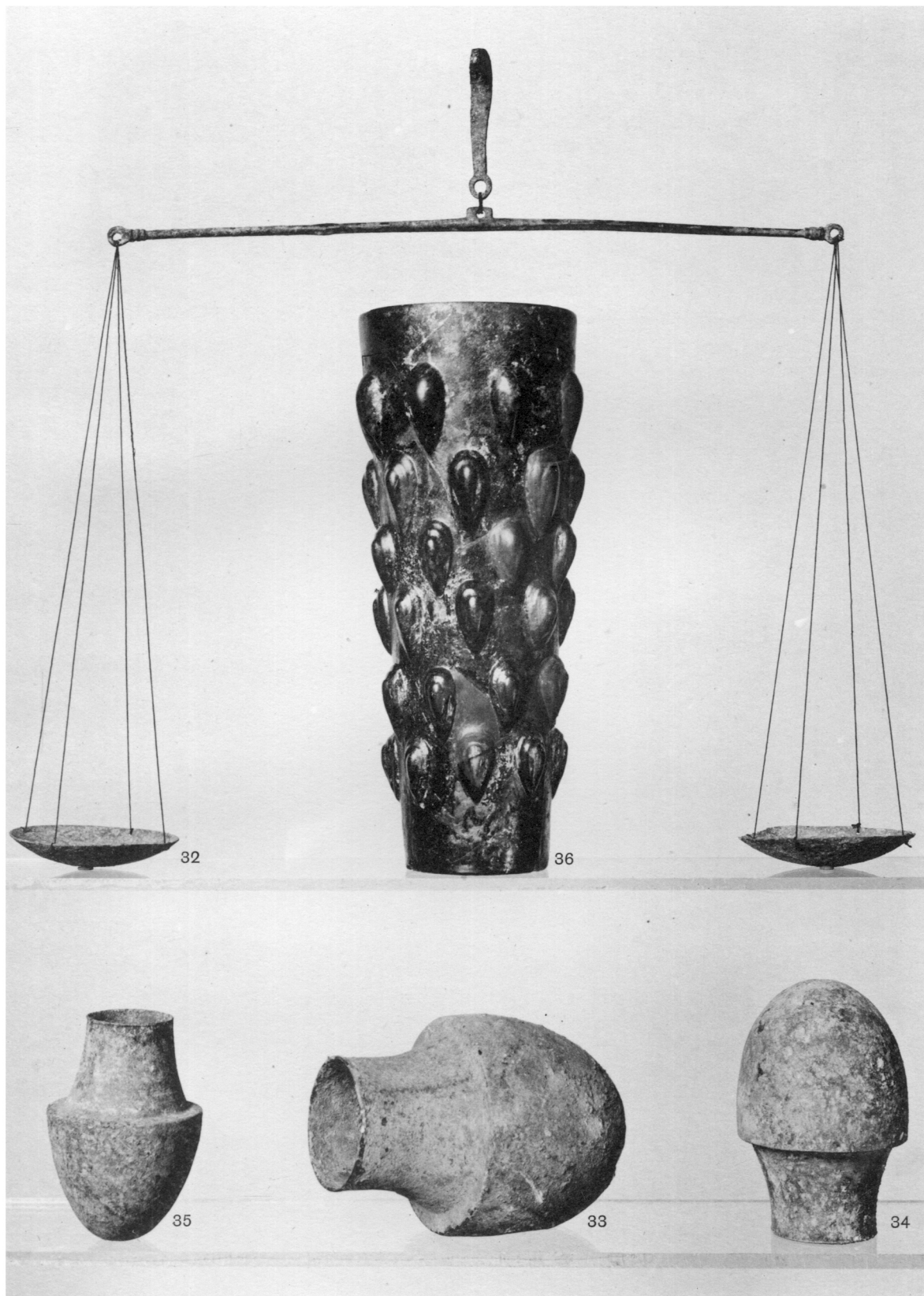
<sup>4</sup> Macrobius, *Sat.* v. 19.



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be remembered that surgical treatment was related to the worship and ritual of Asklepios.

The illustration in the text (Fig. 1) shews the remains of two knives, *A* and *B* (copied by permission from the excellent treatise on Greek and Roman surgical instruments by the late Dr. Milne). The steel blades here remain, though much altered in shape by rust. *C* and *D* are restorations shewing two out of the many types of surgical knife. It will be noticed in these four cases that the handle consists of a squared central part, beyond which, at the part remote from the steel blade, a leaf-like projection extends. This is in fact a sort of bronze blade, and the two edges are in some cases fairly sharp. Whether this part of the instrument was retained for use as a sort of blunt dissector, or whether it is a ceremonial survival of the ancient bronze cutting blade, may be uncertain. I suggest the latter explanation. For the operator it was not a comfortable or convenient handle. *C* represents a double-edged scalpel or *φλεβοτόμον* or *κατειάς*. *D* is the convex single-edged scalpel or *στηθοειδής*.

This collection includes six knives of the above type (Plate X. Nos. 1 to 6). In 5, which is shewn in profile, the groove is well seen in which the base of the steel knife was secured. Nos. 7 and 8 are rounded handles, and 9 is another form of the same, formerly holding some steel instrument, perhaps a knife blade. Probably among these knives may have existed the *κατειάδιον*, a long slim blade, and the shorter and stronger *λιθοτόμον*. These objects vary from 7·5 cm. to 12·5 cm. in length.

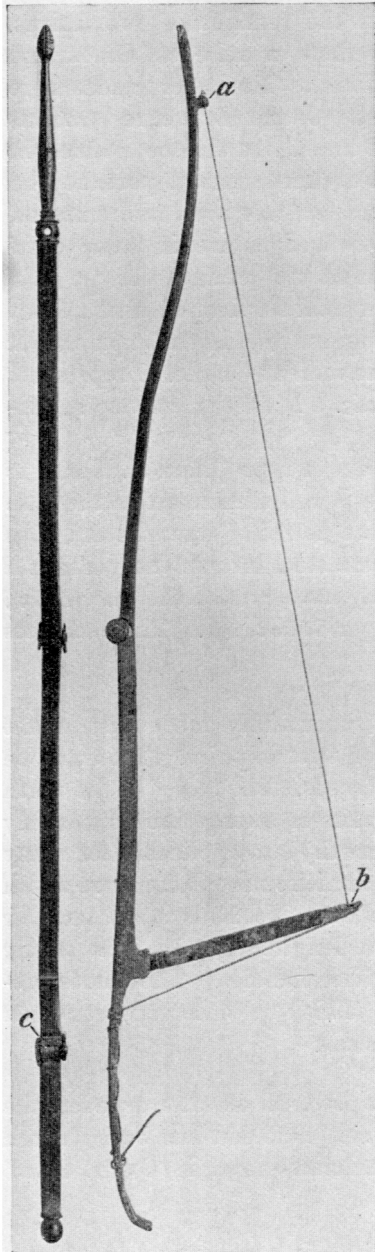
**II. Forceps.**—No. 10 is a large and beautifully made instrument 19·5 cm. long. The handle is in part formed of two dolphins. This may be an example of the *πολυπόξυστης* or polypus forceps. The 'bite' of the teeth is strong and close. Nos. 11 and 12 are two pairs of strong forceps possibly *τριχολαβίς* or epilation pincers (14·5 cm. in length) but applicable for many purposes. In each case the one prong has a semicircular prominence which accurately fits a corresponding hollow in its fellow. No. 13 is a lighter pair one prong of which has been lost; 14·2 cm. in length. No. 14 is a strong *ὀστέγγρα* or bone forceps, with artistically modelled handles. The blades present teeth which grip firmly. Length 22 cm. This type of forceps was often needed for the extraction of arrow and lance heads.

**III. Elevator.**—No. 15 appears to be a powerful elevator or lever, the *vectis* of the Romans, for raising depressed bone. One end has been broken and is lost. Length 15·6 cm. Complete specimen shown in Gwilt, *Gesch. der Chir.* i. Pl. II. n. 41.

**IV. Tenacula.**—No. 16 is a beautiful example of a double *ἄγκιστρον* or sharp hook. The handle is formed of turned bronze. The two limbs twist round one another spirally. Size 16·5 cm. Nos. 17 and 18 are two single sharp hooks both decorated. Size 16·3 cm. No. 19 is an example of *τυφλάγκιστρον*, the blunt hook. Size 11·6 cm.

V. **Catheters.**—The *καθετήρ* or *fistula aenea* of Latin writers.

No. 20 in Plate XI. is an excellent example of a full sized male catheter, having an aperture or eye at its lower point and a projecting edge at the upper end as in modern instruments. It has the usual S-shaped curve commonly adopted in Graeco-Roman times. Length 32·2 cm., breadth 6 mm. No. 21 is a portion of a smaller catheter, 16·5 cm. in length, 3 mm. broad.



23B 23A

FIG. 2.—DRILL-BOWS. [Scale  $\frac{1}{2}$ .]

VI. **Bronze Box.**—With lid, for small instruments or medicaments, 15 cm. by 2·2 cm. (No. 22).

VII. **Drill-Bow** (?).—The instrument numbered 23 has been somewhat difficult to explain. In all probability it is a folding drill-bow for driving a trephine. No. 23A in Fig. 2 shows the instrument opened out and the cord attached to and stretched between the two apertures at *a* and *b*. The total length of the bow is 39 cm. and the length of the cord 26 cm. Hippocrates,<sup>5</sup> Celsus,<sup>6</sup> Galen<sup>7</sup> and other writers speak of the use of this instrument in injuries and diseases of the skull and larger bones. The drill itself, the *πρίων* of Hippocrates and *τρύπανον* of later writers, a straight steel or bronze rod, having a rotating handle at its upper end, and a sharp steel auger or a circular saw at the lower, had a turn of the cord passed tightly round it. The operator holding the rotating handle placed the auger or saw on the bone to be perforated and by a rapid to and fro movement of the drill-bow caused a quick revolution of the auger and speedy perforation of the bone. When a circular piece of bone was to be removed a short steel tube with teeth on its lower edge was used in place of the auger: this was termed *χοινικίς*. The drill-bow is similar to the tool used by carpenters in

ancient and modern times. Examples of the special form used by Greek and

<sup>5</sup> Hipp. *περὶ κεφ. τρυμ.* (Van der Linden), xxviii.

<sup>6</sup> Celsus, viii. 3.

<sup>7</sup> Galen (Kühn), x. 445.

Roman surgeons are rare. The British Museum possesses one, though its nature and purpose were never ascertained until the discovery of the specimen here described.

The example from the British Museum is shewn in 23*B* (Fig. 2). The hinged piece *c* has been broken off near the joint, hence it was difficult to identify until a complete specimen could be used for comparison. We are indebted to Mr. A. H. Smith for permission to photograph the Museum specimen: he first noted its identity with our No. 23.

VIII. **Scoop or Curette.**—Specimen No. 24 is of much interest. It is a double scoop or *κναθίσκος* measuring 19.5 cm. in length. The one scoop is toothed at its extremity, the other is smooth. On cross section the hollow of each scoop is seen to be formed not by a curve but by five planes meeting one another at equal obtuse angles. The two scoops, each 9.75 cm. in length, are joined together by a cross piece 1.5 cm. in length at right angles. This arrangement permits a strong hand-grip on the instrument. Gynaecologists whom I have consulted tell me this double scoop may be intended for, and could be used as a uterine curette.

Hippocrates<sup>8</sup> speaks of such an instrument (*ξύστρα*) being used for disease of the os uteri.

IX. **Probes.**—Nos. 25 and 26 are good examples of the probe *μήλη* or *specillum*. No. 25 is exactly like a probe of to-day; it has the two olivary thickenings at the ends and is what Galen would have called *διπόρηνος μήλη*<sup>9</sup>; length 15.7 cm. No. 26 has no olivary enlargement at either end, but presents a small round flat disc about 6 mm. in diameter at one extremity: length 17.2 cm.

X. **Cautery.**—No. 27 is probably a bronze cautery or *καντήριον*. Its length is 16.8 cm. and the breadth across the part to be heated is 3 cm. Similar specimens of cautery are shown by Gwilt, I Pl. II. Nos. 37, 38. There is just a possibility that it is a *γλωσσοκάτοχος* or tongue depressor, but I think that it is improbable.

XI. **Needle Holder** (?).—A bronze rod 13.75 cm. in length decorated by three bands of turned ornament (No. 28). At each end an aperture about 1.5 cm. deep. This looks like a needle holder. The rod is curved at one end, either with a purpose or accidentally.

XII.—**Spatulæ.**—No. 29 is a good example of the *σπαθομήλη* or spatula having an olivary probe at its other end. Its length is 16.8 cm., and the breadth of the spatula end is nearly 1 cm. The spatula is slightly concave or spoon-shaped. No. 30 is a large double spatula with a central decorated handle. Length is 19.5 cm., the breadth of the spatulæ being 1.5 cm. The spatulæ are slightly concave, one more so than the other.

<sup>8</sup> Hipp. *περὶ γυν. φουσ.* (Van der Linden), xxxvi.

<sup>9</sup> Galen (Kühn), ii. 581.

XIII. **Slab** of Egyptian porphyry, 12 cm. by 7·5 cm.—This slab doubtless was for mixing the solids of the *Materia Medica*. The slab was bevelled on one side and polished on the other. It is marked No. 31 on Plate XI.

XIV. **Balance**.—A well constructed pair of scales, still in excellent equipoise (Plate XII. No. 32). The beam is 30 cm. in length. It was supported by a central hook. The pans are cup-shaped, about 1·4 cm. in depth and 6·7 cm. in breadth. Each is suspended from the beam at four points, instead of the three in use in modern times.

XV. **Cupping Vessels**.—Three well preserved *σικύαι* or *cucurbitulae* of different sizes were found. They are of the usual shape. The method of application was to ignite a piece of dry linen in the fundus of the cup. The cup was then applied to the skin. As the heated air within cooled it contracted and sucked the skin into the neck of the cup. Cup No. 33 is about 11·5 cm. in height, 9·2 cm. in breadth. No 34 is 10·7 cm. by 6·7 cm., No. 35 is 9 cm. by 6·3 cm. For convenience of hanging a ring was usually soldered to the cone-shaped apex of each cup. Faint traces of this arrangement may possibly here be seen, but such vessels did not always have rings, and perhaps these never had them.

XVI. **Beaker**.—A decorated purple glass beaker, No. 36, 25·5 cm. high and 10·5 cm. broad at the brim, was found with the instruments in fragments, and has now been restored. Its function was probably not medical. It may have been the drinking-cup of the physician, or the vessel used for pouring libations at his tomb.

I desire to acknowledge the great help obtained in preparing this paper from the late Dr. J. S. Milne's *Surgical Instruments of Greek and Roman Times* (1907). Further information and a bibliography will be found in E. Gwilt, *Geschichte der Chirurgie*, i. 1898, 505–6.

RICHARD CATON.