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A GRAECO-ROMAN SPECULUM IN THE WELLCOME MUSEUM

by

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There is evidence from Graeco-Roman texts and inscriptions that gynaecology and obstetrics were important areas of ancient medicine which attracted many practitioners,¹ some well-known for their own special remedies.² Diagnosis and subsequent application of these preparations almost invariably required a dilator,³ and the use of the vaginal speculum (*dioptra*), sometimes familiarly called *organum* "the instrument",⁴ is specifically recommended for these purposes. It is therefore surprising to find that the three-bladed vaginal speculum is among the rarest Graeco-Roman artefacts extant. Until recently, only five authenticated⁵ examples

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¹*medicae* Mart. XI.71; E. Hübner, *Inscriptiones Hispaniae Christianae Latinae*, vol.2, Berlin, apud Reimerum, 1900, pp.55-56, no. 497 *Iuliae Saturninae - incomparabili medicae optima*, from the monument in Mérida Museum (second century AD) which has a relief of a swaddled child on its side; C.I.L. VI.i.700 *Aemilia Asclepias*: VI.ii.6851:7581:9614-9617. *obstetrices* Galen XIV. 641; Plin. N.H. XXVIII.(vi).18; Soranus I. 3 & 4; C.I.L. VI.ii.6325: 6647: 8192: 8947: 8949: 9720-9723; men and women mentioned by name - Aetios XVI.10+13+15+18+21+26+39-45+67-110; Theodoros Priscianus, III (*Gynaecia*) Praefatio. Mary R. Lefkowitz and Maureen B. Fant, *Women's life in Greece and Rome*, part 2, London, Duckworth, 1982, pp. 161-162, 164, 168 - translation and comment on most of the C.I.L. epitaphs quoted here.

²Galen, XIV.475-478+536; Paul, VI.72; Celsus, IV.27.ID; Scrib. Larg., *Conpos.* CLVI; Aet. XVI., 67+72-77+93+95+97; Juv., II.141; Muscio, *Gynaecia* II, xxiii.74; xxviii.80; xxix.81, xxxi.86+87. Valentine Rose (editor), *Sorani Gynaeciorum*, Leipzig, Teubner, 1882. *Muscio/Mustio* - Rose, pp.I-XX + 2-4, gives evidence for the name from Cod. Brux. 3701-14.t.I.p.75; Cod.Laur.73.1f.186b-214b; Cod. Hafn.gl.saml. 1653.4f.3-25b. G. Barbour, 'Soranus on gynaecological anatomy', *XVIIth International Congress of Medicine, Abstracts*, 1913, sect. 23, pp.277-283, summarizes the findings of F. O. Dewez, R. Dietz, F. Z. Ermerins, V. Rose, and J. Ilberg, on Soranus' translator whom he styles "the later Greek Moschion" (i.e. not Soranus' contemporary Plin. N.H. XIX.26).

³Muscio, II. xxxiii.91 - *ut orificium clusum non possit nisi organo videri*; Oribas., *Syn.* IX.41: LXXXI *aponitur in os matrici*: cf. IX.55.XC.

⁴*dioptra*, Galen XIX.110; Paul, VI.72+73; Sor. II.40; Aet. XVI.89+91+99+101+108+110. *organum* Muscio, II. xxxiv.94 *requentius organi mentionem fecisse quod graecitas dioptran vocat*: xxx.82 *sic organo patefactis locis*: xxxii.90 *organum ergo patefactae mulieres*: cf. xxxiii.91.

⁵Two other trivalves considered replicas of the Pompeian instruments: Aberdeen University Anthropological Museum, Milne Collection inv. no. 6541; Athens, National Archaeological Museum, Lambros Collection inv. no. 273 (old no. 130). Early this century, replicas of the Pompeian *specula* were marketed by Naples companies viz: J. Chiurrazzi e Fils-S. de Angelis & Fils, Soc. Anonima Napoli, (possibly amalgamated as they appear to have issued a joint publication viz: Catalogue, dated 1911,

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were known to be in museum collections: two in Naples, and one in Mainz, Madrid, and Varna respectively,⁶ the Bulgarian instrument being fragmentary. Consequently, it must be considered an occasion of some importance when in 1979 the Wellcome/Science Museum acquired a trivalve (Acc. no. 1979-327) from a site in Lebanon.

In common with the other trivalves extant, the Wellcome speculum (fig. 1) is of the type known as Rueff's⁷ and it has the same distinguishing features: a *lotos/priapiscus*,⁸ smooth on its outer surface and composed of three blades (valves) prismatic inside and convex outside, the angled surfaces dovetailing perfectly together with the instrument at rest to give a firm phallic shape.⁹ It is blunt at the free end and in this respect superior to the more sharply pointed *priapisci* which characterize the European Renaissance *specula*.¹⁰ The *lotos* stands at right angles at the front of the instrument and its two upper/lateral blades are right-angled finials of the side-bars; these bars end in integral rings which are united by means of a large rivet to form the central joint of the speculum, viz: with the instrument viewed facing, the single ring end of the right-hand bar fits into the double ring end of the left-hand bar. The lower blade is attached to the centre front of a fixation crossbar, which slides freely up and down the side-bars (by means of its integral slots at either end) when

electrotypes nos.113264 quadrivalve, 116435 trivalve, 7029 and 7030 *specula ani*) and Giorgio E. Sommer & Figlio (Catalogue nos.343-350 quadrivalve, 344-250 trivalve, 345 *speculum ani*). Pompeian reproductions may be seen in Ghent University Museum, Deneffe Collection; British Museum; Wellcome Collection at the Science Museum (fig.2); Museum of the History of Science, Oxford; Howard Dittrick Museum of the History of Medicine, USA; Field Museum of Natural History in Chicago (F. B. Tarbell, *Catalogue of bronzes etc. in Field Museum of Natural History, Chicago*, Pub. 130, Anthropol. ser. vol. 7, no.3, 1909, pl. CXVII, fig.298).

⁶Naples, National Archaeological Museum – two from Pompeii, inv. no. 78030 (see fig. 2) found in the House of the Surgeon Physician: inv. no. 78148 (usually unnumbered but the Museum supplied this number); Louis F. Frank, 'Pompeian surgical instruments', *J. Am. med. Ass.*, 1910 **54**: 938, "Lately a speculum similar to the foregoing [i.e. no. 78030] has been found in the ruins". Sir W. Gell, *Pompeiana*, vol.2, App. II, London, Jennings & Chaplin, 1832, p.198, stated that surgical instruments, instrument cases, and a *speculum matricis* were found "in the House of the Graces, the Pharmacy"; the author was present at the excavation. Possibly he was referring to no.78030, as Senn, 'Pompeian surgery and surgical instruments', *Med. News*, 1895, **67**: 704, listed only one trivalve in the Naples Collection.

Mainz, Römisch-Germanisches Zentralmuseum – one from Asia Minor, inv. no.0.38171.

Madrid, National Archaeological Museum – one from Mérida unnumbered, "gift of Juan Grajera Alvarado", 1918, found in one of a series of interments near the East wall (Calle de Pérez Hernández) of Emerita Augusta.

Varna (Bulgaria), Archaeological Museum – unnumbered fragment of screw? from Odessos, pub. Ernst Künzl, *Medizinische Instrumente aus Sepulkralfunden der römischen Kaiserzeit*, Cologne, Rhineland Publications, 1983 p.112.

⁷James Rueff, *De conceptu*, Zurich, Christopher Froschouer, 1554, p.136, *speculum matricis* is figured – quoted by Alban Doran, 'The speculum matricis' *J. Obst. Gynaec. Br. Emp.*, 1914, **26**, no. 3: 132, "the three-bladed Pompeian speculum is the ancestor of Rueff's".

⁸*lotos* Paul, VI.73; Aet. XVI.89; *priapiscus* Muscio, II. xxxiv.94.

⁹Typical also of the Graeco-Roman bivalves (usually termed *speculum ani/katopter* Galen, XIX.110) believed to have been used as vaginal dilators – *diopteron* (the small speculum) Paul, VI.78; several extant – Naples, *Nat. Arch. Mus.*, two, inv. no. 78031 and unnumbered; *B.M.*, inv. no. Gr. 1968-6-26-27; Worms *Mus.*, unnumbered, Ernst Künzl, 'Medizinische Instrumente aus dem römischen Altertum im Städtischen Museum Worms', *Die Wormsgau*, 1979/81, **13**: 52, pl.3 no.5; Johns Hopkins University Institute of the History of Medicine, No.41, Lawrence J. Bliquez, 'Roman surgical instruments in the Johns Hopkins University Institute of History of Medicine' *Bull. Hist. Med.*, 1982, **56**: 216-217, fig. 8.

¹⁰Doran, op. cit., note 7 above, p.132: see fig. 2.

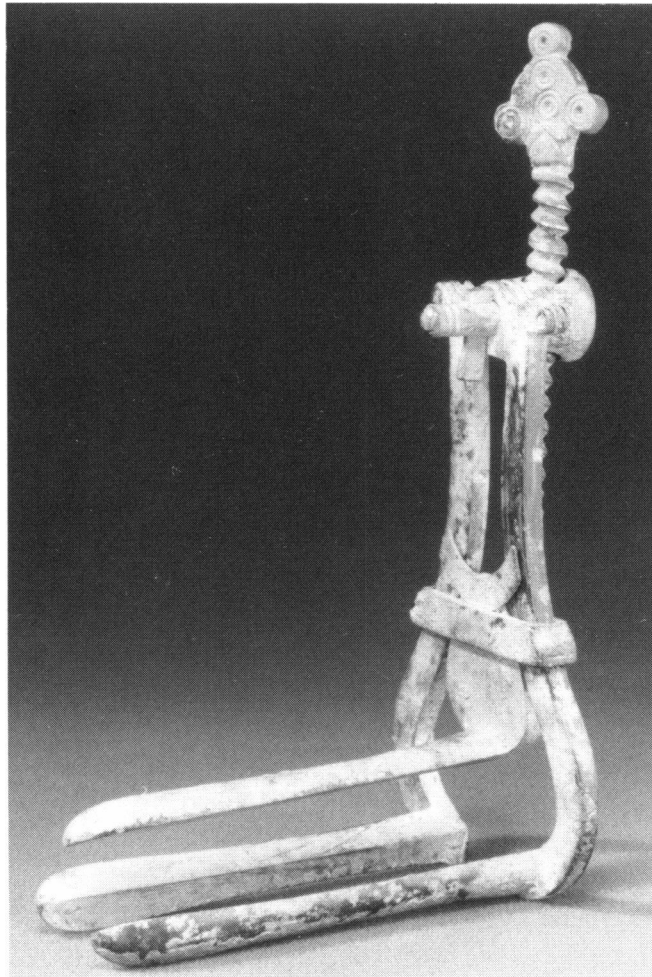


Figure 1. Graeco-Roman trivalve speculum from Lebanon. Wellcome Museum of the History of Medicine, Acc. no. 1979-327. (Photograph – Wellcome Museum of the History of Medicine at the Science Museum.)

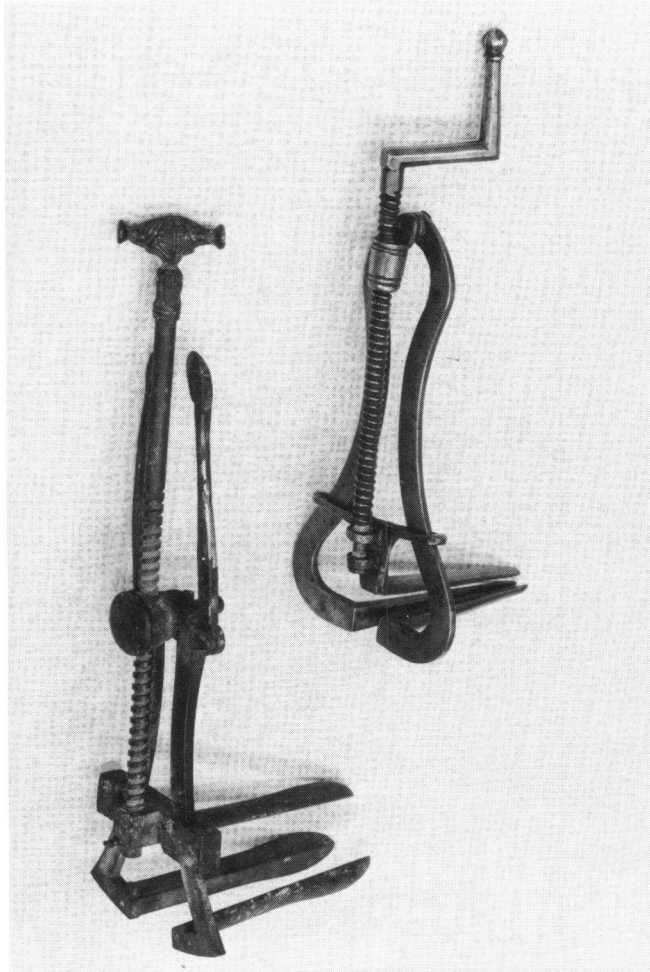


Figure 2. (*top*) Seventeenth-century trivalve speculum, Wellcome Museum of the History of Medicine, Acc. no. R2850/1936. (*bottom*) Fascimile of the larger trivalve found at Pompeii, Wellcome Museum of the History of Medicine, Acc. no. R7730/1936. (Photograph – from the original negative WHMM 19321 in the Wellcome Institute for the History of Medicine, by courtesy of the Wellcome Trustees.)

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the handle of a worm/endscrew,¹¹ situated at the back of the instrument, is turned.

The worm passes through a screw-bearing in the head of the central rivet, proceeds upwards, piercing the bearing at the back of the crossbar, and is secured there above a metal washer, so that the screw can be operated without becoming detached from the crossbar. The head of the worm, though not so high as in the Naples and Madrid *specula*, is more elegant than the flat nail head of the Mainz instrument; its domed shaping is a common feature of the decorative rivets produced on the recessed anvils of the Graeco-Roman smiths.

Flanking the central joint at the “elbows” of the side-bars are two small hinges (of similar construction to the joint) for attaching slender handles used by the operator to hold the instrument steady¹² at the introduction of the *lotos*. Although their securing rivets are still *in situ*, the handles themselves are missing. They would probably have resembled those of the extant *specula*,¹³ i.e. curved to enable them to be folded back neatly into the “waisting” of the side-bars when not in use, and with snake-headed finials, a decoration having appropriate medical¹⁴ and obstetrical¹⁵ associations.

A small wedge-shaped linchpin, not so dainty as the rounder Naples pins but effective, is inserted into the tapered end of the central rivet (at the front of the instrument) and this anchors it firmly. The absence of a retaining pin from the Mainz speculum enables the gate for its passage into the rivet to be examined; the design, an extended open figure-of-eight, facilitates the grip of the pin.

The Wellcome trivalve is quite well preserved, with a pleasant green patina. It is light to handle, being about half the weight of the Mainz speculum,¹⁶ and its precise mechanism with right-hand screw is still operable in spite of some wear in the bearings.

The main dimensions are as follows:

<i>Overall length</i>	174mm (at rest)	<i>Weight</i>	374.7 grammes
<i>Lotos</i>	length (measured from the bars) 106mm; diameter (closed) 21mm (widest), 13mm (at “waisted” section), 17mm (at base)		
<i>Side-bars</i>	length (down to central joint) 128mm approx.; width 9mm; thickness 5mm		

¹¹Muscio, II. xxxiv.94. *aperiendo organi axem torquere incipiat . . . iterum axem torqueat quo organum claudi possit*: Tertull., De Anima XXV.5.

¹²Muscio, II. xxxiv. 94 *sine quassatione*.

¹³Both Naples trivalves and the Madrid speculum (Künzl, op. cit., note 6 above p. 102, fig.81); viewed in 1967, the Madrid instrument had one handle *in situ* but a photograph (Madrid, Nat. Arch. Mus. Neg.11315) supplied in 1968 showed both missing. The Mainz trivalve has one handle *in situ*.

¹⁴Apollo Pythius as the Healer, Livy, IV.25.3; Aesculapius, Livy, X.47.7; Epit XI; Plin., N.H. XXIX.(iv).22.72; represented with snake, see statues (e.g. Naples, Nat. Arch. Mus.; Borghese Mus., Rome, etc.) and coins (e.g. *antoninianus* of Postumus, *denarius* of Caracalla, *billon-tetradrachm* of Maximinus I and Julia Mamaea) *inter alia*. Further reading, especially inscriptional evidence, Emma J. Edelstein and Ludwig Edelstein, *Asclepius. A collection and interpretation of the testimonies*, 2 vols., Baltimore, Md., Johns Hopkins University Press, 1945 vol. 1, pp.185–186 nos. 357+359–360: pp.339–340 no.615: p.345 no. 630: pp.360–362 nos. 689–691: pp. 368–369 nos. 705–706.

¹⁵Role of serpent in miraculous births: Alexander the Great, Plut., Alex.3; Scipio Africanus, Livy, XXVI.19.6 and 7; Octavian, Suet., Aug. 94; Dio. Cass. XLV.1.2–3; Lucian, Alexander 7: 14–16; I.G., IV2.122. (quoted in Lefkowitz and Fant, op. cit., note 1 above, part 1, p.123).

¹⁶Künzl, op. cit., note 6 above, p.23, footnote 50.

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<i>Crossbar</i>	width, 49mm; depth 9mm
<i>Central rivet</i>	diameter (head) 20mm tapering to 7mm; protrusion beyond linchpin (front) 17mm, (back) 15mm
<i>Linchpin</i>	length 20mm; width 5mm decreasing to 4mm; thickness 2mm tapering to 1mm
<i>Worm</i>	Length 105mm; diameter 8mm (top 5mm); incision width 2mm with 3mm space between
<i>Washer</i>	diameter 10mm; thickness 2mm
<i>Worm-handle</i>	length 30mm; width (at base) 25mm; thickness 6mm

X-ray fluorescence analysis confirmed the metal of the body of the speculum and the main rivet with retaining linchpin, to be a “high-tin leaded bronze”; and further microscopic examinations of the rivet showed a dendritic structure on the surface, proving that it was cast.¹⁷ These findings are consistent with those of tests conducted some years earlier upon other medical/toilet instruments from the Wellcome Collection.¹⁸ Bronze held pride of place in the Graeco-Roman doctors’ instrumentarium for several reasons, ease of casting, strength, resistance to rust, and decorative appearance.¹⁹ The metal composition of the worm is brass¹⁷ with zinc content higher than tin, indicating an ancient wrought alloy,^{20,18} not cast, agreeing with Alfred Mutz’s findings on the method of manufacture of the Pompeian trivalve screws.²¹ The Romans were the first to use brass (*orichalcum*)²² on any significant

¹⁷X-ray fluorescence analysis of the metal and microscopic examination of the speculum for the Wellcome/Science Museum carried out by the British Museum, who have agreed to the results being published:

	% Copper	Tin	Lead	Zinc
Body of the speculum	79.5	16	4.3	0.2
Screw	82.3	0.5	0.2	17
Threaded pin (i.e. central rivet)	84	9	2	5
Wedge for pin	85	9	5.5	0.5

¹⁸Tests to establish method of manufacture, on bronze instruments from the Wellcome Museum, in 1969, by Dr Rees Rawlings at Imperial College, University of London, viz: metallographic analysis, EPMA, Vickers Hardness (10HV). One probe and one forceps found to have been cast; two spatulas cast with signs of “tapping” (gentle working); one probe and one forceps showed evidence of “working”; one forceps had been wrought and annealed.

¹⁹Hippocrates, *De medico* 2: Celsus, VII.26.1; Oribas., XLIX.3.

²⁰John F. Healy, *Mining and metallurgy in the Greek and Roman world*, London, Thames & Hudson, 1978, p.213.

²¹Alfred Mutz, ‘Römische Bronzegevinde’, *Technikgeschichte*, 1969, 36: nr.2:163–164; examination of the screw mechanisms of the Pompeian trivalves:

Inv.no.	length	diameter	incision width	space between incisions
78030	110mm.	7.8mm.	1.6mm.	2.2mm.
78148/ unnumbered	105mm.	8.5mm.	1.0mm.	3.2mm.

For this exactitude, a lathe and specialist cutting tools are necessary – Alfred Mutz, *Die Kunst des Metalldrehens bei den Römern*, Basle and Stuttgart, Birkhäuser Verlag, 1972, p.163.

²²Cic., *De off.* III.23.92.

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scale,²³ in particular, for coins and jewellery but also for other artefacts, including medical instruments.²⁴ The composition of brass used was approximately the same as the modern “gilding metal” (i.e. about eighty per cent copper and eighteen per cent zinc).²⁵ It would be economical²⁶ and practical – strong enough and workable for the precise cutting of the screw incisions,²¹ and of good colour, thus filling the Roman doctor’s need for expensive-looking instruments to impress his patients.²⁷ It is not possible to state if the choice of brass for the screw is peculiar to the Wellcome instrument or to the Graeco-Roman trivalve as a class, because metal analyses are not readily available.²⁸

Besides the design of concentric circles upon the head of the central rivet which is common to all extant trivalves, the ornamentation of the Wellcome speculum is sparse, consisting of: (i) simple indentations at the sides of the crossbar and on the taper of the central rivet; (ii) circles-and-dot patterns on the handle, one in each “corner” and two running vertically down the centre to meet (iii) an incised herring-bone decoration at the junction with the screw (fig. 1). These patterns are of a type quickly and cheaply executed and are found frequently on Graeco-Roman toilet articles. In no way is the workmanship comparable with the raised acanthus leaf mouldings on the T-handles of the Madrid specimen and the larger Naples instrument or with the lavish incised decoration of the Mainz crossbar.²⁹ There is no doubt, either, that the additional ornamentation of side-hinges patterned to match the central rivet-head and side-bars elongated into elegant points, as seen in the Madrid and Mainz *specula* respectively, would have considerably enhanced the appearance of the Wellcome instrument.

By comparison with the other *specula*, the Wellcome trivalve (fig. 1) has several important features of its own. (1) The framework lacks their clumsier “shouldered” design because its side-bars are not right-angled but rounded at the top; with the *lotos* at rest they enclose a space of about 30mm x 40mm above the “waisted” shaping. The only other Graeco-Roman speculum to have a rounded frame is the quadrivalve in the Naples Museum,³⁰ but in this instrument the whole framework is circular down to the

²³B. Webster Smith, *Sixty centuries of copper*, London, Hutchinson, (for the C.D.A.), 1965, p.37, Paul T. Craddock, ‘The composition of the copper alloys of the Greek, Etruscan and Roman civilizations’, no 3; ‘The origins and early use of brass’, *J. archaeol. Sci.*, 1978, 5: 9.

²⁴Craddock, *op. cit.*, note 23 above, p.11; Healy, *op. cit.*, note 20 above, p.213; Smith, *op. cit.*, note 23 above, p.38 and fig.5 (between pp.32–33) – brass Roman parade helmet from Norfolk; Olwen Brogan, *Roman Gaul*, London, G. Bell, 1953, p.154, brass bucket produced on the borders of *Gallia Belgica*, similar artefacts found in *Germania* and Kent; Theodor Meyer-Steineg, ‘Chirurgische Instrumente des Altertums’, *Jenaer Medizin-historische Beiträge*, Jena, Gustav Fischer, 1912, Heft I, P1.III.3, *hypospathion* (combination instrument long-handled knife with spatula finial); *ibid.*, p.11, brass probe analysed by Blümner contained fifteen per cent zinc and traces of lead and tin.

²⁵Smith, *op. cit.*, note 23 above, p.38; Craddock, *op. cit.*, note 23 above, p.13, gives zinc content as 12–19 per cent, (analysis of “Roman military trappings”).

²⁶*Ibid.*, p.11 “brass had the obvious advantages of cheapness – once viable ways of manufacturing had been found.”

²⁷Lucian, *Adv. Indoct.* 29 – “ivory pill-boxes, silver cupping-glasses and gold inlaid scalpels”, cf. Galen, *XIV.* 600.

²⁸Mutz, *op. cit.*, note 21 above, describes the screws as “bronze” but gives no metal analysis.

²⁹Incised pattern at the back and sides but, in particular, at the front, where the incisions are grouped in six patterns of three vertical lines, framed by “fringes” of horizontal lines at each end, conveying the impression of a decorative sash or band.

³⁰Naples, *Nat. Arch. Mus.*, Inv. no.113264 (1.1882): found in 1882 – Senn, *op. cit.*, note 6 above, p.704.

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central joint, and the operating mechanism is quite different. (2) The fixation crossbar is mounted on a metal plate, pear-shaped to fit into the rounded top when the instrument is not in use. (3) The back of the crossbar does not have the small detachable plates which characterize the other trivalves and which allow their fixation bars to be removed for repair or packing into carrying-cases. The instrument may perhaps lose a little in convenience by this, but it gains in strength of construction; significantly, the Madrid speculum has only one plate *in situ*³¹ while both are missing from the Mainz trivalve where the grooves for their insertion are clearly visible. (4) Attached at the front of the crossbar, just below its centre, is a crescent-shaped lamina (9mm at its widest) which, as the screw is turned, passes up and down the front of the side-bars, steadying the crossbar and giving smoother and more controlled action. (5) The worm has a flat trefoil handle finial, its design somewhat reminiscent of a type of plate brooch,³² lighter and easier to turn than the T-handles of the other trivalves.³³

As these differences tend to improve performance, it is tempting to consider them as modifications, indicating a later development of the instrument, although this assumption cannot be supported by a positive dating, and it must be observed that undisputed proof for dating cannot be established by details of construction or decoration. An instrument so highly specialized and expensive³⁴ to produce would have been custom-made in ancient times and therefore a great deal of its ornamentation and modifications would depend upon the skill of the smith and the requirements and taste of the client, not forgetting the amount of money forth-coming to pay for the work; no two of the trivalves extant are identical in every detail. Yet with due regard for these reservations, in the case of such an essential type of instrument^{3,4} which continued in use from at least the first century AD up to the end of the Roman period and into the Byzantine period,³⁵ it would not be surprising to find that it had undergone changes as time went by. For example, the Mainz speculum from Asia Minor has at the centre back of its crossbar an urn-shaped extension which may be pure ornamentation but might serve as a “leg” giving firm

³¹As examined in 1967: Künzl, *op. cit.*, note 6 above, p.102, fig. 81, shows the plates *in situ*.

³²The type is believed to have originated in Asia Minor and by the second century AD to have become popular in the Western Empire also; own coll., inv. no. ST/RB silver brooch red-enamelled, mid-second century, Romano-British/Belgian import, found on the riverbank in Colchester 1981; Ibolya Sellye (with appendix by K. Exner), ‘Les bronzes émaillés de la Pannonie romaine’, *Dissertationes pannonicae*, sér.2., fasc. 8, Budapest, Institut de Numismatique et d’Archéologie de l’Université Pierre Pázmány; Leipzig, En commission chez O. Harrassowitz, 1939, taf. IX.12; Emilie Riha, ‘Die römischen Fibeln aus Augst und Kaiseraugst’, *Forschungen in Augst*, 3, Augst, Amt für Museen und Archäologie des Kantons, Basel-Landschaft, 1979, taf.64.1681; Elisabeth Ettliger, *Die römischen Fibeln in der Schweiz*, Berne, Francke Verlag, 1973, taf.13.25. The trefoil shape continued at least into Anglo-Saxon times – New Milton Coll. of R.A. Hattatt, no.1899, sixth century AD, from Essex, and no.2542, eighth/ninth century. I am indebted to Mr Hattatt for the three references quoted here.

³³The comparative daintiness of this trivalve, i.e. shorter length, less weight smaller handle, might suggest use by a lady (*medica*), or perhaps a “second” instrument for taking out on rounds, cf. portable instrument-case recommended by Hippocrates, *Decorum* 8.

³⁴John Scarborough, *Roman medicine*, London, Thames & Hudson, 1969 (New York, Cornell University Press, reprint 1976), pp.136–137, fig.43 and note – vaginal *specula* probably too expensive for the ordinary doctor.

³⁵Verified by first century AD finds at Pompeii and texts, e.g. Galen, Soranus first/second century AD up to Aetios and Paul sixth/seventh century AD.

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support to the instrument when the operator set it down after use, and might also act as an anchor keeping the crossbar steady and safe in a carrying-case after its removal from the frame. If this extension is deemed to be a modification, the Mainz instrument could be considered to postdate the first/second-century AD Madrid speculum.³⁶

From the use of brass in its construction,³⁷ the Wellcome trivalve can be judged to be not earlier than the second century AD, the period when the brass industries of the zinc-producing areas were coming into large-scale production of the metal for general objects.³⁸ Further, its zinc content (seventeen per cent) would be consistent with a later dating; Dr Craddock,³⁹ detailing analyses of Roman brasses from the first four centuries AD, states: “the decrease in brass containing more than 22% zinc is especially noticeable . . . none of the 3rd. and 4th. century Roman brasses have more than 22% zinc”. It is interesting to note that in overall length and measurements of side-bars, crossbar, rivet-head, and screw, the Wellcome instrument approximates quite closely to the Mainz speculum:⁴⁰ length of *lotos* cannot be seriously considered, as texts imply that it was purposely varied to accommodate the patient.⁴¹ It is

³⁶Künzl, op. cit., note 6 above, p.102, fig. 81. The speculum was found in a Roman tomb (see note 6) with a balance arm, a clay *ampulla* and utensils for preparing medicaments, so that, although no tomb inscription was found on the exact spot, it was undoubtedly the grave of a medical practitioner. Hübner, op. cit., note 1 above, gives three inscriptions from Mérida connected with doctors, viz: 2 funerary: 497. to Julia Saturnina (quoted note 1); 526. *medicus — hoc in sepulcro*; and one from a second-century AD altar to Venus Victrix, dedicated by a doctor: 470. *Veneri Victrici/L. Cordius Symphorus medicus/sacr. ex-voto*.

³⁷It is acknowledged that as the screw is the only brass component in the trivalve, the point might be made that it could be a repair/refit and not part of the original instrument. However, the sturdiness of the screw in the other extant *specula* would militate against this argument.

³⁸Brogan, op. cit., note 24 above, p.154, brass industries near Aix-la-Chapelle around Gressenich; cf. Craddock, op.cit., note 23 above, p.9, near Aachen and Stolberg.

³⁹*Ibid.*, p.13

Date	No. of brasses analysed	No. containing over 22% Zinc
First century AD	82	13
Second century AD	94	2
Third and fourth centuries AD	32	0

⁴⁰Mainz trivalve: *overall length* 190mm: *sidebars* 135mm. long x 9mm. wide x 6 mm. thick
rivet-head 20mm. (diameter) tapered to 7mm; front projection 15mm. long
screw (diameter) 10mm. (top 9mm) *incisions* 2mm. wide with 3mm. space between
lotos (diameter) approx. 22mm. (widest) 16mm. (waisted section) 18mm. (base)
crossbar 80mm. wide x 12mm. deep

⁴¹Paul, VI.73., depth of vagina measured beforehand to ensure correct size of *lotos*; cf. varied lengths in trivalves extant:

Museum	Wellcome	Mainz	Naples	Madrid
Inv. no.	1979–327	0-38171	78030	unnumbered
Length of <i>lotos</i>	106mm.	100mm.	90mm.	66mm.

unfortunate that the Varna fragment, dated second/third century AD by finds from the excavation site,⁴² is too slight for useful comparison,⁴³ otherwise a fascinating check might have been made for the continuation of the removable crossbar and the modifications seen in the Wellcome instrument. At present, there are no other extant authenticated Graeco-Roman trivalves of later date to compare until a happy discovery from future excavations or a chance find (as with the Norfolk uterine probe) produces such an instrument.⁴⁴

Arabic medicine (which inherited the Graeco-Roman tradition) continued the use of the vaginal speculum; Albucasis⁴⁵ wrote of “a type of screw speculum mentioned by the ancients” but gave no details or illustrations. He described two Arabic instruments as follows: (i) “Speculum for opening the entrance of the womb . . . this is the type of instrument with which books are pressed”. The illustration (fig. 140) is of a frame not unlike a racquet press. (ii) “Another instrument for the same purpose but smaller and lighter. It is made of ebony or boxwood in the shape of a forceps.” No illustration is shown. The latter may resemble the ancient *speculum ani*,⁹ but neither instrument approaches any of the Graeco-Roman trivalves extant.

There is other evidence for the survival of the *dioptra*. It is mentioned, but not described, in two eleventh-century works, one being a list of surgical instruments,⁴⁶ the other Psellus’ *Carmen de re medica*.⁴⁷ The fourteenth-century surgeon Guy de Chauliac, in the obstetrical section of his *Grande chirurgie*, advised on the use of the speculum and defined it as being “constructed with a wine/oil press screw”,⁴⁸ a description strongly suggestive of the worm of the *dioptra*.

If we progress a little further in time to the Renaissance and later European vaginal *specula*,⁴⁹ we find that the development of their operating mechanism (crossbar and worm) from the Graeco-Roman prototype is apparent (fig. 2) and indeed was recognized early this century;¹⁰ one sixteenth-century trivalve⁵⁰ is also comparable in

⁴²Künzl, op. cit., note 6 above, p.112.

⁴³65mm. long: I am indebted to Professor Künzl for this information, also for bringing my attention to the work of Alfred Mutz on the Pompeian *specula*.

⁴⁴Uterine sound in Norwich Castle, Mus. Acc. no. 697–966, found at Hockwold-cum-Wilton, 1966 – Calvin Wells, ‘A Roman surgical instrument from Norfolk’, *Antiquity*, 1967, 41: 139–141, pl.XVIIb; cf. find of a fragmentary cranioclast/cephalotribe post second century BC from Asia Minor – Meyer–Steineg op. cit., note 24 above, pl. VI.1.

⁴⁵M.S. Spink and G.L. Lewis, *Albucasis on surgery and instruments*, London, Wellcome Institute of the History of Medicine, 1973, pp.488, 484, 485 (fig.140), 486 respectively.

⁴⁶Codex Laurentianus gr. LXXIV.2. – H. Schoene, ‘Zwei Listen chirurgischer Instrumente’, *Hermes*, 1903, 38: 280–281.

⁴⁷Michael (Constantinus) Psellus the Younger (1018–1078), *Carmen de re medica*, line 1189, Julius L. Ideler, *Physici et medici graeci minores*, Amsterdam, M. Hakkert, 1963, p.237 (reprint of the two-volume edition, Berlin, G. Reimer 1841–1842).

⁴⁸*La grande chirurgie de Guy de Chauliac, Revue par E. Nicaise*, Paris, Félix Alcan, 1890, doct. II. ch. VII, *Des passions de la matrice*, p.549 – “speculum fait avec une vis de pressoir”, and footnote 6 – “instrumentum dictum speculum factum cum vice torculari – Ms 24249”.

⁴⁹Hans von Gersdorff, *Feldtbuch der Wundartney*, Strassburg, John Schott, 1526, (reprint of the 1517 edition), p.57 rectal/obstetrical speculum; Joannes Scultetus the Elder of Ulm, *Armentarium chirurgici*, Amsterdam, apud Joannum à Someren, 1672, (reprint of 1655 edition), pl.XVII, fig. IV; Gustav J. A. Witkowski, ‘Arsenal obstétrical’ (Appendix to *Histoire des accouchements chez tous les peuples*, Paris, G. Steinheil, 1887, p.15, fig. 33). (Doran, op. cit., note 7 above, pp.133–134, fig.3, and p.140 incl. footnote 1.)

⁵⁰*Speculum matricis* in the Loan Collection, Museum of the Royal College of Surgeons of England – Doran, op. cit., note 7 above, pp.143, 129 and fig. 1 between pp.131–132.

Illustrations from the Wellcome Collections

length (190mm) and weight (400 grammes). A comparison of the Wellcome Graeco-Roman speculum's rounded top and "waisted" sides with the pear-shaped frames of its sixteenth- and seventeenth-century counterparts, reveals that in framework also the ancient instrument presages the later development, although dissimilar in important features, e.g.: the sophistication of the Wellcome crossbar has given way to a simpler design recalling that of the Naples instruments (fig. 2) and the trefoil handle has been replaced by the barrel-organ variety, i.e. the T-handle with right-angled extension. The flat type of handle may have survived into the fourteenth century, if we accept Alban Doran's interpretation of de Chauliac's instrument as "provided with a thumbscrew".¹⁰ Trefoil shaping³² returned in an openwork design with de Garengot's eighteenth-century trivalve⁵¹ as the instrument continued to be adapted to meet the needs of doctors. The superior design of *lotos* which so characterizes the Graeco-Roman trivalve, was unfortunately not repeated in these later derivatives.⁵²

The provenance of the Wellcome *speculum* in the Eastern Empire would not be inconsistent with a time placing after that of the other extant trivalves viz: third/fourth century AD up to the seventh century, when Byzantium lost Syria and Palestine to the Arabs, but possibly later as the territory was regained in the tenth century.

The instrument appears to provide an important link in the development of the European speculum from the Graeco-Roman. There is no doubt that the Wellcome Museum has acquired one of the more significant and interesting finds of the present century.

ACKNOWLEDGEMENTS

I am indebted to all the museums quoted for their co-operation and help, especially to Dr Ghislaine Skinner, Assistant Keeper of the Wellcome Museum of the History of Medicine, who also provided fig. 1, and to Dr Vivian Nutton of the Wellcome Institute for the History of Medicine, for his invaluable advice. The Wellcome Institute kindly provided fig. 2.

⁵¹René J. Croissant de Garengot, *Nouveau traité des instruments de chirurgie*, vol.1, Paris, Bienvenu, 1723, illustration quoted and reproduced by J. Ricci, *The development of gynaecological surgery and instruments*, Philadelphia and Toronto, Blakiston, 1949, p.220.

⁵²Doran, op. cit., note 7 above, p.141, does, however, note regarding one of the "ring-type specula" – "Excluding the Pompeian model this is the sole speculum with prismatic blades in the Wellcome Museum".