CYCLOPAEDIA OF TELESCOPE MAKERS
Part 5 (Sae-Sim)

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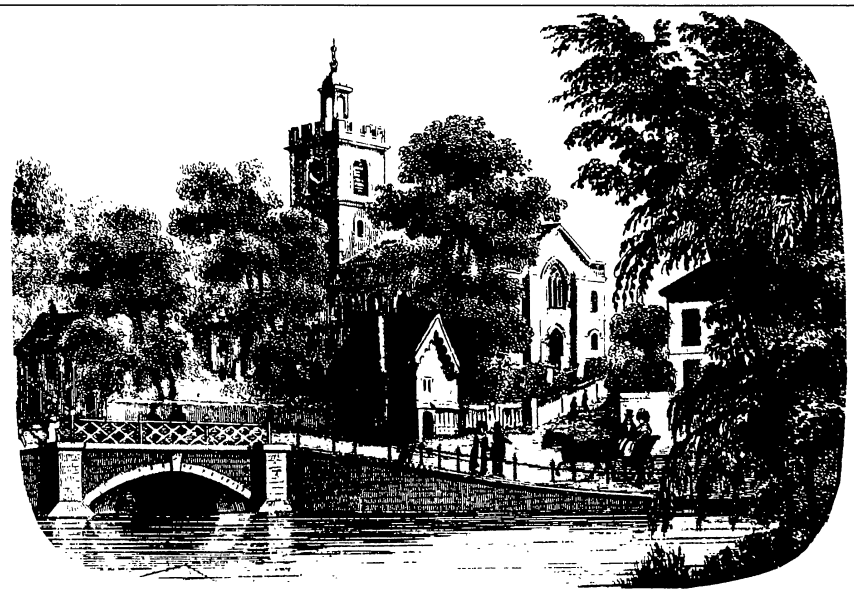


S

SAEGMÜLLER G.N - German instrument maker, late 19C, following FAUTH at *Washington DC*. Supplied mountings for 20-inch Manila (Phillippines) [1] and 20-inch Chamberlain Obs. (Denver, Colorado) equatorials. [2]

SAGREDO - supplied GALILEO with glass.

SAINT-LOUIS - one of the first successful French producers of flint glass (c.1811). [3]

SALMOIRAGHI A & H - Italian instrument makers, for astronomy, geodesy and surveying, *Milan*, fl.1910 into mid-20C. The firm became known as "La Filotecnica". Their instruments were used by the Royal Commission for Italian Geodesy.

SALMON Benjamin - instrument maker, microscopes, *London*, mid-19C. [4]

SALOM Benjamin and Co - optician, either instrument maker or retailer, *St. Andrew's Square, Edinburgh* and possibly *London*, fl.1840-1842. [5]

SAMSON R.A - designed a lens/mirror system (1914), essentially a Cassegrain telescope with corrector lens. [6]

SARON - Paris, 1750-69 (See Howse).

SAVERY Servington - English natural philosopher, *Oxford*, fl.1730-85. He described a telescope with twin objective to the Royal Society (1754). [7]

SCARLETT Edward (I) - English optician, instrument maker, spectacle maker, *Archimedes and Globe in Dean Street, nr. St*

[1] See *Cyclopaedia Part 3, Fig. 155.*

[2] H.A. Howe, *Astronomy and Astrophysics vol.13, p.85, 1894* (N.B. Earlier use of title). The mounting of the Denver telescope was the first by SAEGMÜLLER in the US, and Howe remarks that he feared (wrongly) that the mounting might have lacked rigidity since it was believed that SAEGMÜLLER strove "to build his instruments as light as is consistent with proper strength". The Denver optical discs were supplied by FEIL and figured by Alvan G. CLARK. See Danjon and Couder, *Lunettes et Télescopes*, p.703, 1935 (hereafter D and C). See also King p.244.

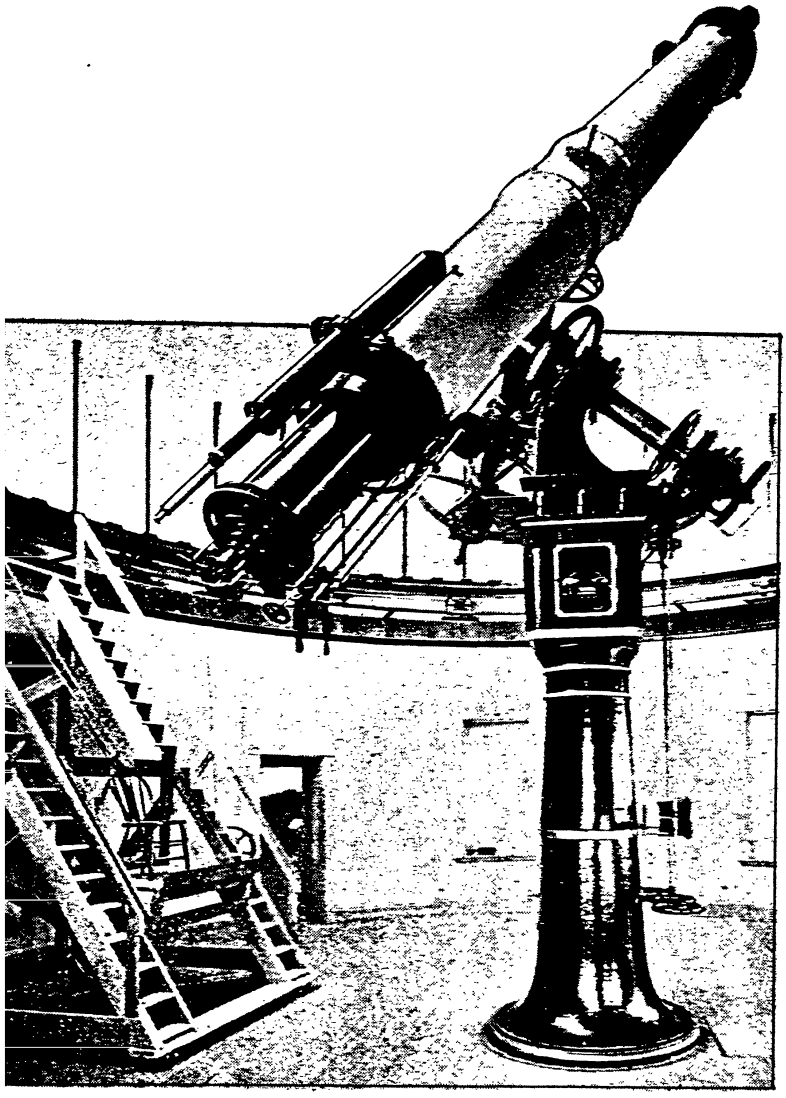
[3] See also LE CREUSOT and VONÉCHE. See DOLLOND in London 1765, and the earliest two-component achromat.

[4] See G.L'E. Turner, Antique Sci. Instr. 1980, p.120. Confusion seems to exist in the literature (see Clarke et al., *Brass and Glass* 1989 NMS, p.99 and index) between SALMON and SALOM.

[5] G. Clifton (under direction of G.L'E. Turner), *British Scientific Instruments 1550 -1850* (hereafter SIMON). See also Christies Auction Catalogue, London, Nov.1986 lot 146, a small 4-draw telescope (hereafter, e.g. CHrNov86).

[6] The SAMSON design consists of a perforated aspheric primary mirror, with a rear-silvered concavo-convex lens as secondary, plus a compound (bi-concave and plano-convex) corrector lens placed near the primary (2/3 primary/secondary separation). See *Phil. Trans. A vol.213, p.27.*

[7] See Phil.Trans. vol.48, p.165, 1754. Therein, SAVERY suggests use in measuring the sun's apparent diameter, taken up later by BOURGUER in the heliometer. A single divided objective also interested DOLLOND, and a divided speculum also attempted by SHORT.



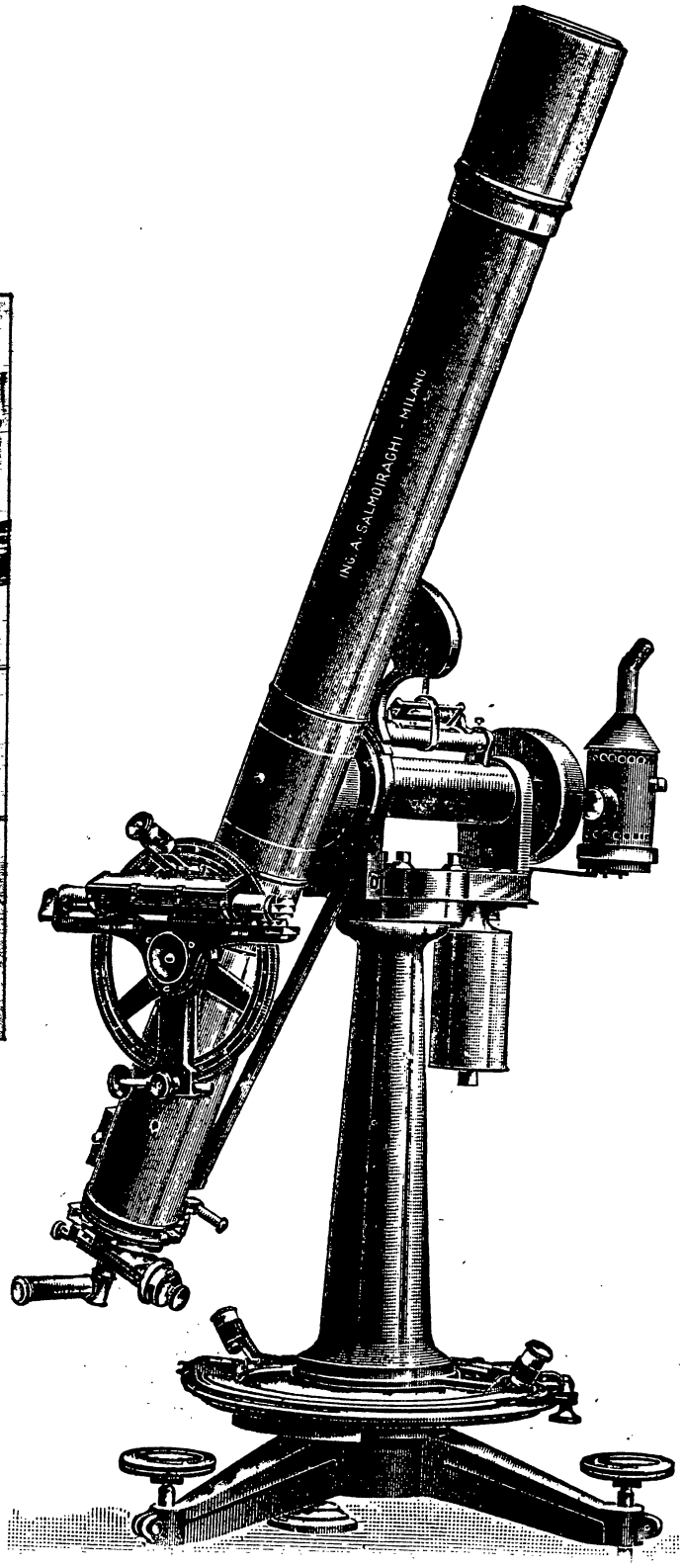
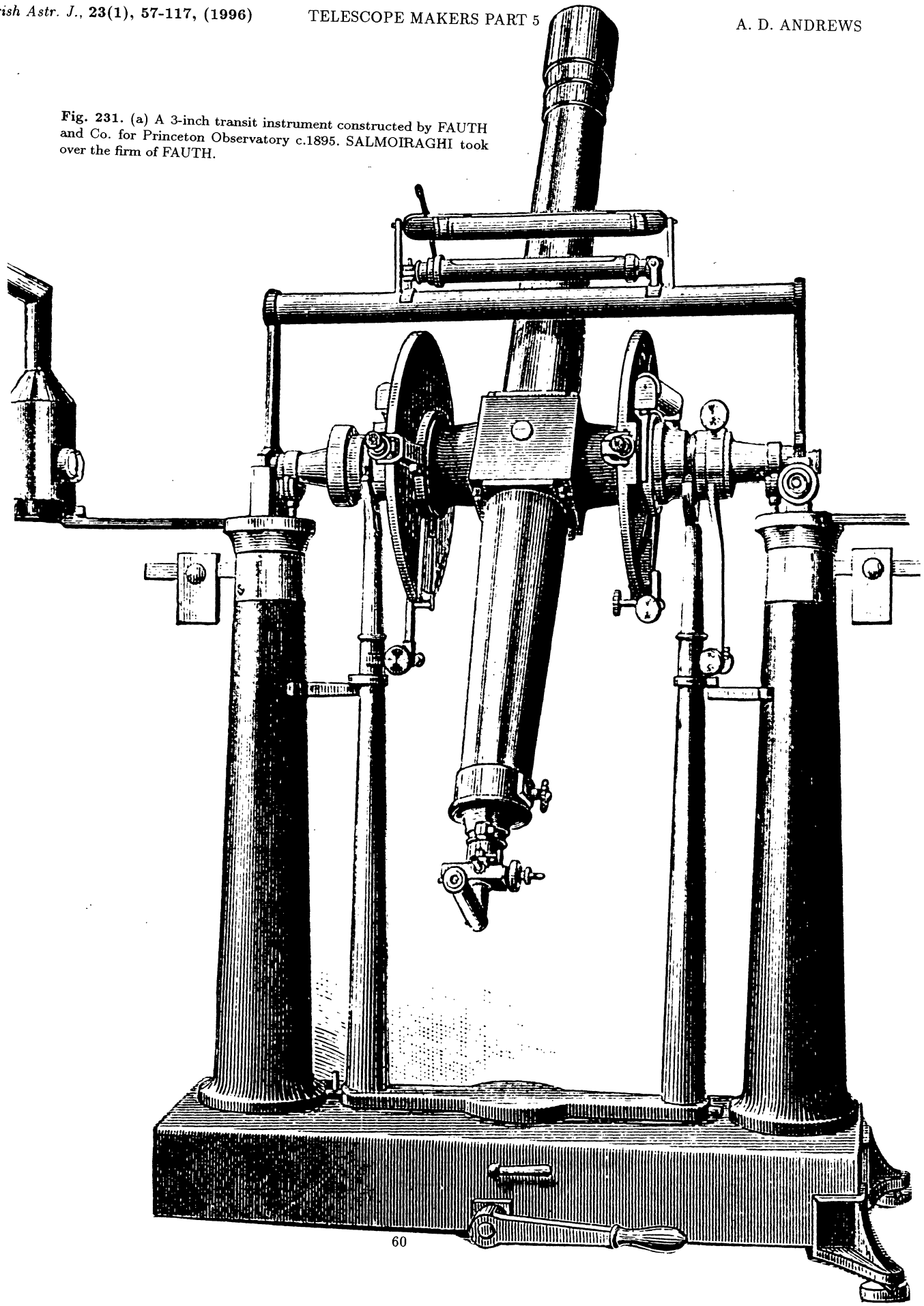


Fig. 229. (a) The 20-inch refractor for the Chamberlain Observatory, Denver, the equatorial mounting made by SAEGMÜLLER in the early 1890s. The Manila instrument by SAEGMÜLLER is shown in *Cyclopaedia, Part 3, Fig. 155.* (b) An advertisement (early 20C) from SALMOIRAGHI (Milano) depicting a theodolite. (c) A fine SALMOIRAGHI equatorial refractor c.1910.

Fig. 230. (a) An advertisement from SALMOIRAGHI shortly after the firm's awards in Europe and S.America in 1910. (b) An equatorial refractor by SALMOIRAGHI c.1910.

Fig. 231. (a) A 3-inch transit instrument constructed by FAUTH and Co. for Princeton Observatory c.1895. SALMOIRAGHI took over the firm of FAUTH.



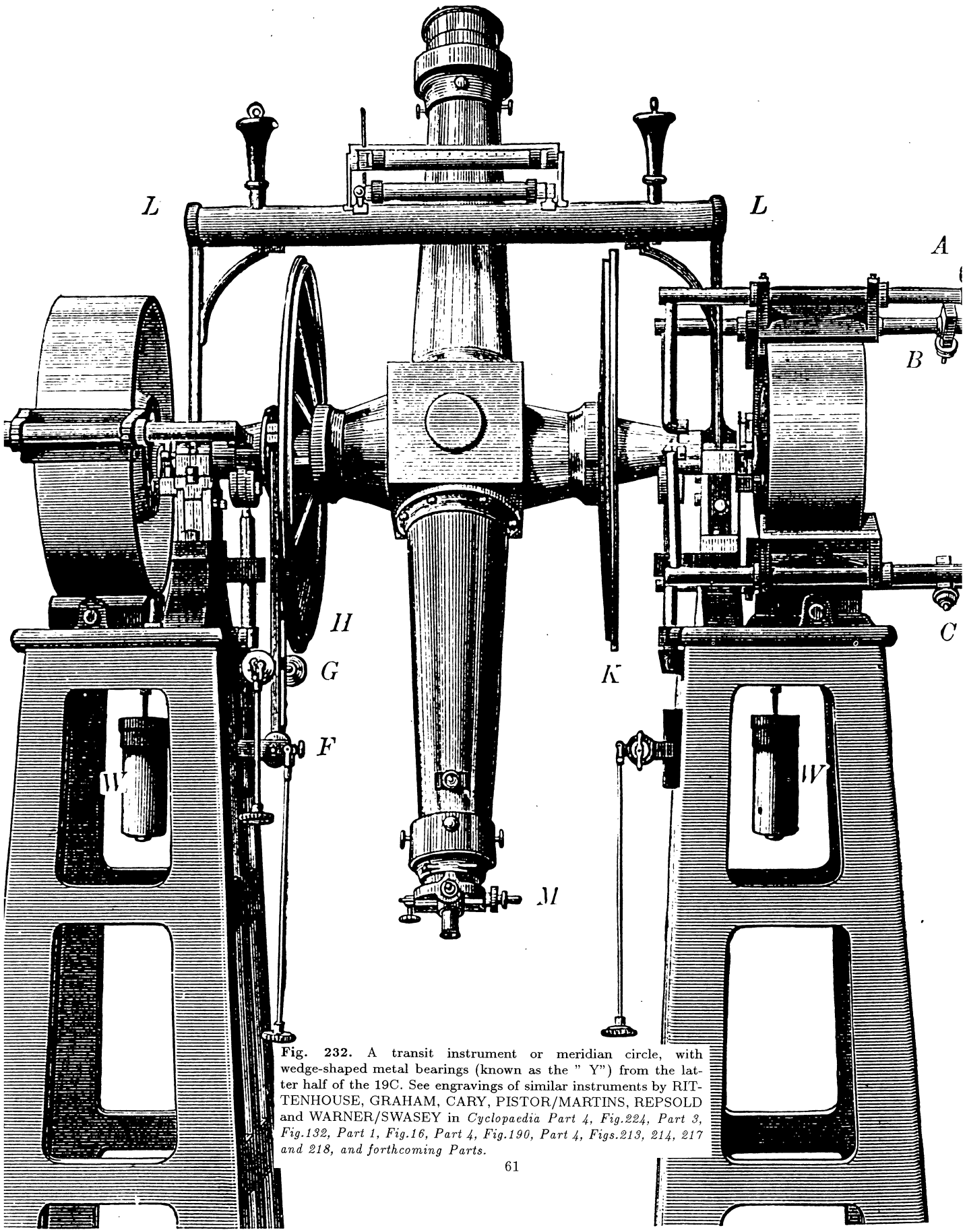


Fig. 232. A transit instrument or meridian circle, with wedge-shaped metal bearings (known as the " Y") from the latter half of the 19C. See engravings of similar instruments by RITTENHOUSE, GRAHAM, CARY, PISTOR/MARTINS, REPSOLD and WARNER/SWASEY in *Cyclopaedia Part 4, Fig.224, Part 3, Fig.132, Part 1, Fig.16, Part 4, Fig.190, Part 4, Figs.213, 214, 217 and 218, and forthcoming Parts.*

Fig. 233. The SCARLETTs, father and son, had their businesses at several locations near St Anne's Church, Soho, from 1705 until c.1770. The Church is depicted at the centre of this 1843 map of London, just north off Old Compton Street, which is similar enough to London today as to be recognized

Fig. 234. When SCARLETT Senior set up business, St Anne's Church had been recently consecrated (1685) and its churchyard laid out in Kemp's Field (later to become King Street where SCARLETT Senior was found in 1822). The engraving (inset) is from Shepherd's *London in the 19th Century* (1819). N.B. Shaftsbury Avenue was not opened until 1866.

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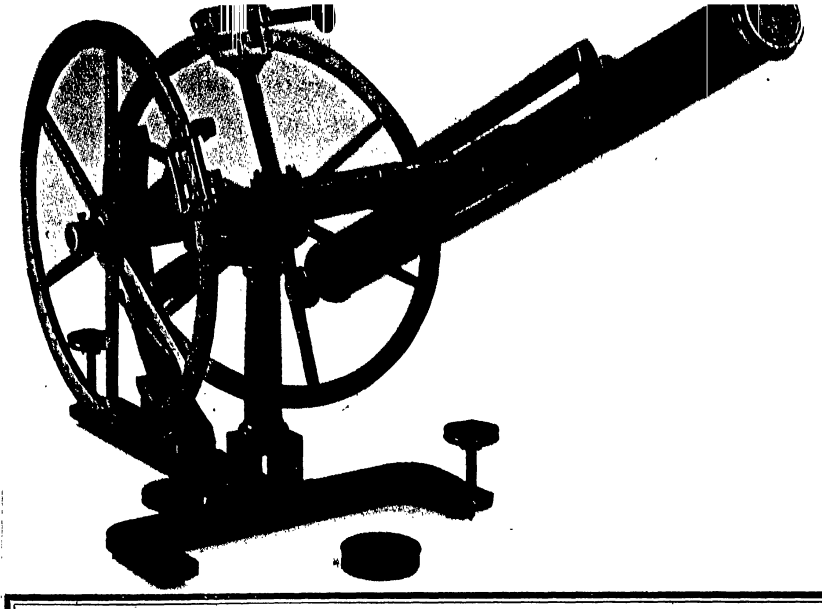

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125	0, 60	1000	400 —	5
135	0, 65	1200	450 —	6
160	0, 75	2000	500 —	7
180	0, 90	2800	550 —	8
200	1m00	3800	600 —	8

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Fig. 235. (a) An early 19C French portable equatorial instrument, a 1.5-inch telescope, on a stand signed by Schemit (Lyon). It has a bubble level mounted with axis, cross bubble and vertical circle with vernier on equatorial circle, and adjustment for latitude by tangent screw, and pillar support with three levelling screws (38cm high). See CHrJun92, lot 115. (b) An advertisement for a SCHAER refracto-reflector. See also *Cyclopaedia Part 3, Fig. 141* for a similar instrument from MANENT. (c) SCHOTT (Jena) advertisement for modern 20C optical glass, the company traced back to the 19C ZEISS, ABBE and Otto SCHOTT collaboration.

Anne's Church, Soho, London (1705-43), also *King Street* (1722) and *Market Street* (1724), freed 1705, b.c.1688, d.1743. This eminent family firm made one of the first commercially viable reflecting telescopes. Edward (I) took Nathaniel ADAMS as apprentice.

SCARLETT Edward (II) - English optician, instrument maker, continuing in his father's business, *The Spectacles, 2nd House from Essex St, nr. Temple Bar, London, also Maxwell St* (1749), and *Near St Anne's Church, Soho* (1763), b.c.1702, d.c.1779. The firm collaborated with HEARN. [8]

SCHAER Emil - Eminent Swiss astronomer and optician, Director of *Geneva Observatory* (1898-1926), *2 rue de l'École de Chemie*, b.1862, d.1931. He was involved with reflecto-refractors (folded telescopes), and an interesting experimental optical system which preceded the field flatteners and coma correctors of ROSS and BAKER. He successfully employed local figuring on a hyperboloidal secondary mirror, a remarkable achievement. [9]

SCHEINER Christoph - Jesuit priest and astronomer, from *Ingolstadt*, 1575-1650. From the *Collegio Romano* he published his observations of sunspots made using an equatorially mounted telescope (1620) earlier used by Father Grienberger. [10]

SCHEMIT - early 19C, *Lyon.* [11]

SCHENK W - c.1820. A theodolite by SCHENK is found in the Herschel Collection. [12]

SCHIEK F.W - microscope maker, *Berlin.*

SCHMIDT Bernhard Voldemar - eminent Estonian optical innovator, builder of the first successful wide-field catadioptric telescope, the Schmidt camera, 1879-1936. [13] His first astronomical photographs with the new camera (a 17.3-inch spherical mirror of focal length 24.6 inches, plus a thin 14:2-inch corrector plate at its centre of curvature) were taken in 1930 at Hamburg Observatory, Bergedorf, where he had worked as "a voluntary member of staff" since 1926. SCHMIDT started mirror making in *Mittweida, Germany* (c.1901), supplying first amateurs, then professionals, but his interest in optical problems probably stems from c.1899 when he became involved with fluid lenses. [14]. Schmidt telescopes became standard equipment in observatories worldwide, and many modifications to SCHMIDT's basic design were constructed subsequently (leading to modern day Schmidt-Cassegrains, Maksutovs etc.).

SCHNEIDER E - mechanical engineer in *Währing, Vienna Observatory.* He designed rather fantastically large comet-seekers.

SCHOTT Otto Friedrich - eminent German glass chemist, 1851-1935. He manufactured optical glass with dispersions specified by ABBE at the Carl ZEISS, Jena works. SCHOTT and Sons were producing 120,000kg of optical glass per year in 1912, according to BRASHEAR. The name is well known today. [15]

SCHRADER - Kiel, 1792 (See Howse).

SCHRÖDER H - instrument maker, including microscopes and telescopes, mid-late 19C, *Frankfurt a/M.* The astronomer NEWCOMB records several telescopes involving SCHRÖDER at Potsdam, Kiel and Sydney. [16]

SCHRÖTER Johann Hieronymus - chief magistrate of *Lilienthal, near Bremen.* He owned a world famous collection of instruments including HERSCHEL and SCHRÄDER instruments and a self-made 20-inch f/16 reflector. Author of *Aphroditographische Fragmente* (1796). His friends included Baron ZACH (1754-1832), court astronomer at *Gotha*, C. L. Harding (1765-1834) employed by SCHRÖTER, and H. W. M. OLBERS (1758-1840), physician from near *Bremen.*

SCHULZ - Wien, 1750 (See Howse), Altern. SCHÜLTZ.

SCHUPMANN - German optician. He attempted to make an apochromatic telescope (i.e. suppressing the secondary spectrum) in 1899. [17]

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[8] See SIMON. Both BRADLEY and MOLYNEUX used the combined services of the two firms in 1738. See Vistas in Astronomy vol.28, p.357, 1985.

[9] SCHAER's pioneering optical correctors were employed on a 39.5-inch f/3.0 telescope for photographic work. See King pp.419-421, and also D and C p.703. SCHAER's instruments were marketed by HONNEGER-CUCHET, *23 Glacis de Rive, Geneva (near the observatory).*

[10] This makes SCHEINER one of the first to use a polar axis mounting. See, amongst his writings, *Rosa Ursino*, 1630. SCHEINER states that he showed the Archduke Maximilian a 2-lens telescope in 1617 similar to KEPLER's suggested instrument *Dioptrica 1637*

[11] See CHrJun92 illustration of portable equatorial.

[12] Associated with BERNE.

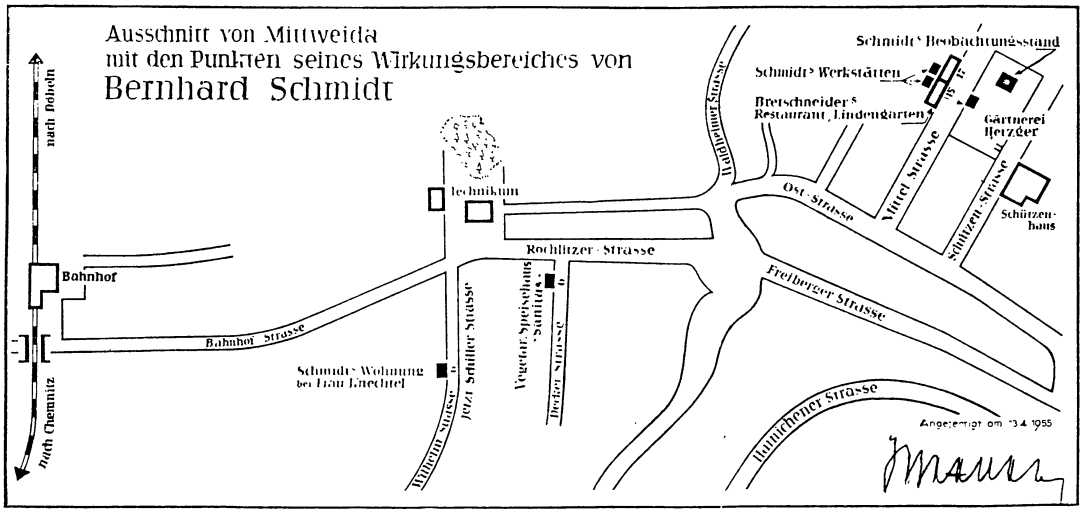
[13] Wachmann, *Sky and Telescope, Nov. 1955, p.4*, and biography, Bernhard Schmidt 1879-1935, by P.V.Müürsepp and U.K. Veismann, ed. Mikhel'son *Nauka, Leningradskoe Otdelenie, Leningrad 1984, in Russian.*

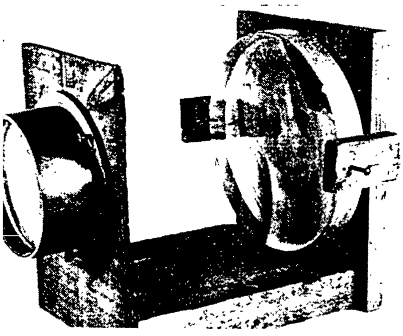
[14] SCHMIDT made a 16-inch f/2.26 mirror for the Astrophysical Observatory in Potsdam in 1905. See Obituary by Schorr, (*Astron, Nachr. 258, p.45, 1936*; transl. by Mayall, *Publ. Astron. Soc. Pacific, vol.58, p.282, 1946*). In 1909 SCHMIDT constructed a 16-inch horizontal telescope, and in 1920 another *Uranostat* of 24-inch aperture for Hamburg Observatory. His exceptional skills were called upon for re-figuring several large photographic objectives (20-inch Potsdam, 24-inch Hamburg, 12-inch Leipzig). See Öpik, *Irish Astr. Journ. vol.3, p.237,1955*

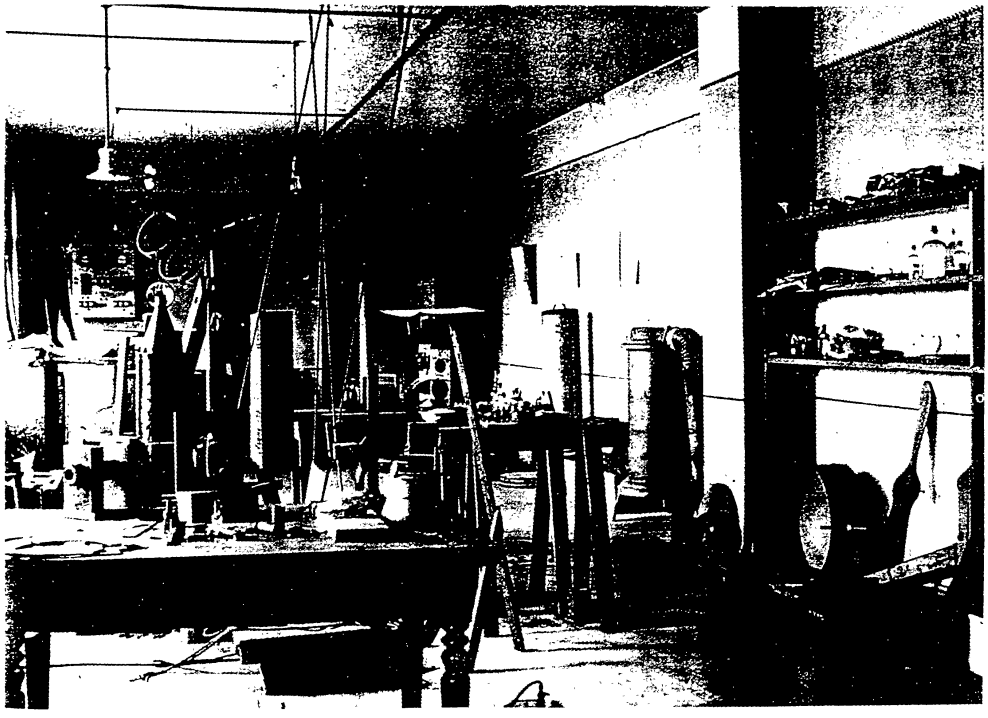
[15] See G. L'E. Turner's *Nineteenth Century Scientific Instruments, p.163* (hereafter Turner 19C).

[16] See Newcomb's *Popular Astronomy 1881*: We find an 11-inch SCHRÖDER/ REPSOLD telescope (1879) at Astroph. Centralobserv. Potsdam, another 11-inch SCHRÖDER telescope at Bothcamp. St.-W., bei Kiel (1870), a 10.75-inch telescope at Sydney Obs. Australia (1875), and a 10-inch telescope (in progress 1881), destination unknown (all in French inches). Newcomb (p.250) also shows a spectral apparatus.

[17] See D and C p.237.







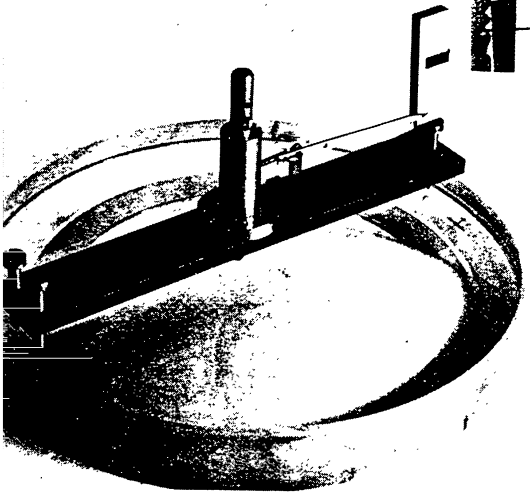
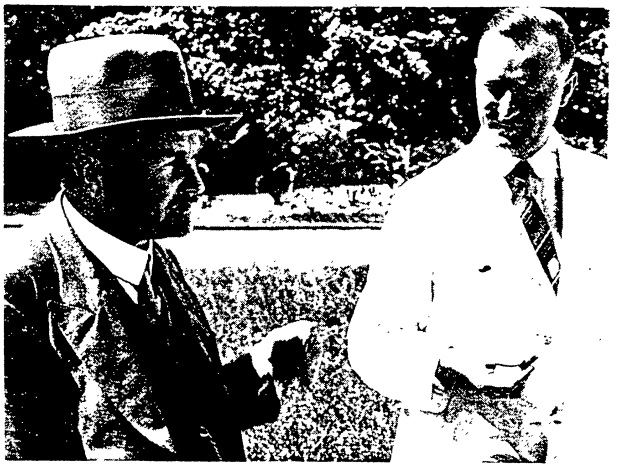
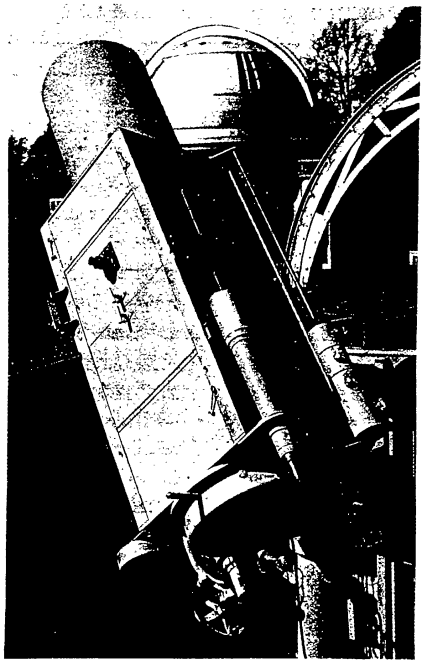


Fig. 236. (a) Bernhard SCHMIDT, age 22 years (Courtesy of Müürsepp and Veismann 1984). (b) Location of SCHMIDT's workshops in Mittweida (Courtesy of Wachmann, Sky and Telescope, Nov. 1955). (c) SCHMIDT's second workshop in Mittweida (W 1955). (d) SCHMIDT's achromatic lens-mirror system 1934 (W 1955). (e) SCHMIDT's spherometer (W 1955).





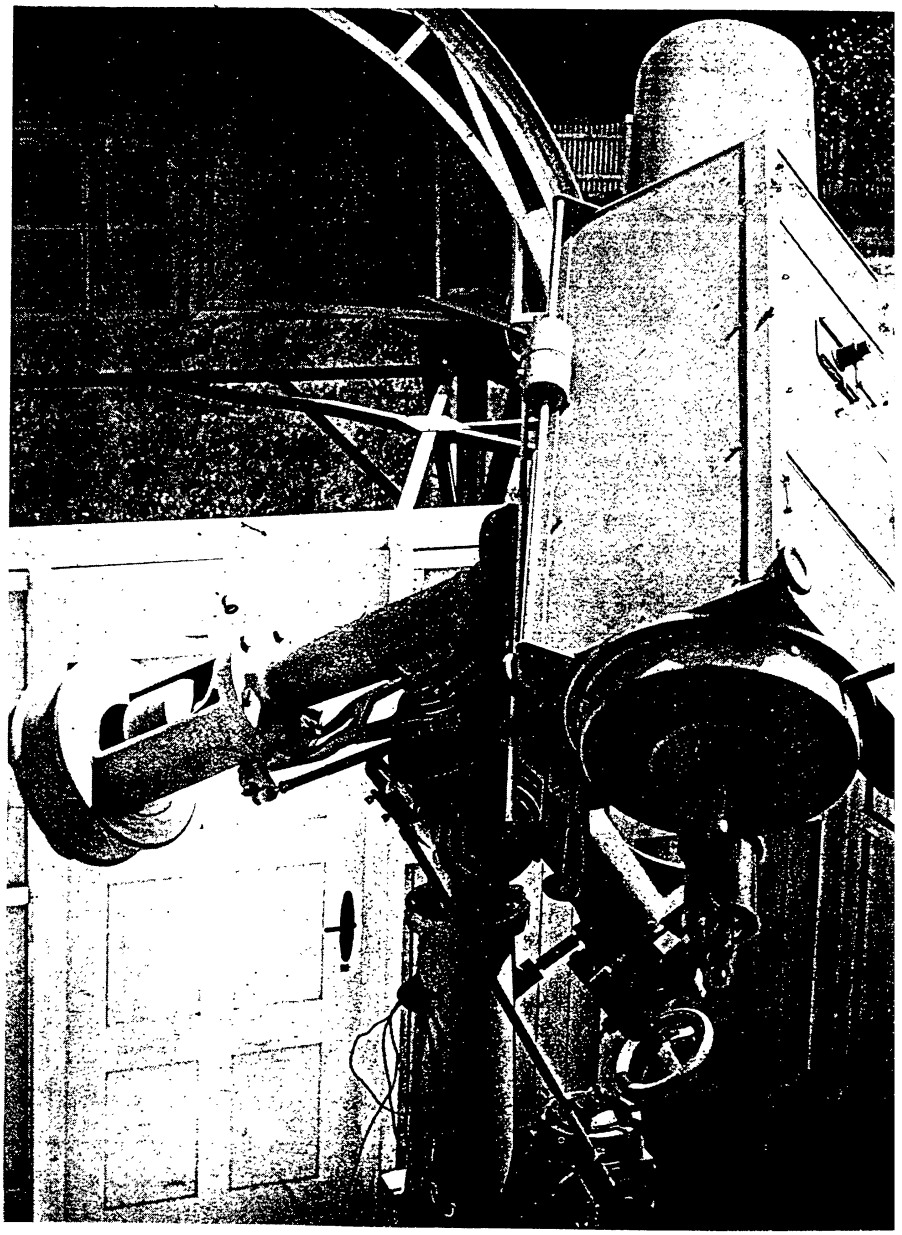
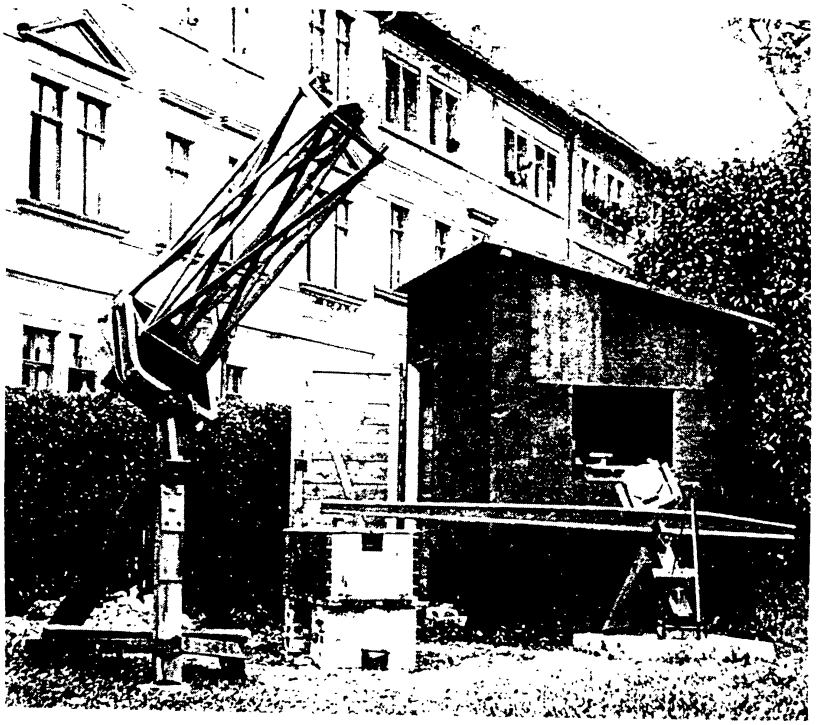


Fig. 237. (a) SCHMIDT 1930 (M and V 1984). (b) SCHMIDT and A.A. Wachmann 1935 (W 1955). (c) The first SCHMIDT telescope with 17.3-inch spherical primary, 24.6-inch focus, and 14.2-inch correcting plate, giving a 15-degree usable field (W 1955). (d) One of SCHMIDT's telescopes at Hamburg Observatory.



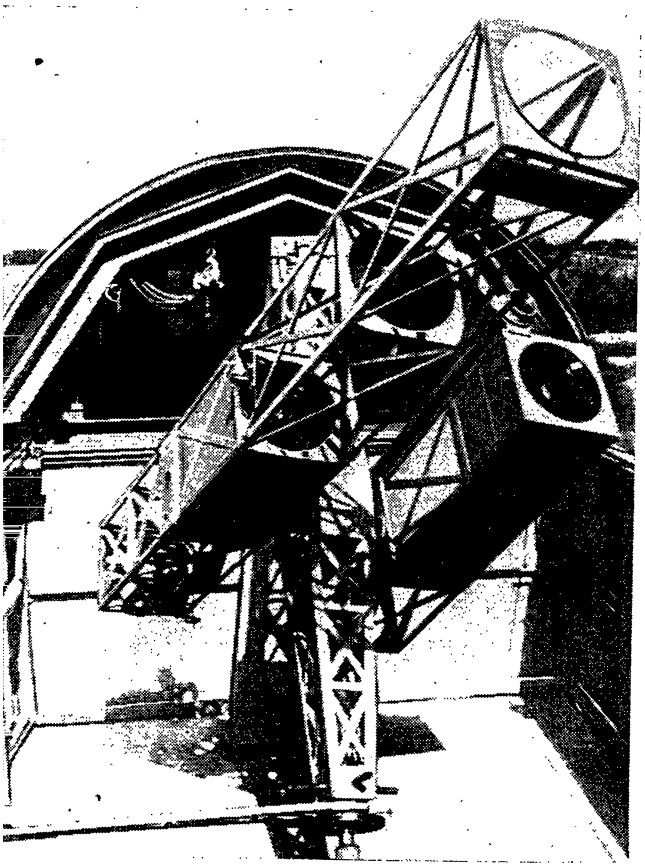


Fig. 238. (a) SCHMIDT 1928. (b) The SCHMIDT 60-cm f/1.5 camera and a 60-cm f/15 telescope (M and V 1984). (c) SCHMIDT at a small equatorial telescope on English-type mounting (M and V 1984).

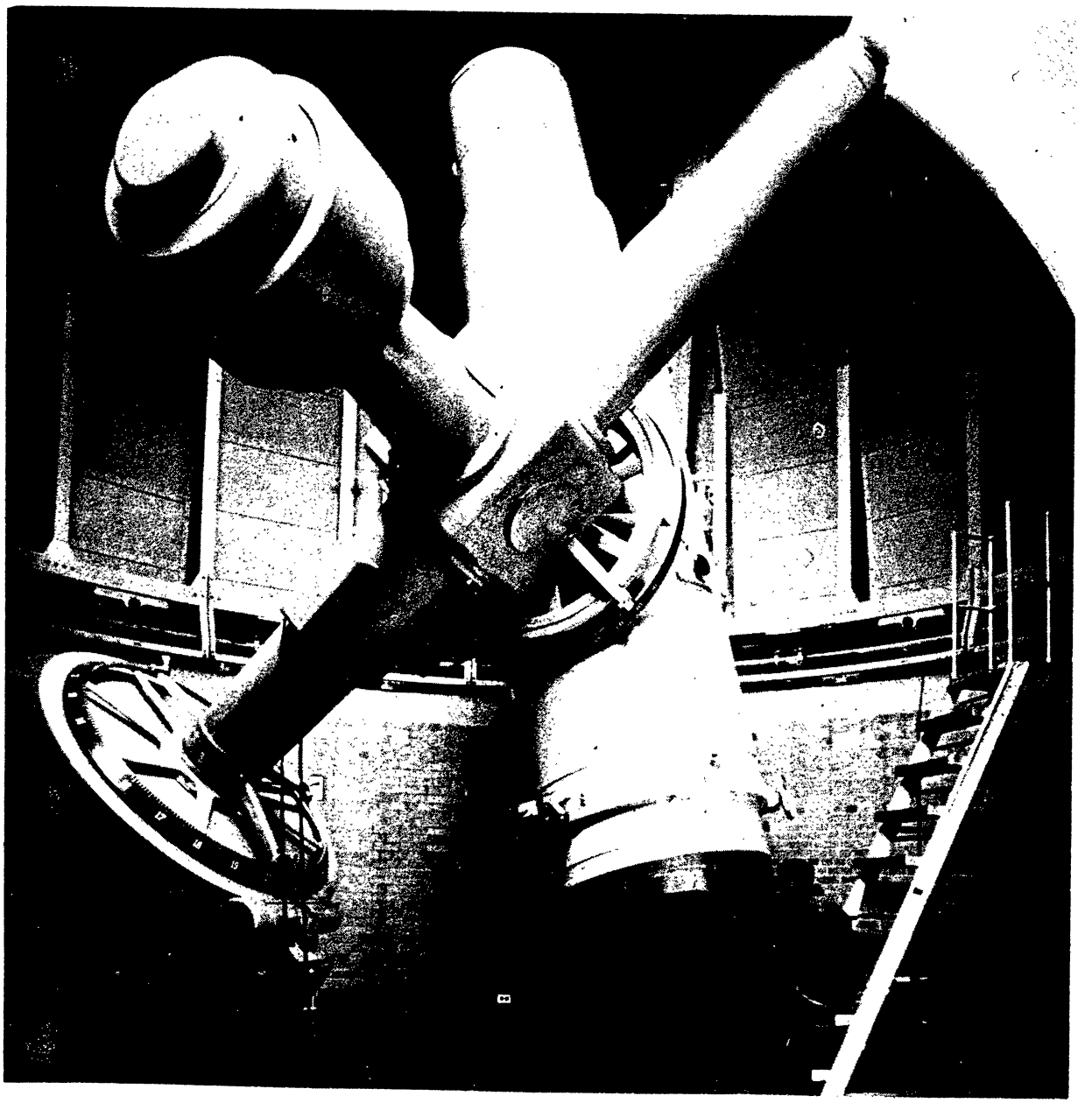


Fig. 239. The 24-36-inch SCHMIDT at the University of Michigan Observatory at Portage Lake.

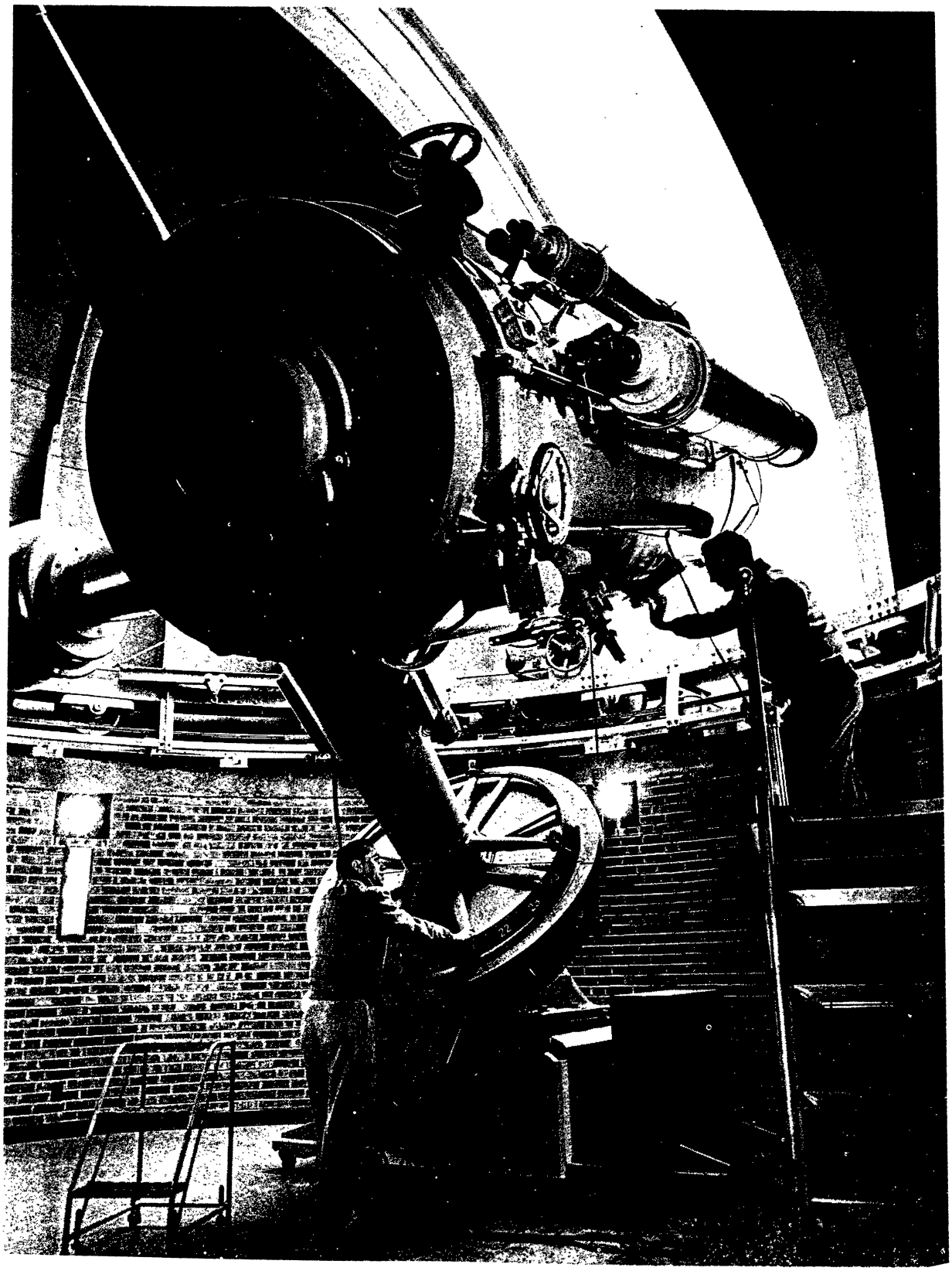


Fig. 240. The 24-36-inch SCHMIDT at the Warner and Swasey Observatory, Case Institute of Technology, Cleveland, Ohio.

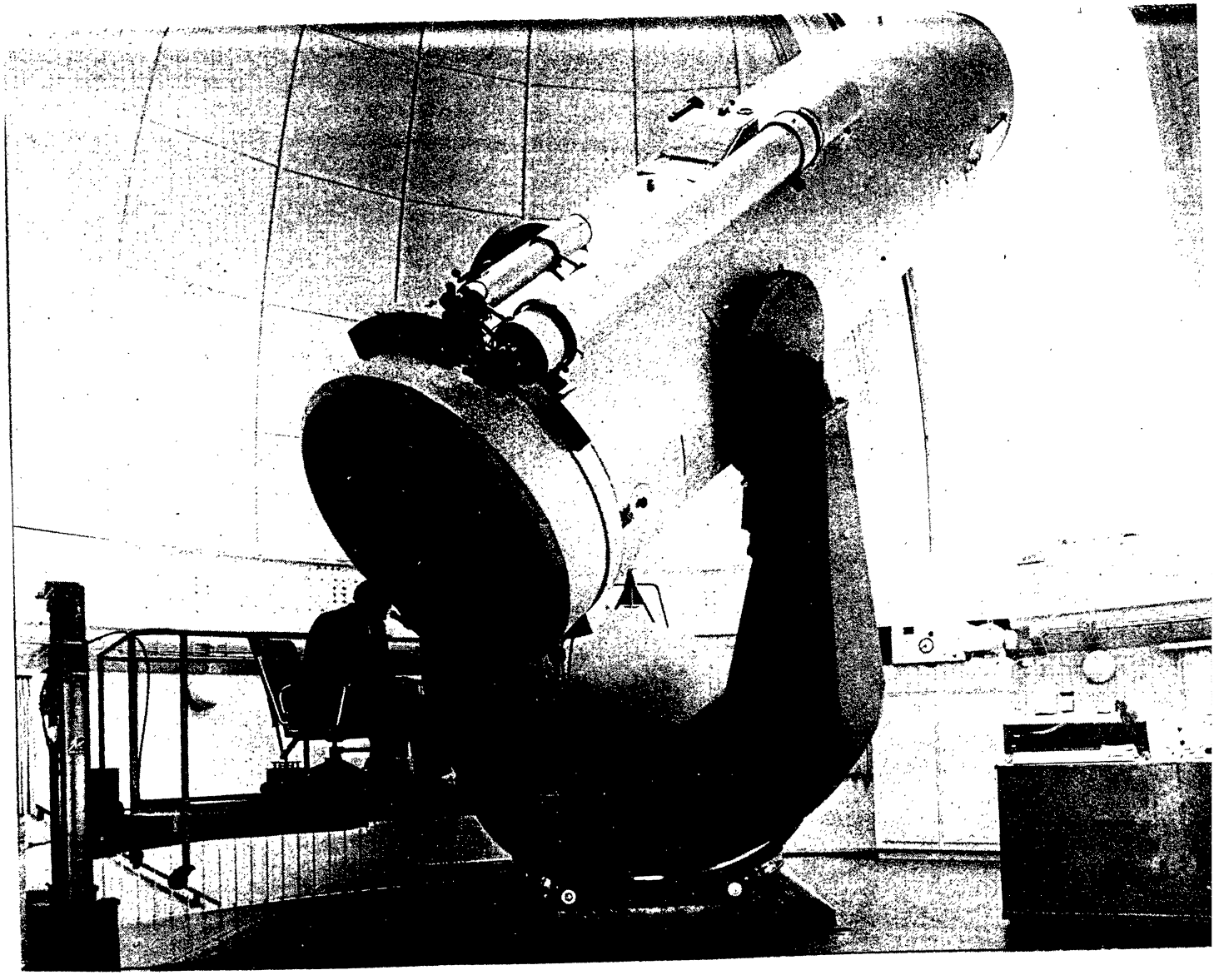


Fig. 241. (a) The 32-48-inch SCHMIDT of the Hamburg Observatory

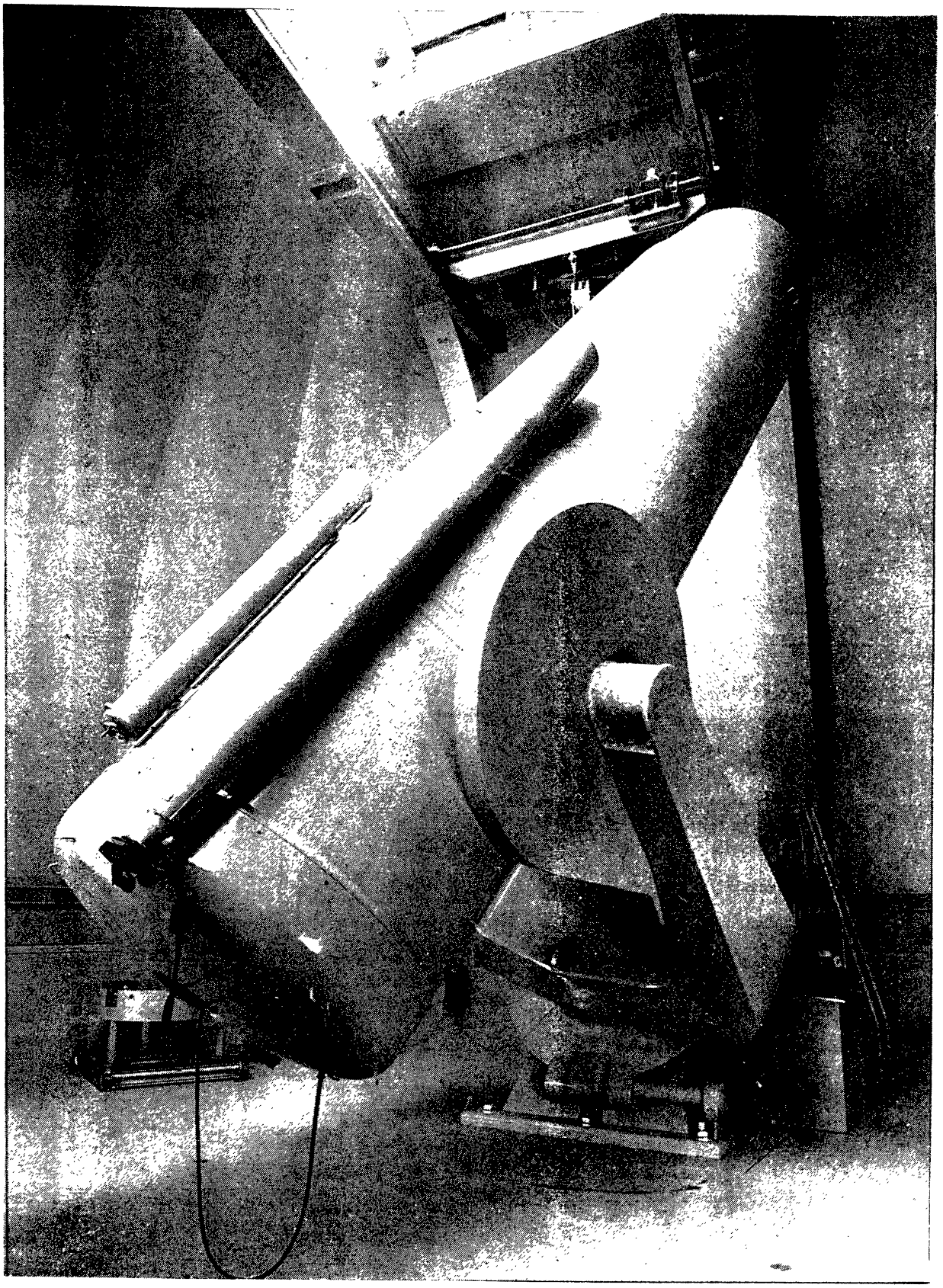


Fig. 241. (b) The 48-72-inch SCHMIDT of the Palomar Observatory

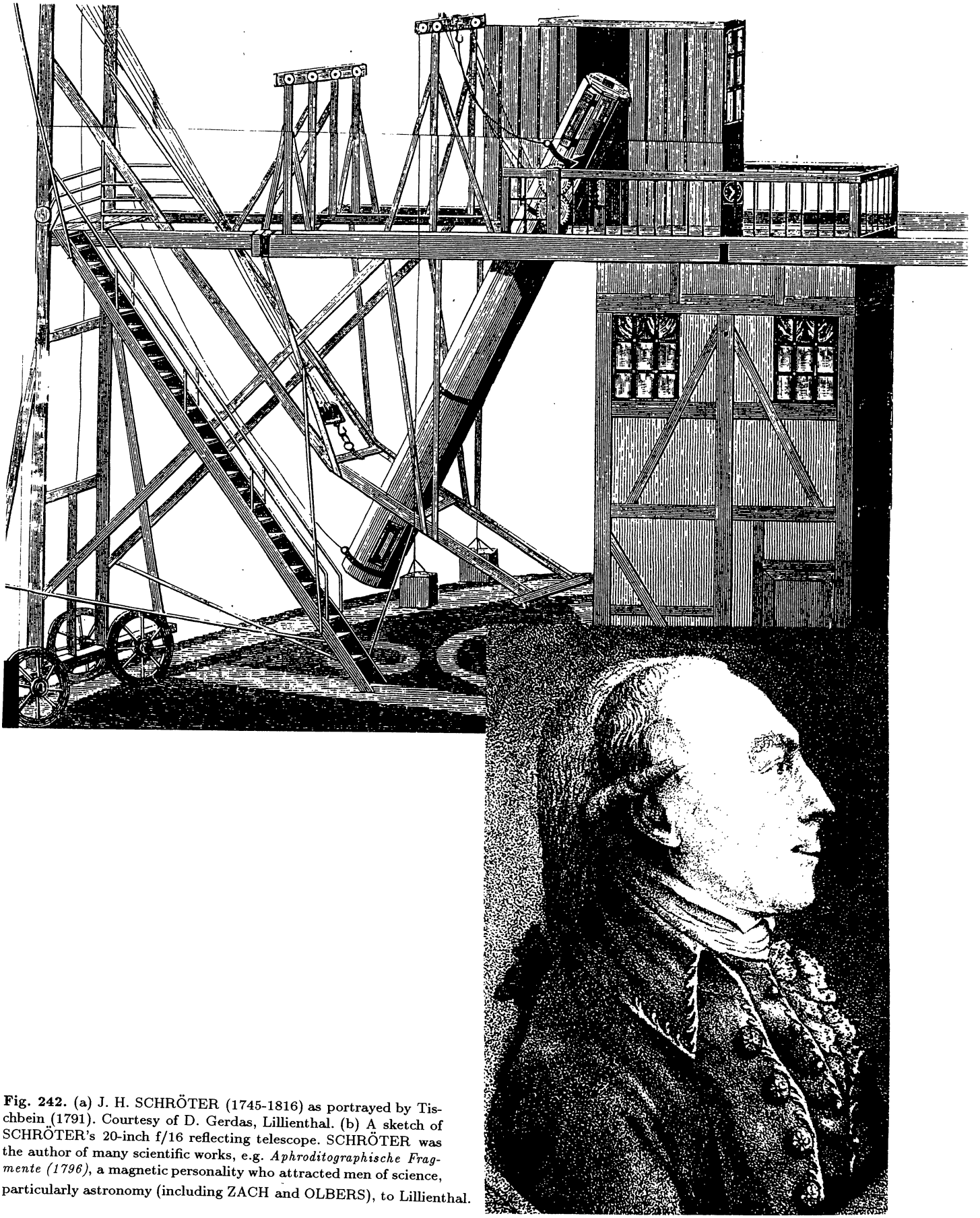
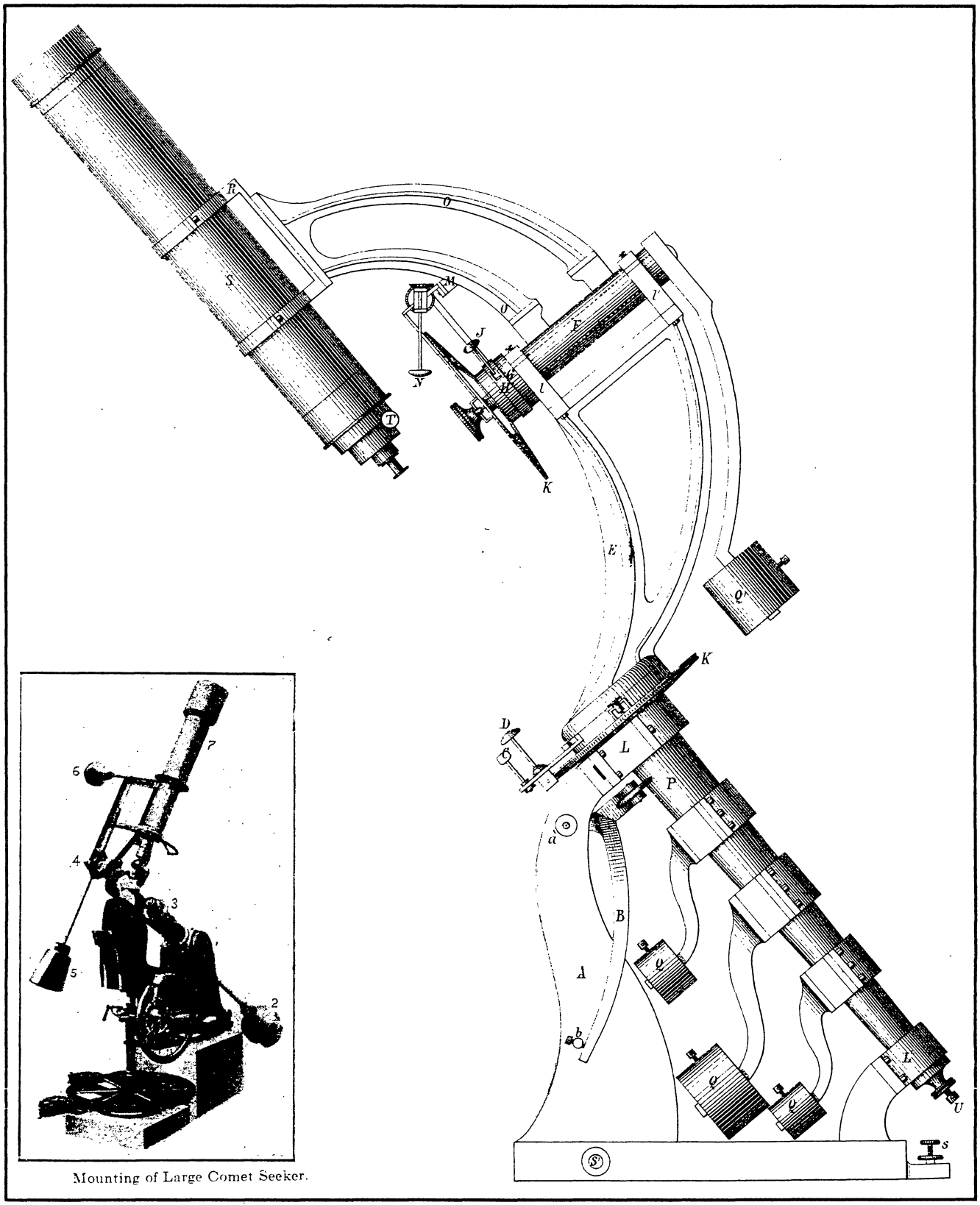


Fig. 242. (a) J. H. SCHRÖTER (1745-1816) as portrayed by Tischbein (1791). Courtesy of D. Gerdas, Lillienthal. (b) A sketch of SCHRÖTER's 20-inch f/16 reflecting telescope. SCHRÖTER was the author of many scientific works, e.g. *Aphroditographische Fragmente (1796)*, a magnetic personality who attracted men of science, particularly astronomy (including ZACH and OLBERS), to Lillienthal.

Fig. 243. Frederick Wilhelm BESSEL, Königsberg (1784-1846), eminent astronomer/mathematician who was the first to successfully measure stellar distances. BESSEL was contemporary with ARGELANDER and STRUVE, and, in England, AIRY, all with interest in positional accuracy. The German and Bavarian astronomical tradition set high standards for optical instruments, supplied by many successful precision engineers and opticians, FRAUNHOFER, REICHENBACH, later MERZ (the Munich Institutes and Benediktbeuern), PISTOR and MARTIN (Berlin), REPSOLD (Hamburg), and STEINHEIL(Munich), and finally, ZEISS. Positional accuracy and mathematical description of orbital elements and perturbations occupied BESSEL's mind, and the discovery of a new comet, for example, provided impetus to new computations and the development of new mathematical functions, especially the development of mathematical expansions in series (i.e. approximations approaching any specified degree of accuracy, given by, perhaps, the accuracy of the astronomer's observations.)



Mounting of Large Comet Seeker.

Fig. 244. SCHNEIDER's design for a comet seeker (Vienna 19C).

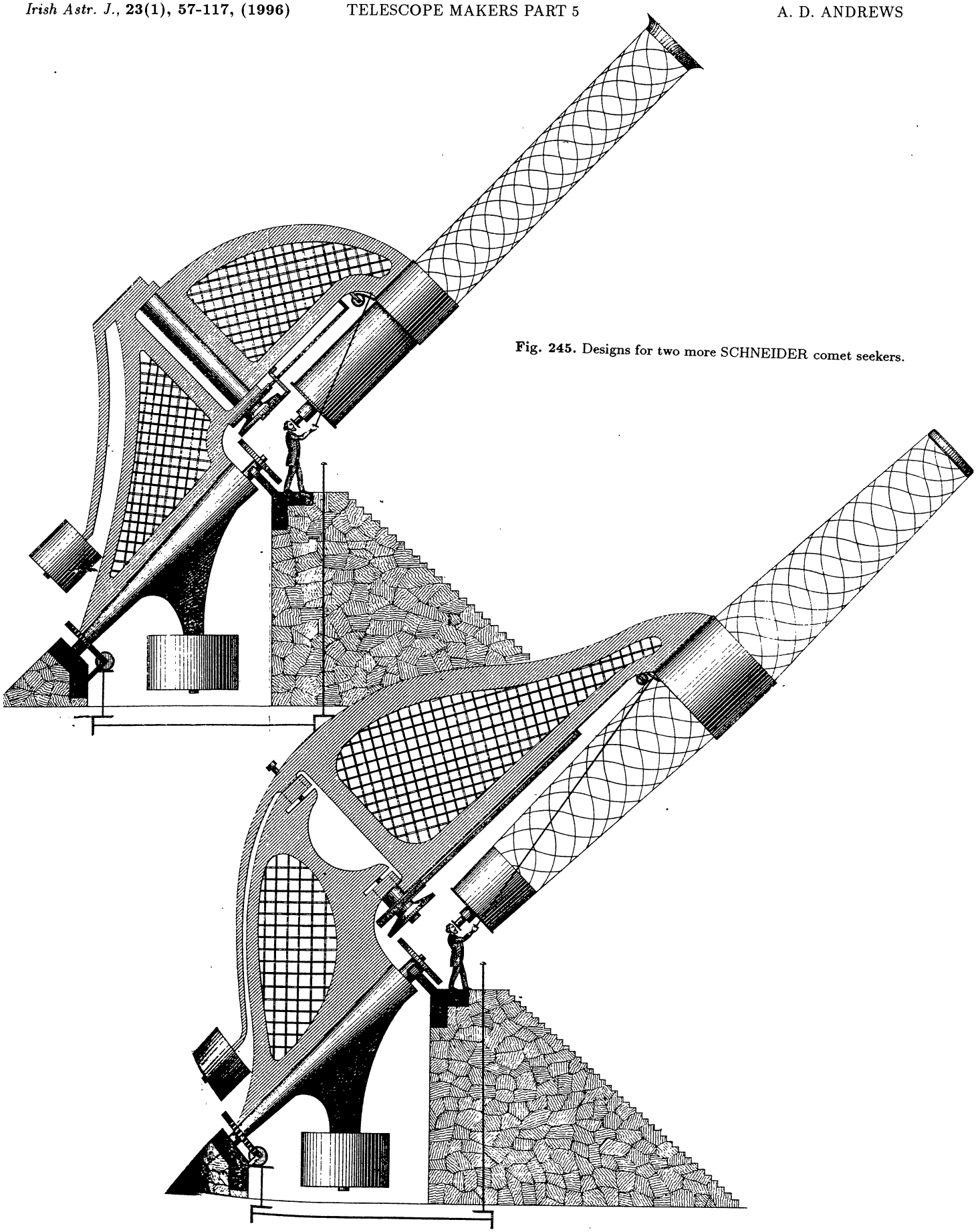


Fig. 245. Designs for two more SCHNEIDER comet seekers.

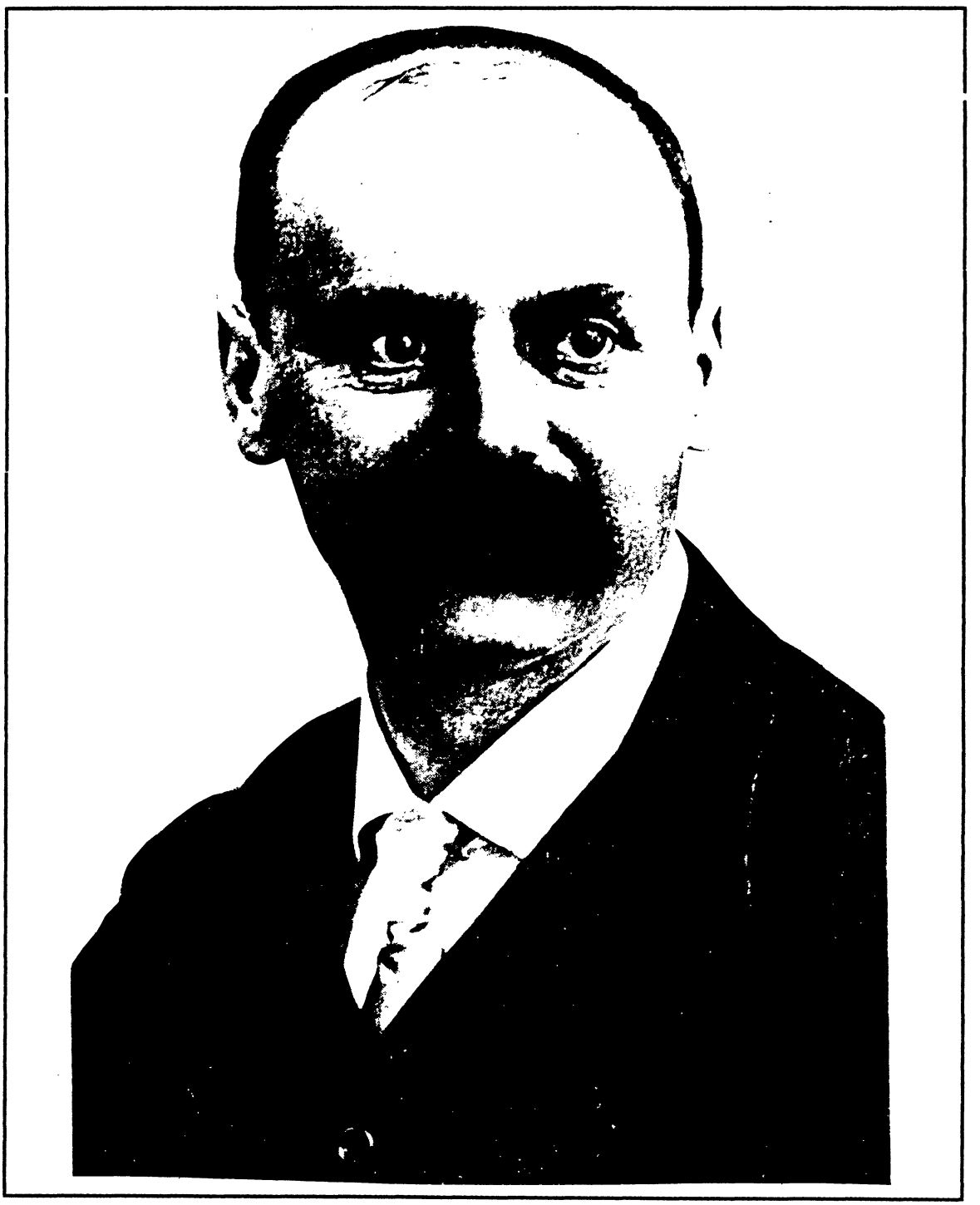
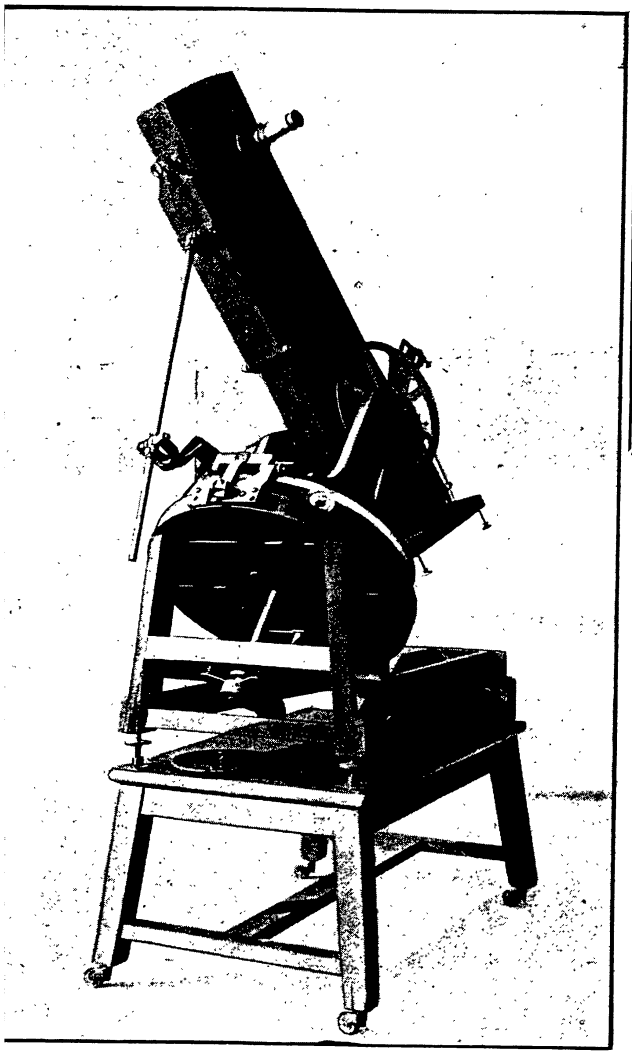
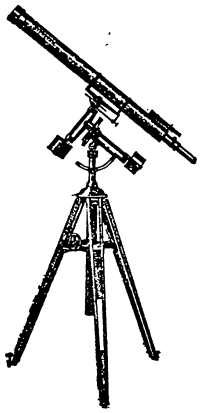


Fig. 246. Karl SCHWARZSCHILD, 1873-1916, eminent astronomer, Director at Potsdam Observatory, well-known not only as an astronomer but as a pioneer in optical design, in the latter albeit not too successfully. Astronomers in the early 1900s were, however, unknowingly awaiting for the successes of SCHMIDT, RITCHEY/CHRÉTIEN, MAKSUTOV and others.





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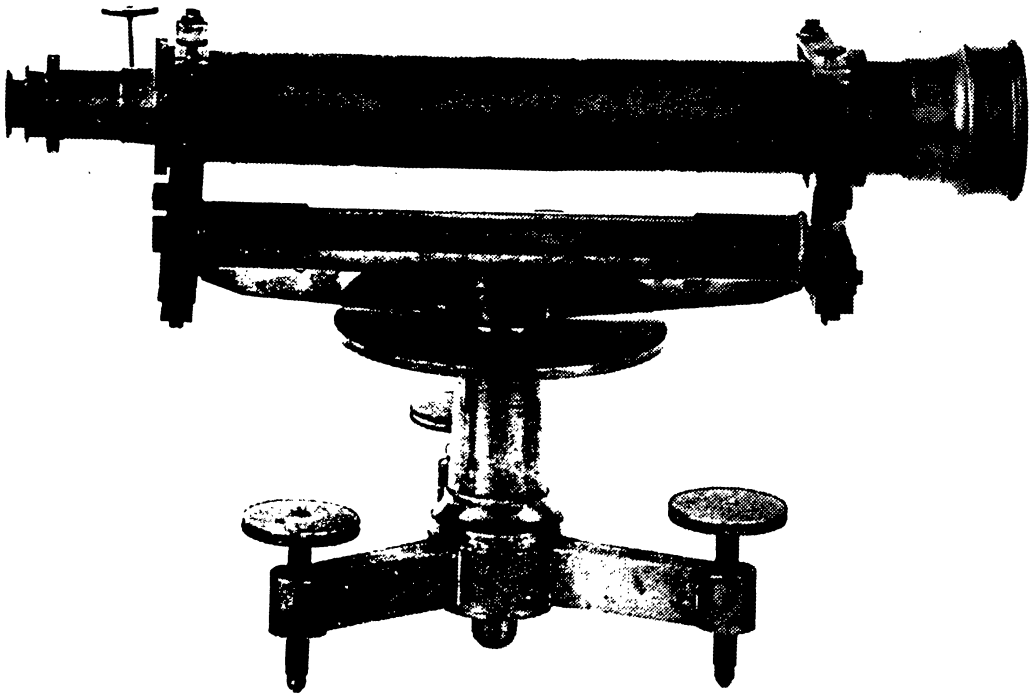
Catalogue franco

151, Boul^d Aug.-Blanqui -:- PARIS (XIII^e)

Fig. 247. (a) SECRÉTAN-mounted telescope with FOUCAULT silver-on-glass mirror. See also *Cyclopaedia, Part 1, Fig. 38.* (b) SECRÉTAN advertisement showing small equatorial refractor. (c) A 19C brass surveying level by SECRÉTAN (see CHrJun92, lot 229).



SCHWARZSCHILD Karl - eminent German astronomer and optical designer, b.1873, d.1916, successor to VOGEL as Director at *Potsdam Observatory* (1909-16). He worked on the theory of optical aberrations and the performance of astronomical mirrors seeking an optical system free from coma and spherical aberrations. His suggested combination of a near-hyperboloidal primary and a large concave near-ellipsoidal secondary mirror (1905) was, however, a relative failure. [18]

SCHYRLE Anton Maria - Capuchin friar, also known as SCHYLEUS DE RHEITA, *Bohemia*, 1597-1660. He designed a binocular instrument (c.1643) and a terrestrial ocular (1645). [19] Also, he built an interesting telescope with an early triple objective. SCHYRLE was author of several works, e.g. *The Napkin of St Veronica*, which contained many of his ideas on optics.

SECRÉTAN Marc - eminent professor of optics (until 1848), *Lausanne University*, and instrument maker in *Paris*, constructing excellent mathematical, optical and philosophical instruments, d.1868. The original firm was at *13 Place du Pont Neuf, Paris* (1789 or 1795), with workshop at *28 Place Dauphine*. He made equatorial telescopes for the great FOUCAULT [20] at the Paris Observatory together with N.M. LEREBOURS (son of J.N.LEREBOURS). SECRÉTAN's name is also linked with EICHENS, GAUTIER and PRIN. The firm LEREBOURS et SECRÉTAN (from 1865) was found at *151 boulevard August-Blanqui, Paris XIIIe (south Paris, west from Place d'Italie)*. At the address *40 rue Hallé, Paris XIVe (south Paris, off ave Rene Coty)* we find ÉPRY the successor to SECRÉTAN in the early 20C.

SECRÉTAN August and George - sons of Marc SECTRÉTAN who continued the family business.

SEIDEL L - eminent German theoretical optician and astronomer, with achievements in third-order geometrical optics applied to primary aberrations in optical systems. [21]

SELVA Domenico - Italian instrument maker, *Venice*, fl. 1760. [22]

SEMINCOLO Leonardo - *London*, 19C. [23]

SEMITECOLO Leonardo - instrument maker, *London*, late 18C-19C. [24]

SENDLINGER - German optical glass works, *Zehlendorf, Berlin* (World War II binocular code fco).

SENEX John - notable globe and map maker, engraver, and mathematical instrument maker, *Whites Alley, Coleman St, London* (1707, with PRICE), *Over against St Dunstan's Church in Fleet St, London* (1724-40), *Hemlock Court near Temple Bar, London, Next the Fleece Tavern in Cornhill, London* (1703-07), *The Globe near Salisbury Court, Fleet St, London* (1710-21), d.1740. [25]

SERRURIER Mark - Engineer, 20C. SERRURIER designed the skeleton tube for the 200-inch Mt Palomar telescope. This design employs balanced flexure and is widely used today. [26]

SEVIN Pierre - French instrument maker, fl.1665-83. [27]

'S GRAVESANDE M.G.J - natural philosopher, mathematician, author, 18C. He designed the first working heliostat (1720). [28]

SHARP Abraham - the highly-skilled graduator of mural arcs chosen by FLAMSTEED for his large astronomical quadrant. [29] SHARP was working in semi-retirement at *Horton* in 1694 still constructing instruments. The Astronomer Royal employed SHARP's services in the 1680s, and used a SHARP mural arc (1689) of 79in radius for the famous star catalogue, *Historia Coelestis*. [30]

SHEEPSHANKS Richard (Rev) - son of wealthy cloth manufacturer in *Leeds*, studied mathematics, (Fellow Trinity Coll. Camb. 1817) and theology (ordained 1828). SHEEPSHANKS was prominent in astronomical circles already by 1820 having set up his own observatory. He collaborated with AIRY on gravity experiments. He also constructed a sidereal clock with governor and pendulum, used by SMYTH at Bedford, and later

[18] Light loss from the large secondary mirror (socalled *vignetting*) amounts to 4.5 magnitudes at the edge of his coma-free field. RITCHEY attempted constructing SCHWARZSCHILD photographic reflectors (c.1930). We record that W.A. COGSHALL constructed a 24-inch for Univ. Indiana, and C.H. SMILEY made a 12-inch which was at the Ladd Observatory, Rhode Island. See King p.356.

[19] Journ. Brit. Astr. Assoc. vol.61, pp.7 and 202 (hereafter JBAA) . See also King p.45, Bell's *The Telescope* p.12, Chambers' *Descriptive Astronomy*, 1867, p.718, and Webb's *Cycle of Celestial Objects, p.267.* There is a telescope attributed to SCHYRLE in the Nat. Marit. Museum. See G. L'E. Turner's *Essays on the History of the Microscope 1980, p.79.*

[20] SECRÉTAN died at almost the same time as FOUCAULT.

[21] See *Astr. Nachr. 43, Nos.1027, 1028 and 1029 (1856).*

[22] A. Turner, in *Early Scientific Instruments, p.214 (hereafter A Turner ESI),*, gives an illustration of a brass instrument, with gold-tooled green morocco, with fruitwood foot and mounting box.

[23] See CHrSep86, listing an embossed carved 3-draw 22-mm telescope, decorated with scrolls and geometric motifs and horn fittings, 82.5-cm long extended, stamped with this name.

[24] See CHrMar89, listing a 1-inch 3-draw telescope in card vellum and horn, 29.2-cm closed. See Bennett's *Astronomy and Navigation*, Whipple Catalogue No.3, p.39. Also, Daumas p.325.

[25] See SIMON. SENEX worked 3 or 4 years before being freed in 1705/06, and was conveniently very near the *Royal Society, Crane Court.* SIMON records alternative name Joanne SENEX.

[26] See G.N. Sisson's article, *On the Design of Large Telescopes, Vistas in Astronomy vol.3, p.92.*, and also, B.V. Barlow's *The Astronomical Telescope.*

[27] See Daumas p.103.

[28] Four-vol. (auto)biography assembled, Amsterdam 1774 (see Daumas p.392), also see Daumas Plate 54, and King pp.60, 279, Dewhirst, *Vistas vol.28, p.147, 1985.* 'S GRAVESANDE's instrument was developed further by GAMBEY (1831), SILBERMANN (1844) and FOUCAULT (1869) to what we should call a siderostat.

[29] See A.Chapman's*Dividing the Circle*, Wiley-Praxis 1995.

[30] See W.Cudworth's *Yorkshire Mathematician* ....., London 1889.

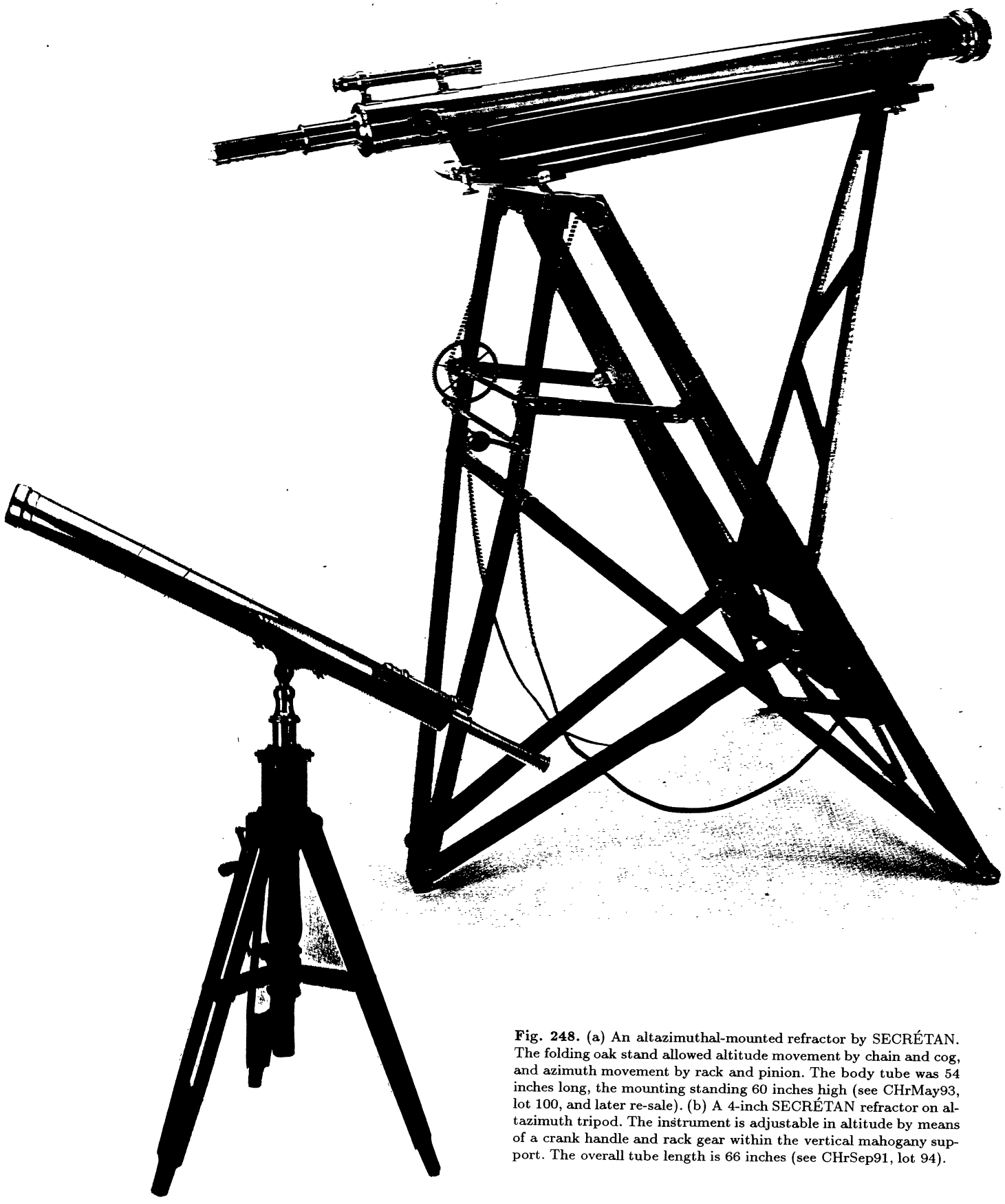


Fig. 248. (a) An altazimuthal-mounted refractor by SECRÉTAN. The folding oak stand allowed altitude movement by chain and cog, and azimuth movement by rack and pinion. The body tube was 54 inches long, the mounting standing 60 inches high (see CHrMay93, lot 100, and later re-sale). (b) A 4-inch SECRÉTAN refractor on altazimuth tripod. The instrument is adjustable in altitude by means of a crank handle and rack gear within the vertical mahogany support. The overall tube length is 66 inches (see CHrSep91, lot 94).

LUNETTE ASTRONOMIQUE

montée sur pied élevé à hauteur variable

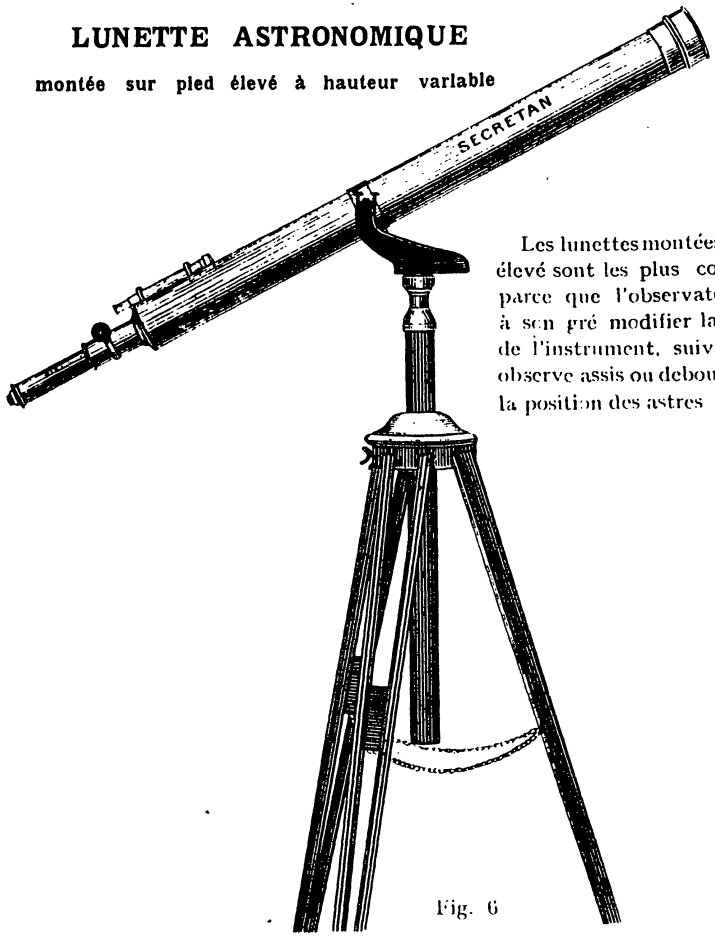


Fig. 6

Les lunettes montées sur pied élevé sont les plus commodes, parce que l'observateur peut à son gré modifier la hauteur de l'instrument, suivant qu'il observe assis ou debout et selon la position des astres

Lunette avec coulant et crémaillère de mise au point.
Fourche de stabilité Secrétan. Colonne mobile en hauteur.
Pied en chêne à trois double branches d'écartement variable.

Nos	Diamètre de l'objectif	Nombre d'oculaires	Grossissements linéaires	Prix avec chercheur
661	61 mm	2	25 à 190	**825 fr.**
670	70 —	2	30 à 220	**975 fr**
675	75 —	3	35 à 240	**1.225 fr.**
681	81 —	3	40 à 265	**1.400 fr.**
695	95 —	4	45 à 310	**1.850 fr.**
6110	110 —	5	50 à 350	**2.675 fr.**

LUNETTE ASTRONOMIQUE

montée sur pied élevé à hauteur variable
avec mécanisme de mouvemonts lents

Un chercheur
est monté sur toutes nos lunettes.
C'est un organe indispensable
pour utiliser les forts oculaires.

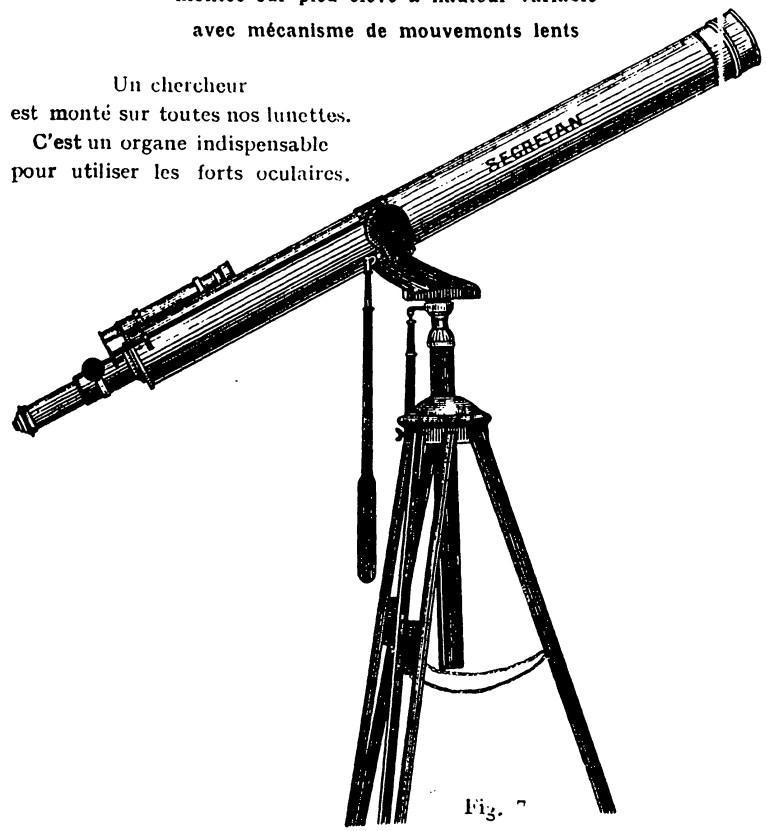


Fig. 7

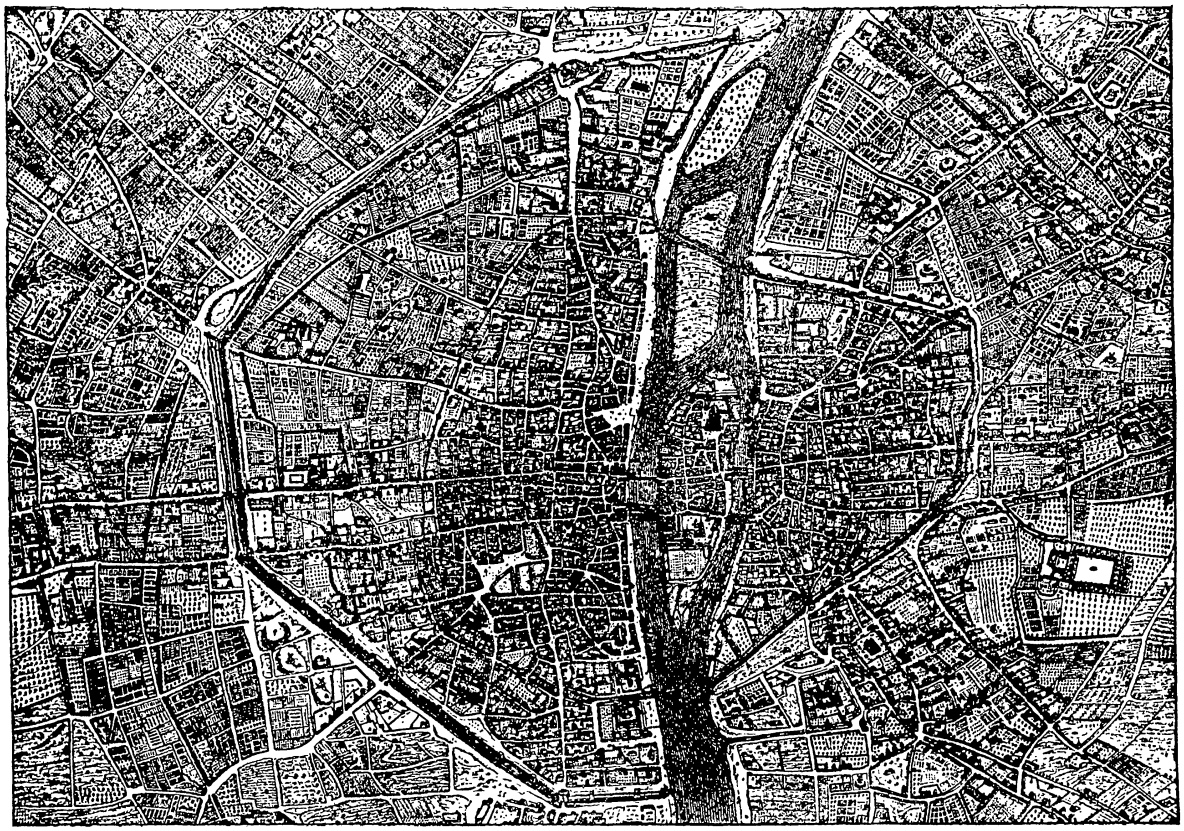
Mêmes lunettes que modèle n° 6 ci-contre, auxquelles est ajouté un mécanisme de mouvements lents commandé par tiges rigides ou par câbles flexibles.

N°	Diamètre de l'objectif	Nombre d'oculaires	Grossissements linéaires	Prix avec chercheur
775	75 mm	3	35 à 240	**1.725 f.**
781	81 —	3	40 à 265	**1.900 f.**
795	95 —	4	45 à 310	**2.400 f.**
7110	110 —	5	50 à 250	**3.275 f**

En montant un oculaire terrestre n° 250 sur une lunette astronomique on la transforme momentanément en une puissante lunette terrestre

Fig. 249. Two advertisements from EPRY et JACQUELIN, successors to SECRÉTAN.

Irish Astr. J., **23**(1), 57-117, (1996) TELESCOPE MAKERS PART 5 A. D. ANDREWS



Paris in 1380.

Paris in 1615.

Fig. 250. Plans of the City of Paris (from 1380 and 1615). In the lower (17C) map, the Bastille appears at the top, the Palais Royale is approximately in the centre. This is Paris in the time of Pierre VERNIER (1580-1637), J.Baptiste MORIN (1583-1656), Pierre GASSENDI (1592-1655) and René DESCARTES (1596-1650). Several later private observatories, listed under Fig. 255, may be pinpointed on this early map with the help of modern maps (see Figs. 252 and 258).

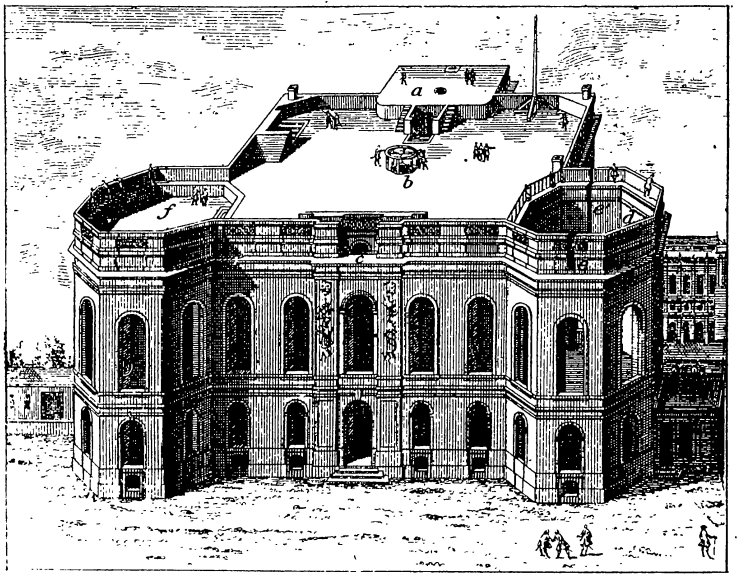


Fig. 251. Portrait of Jean-Dominique CASSINI by Durangel (Courtesy of Musée de l'Observatoire Paris, and Société Astronomique de France, publ. Sept. 1925. Also shown is the Paris Observatory, from *l'Histoire Celeste* by LeMonnier). CASSINI's contemporary, the eminent minister and financial advisor to Louis XIV, Jean Baptiste COLBERT (1619-1683) is depicted in a fine bust. It was COLBERT who effectively remoulded Paris with new roads and canals, and built up a powerful French naval and merchant fleet. COLBERT was influential in establishing glassworks, most important in the manufacture of optical instruments. French optical instrument makers could fulfill the requirements of the scientific and the new astronomical community. With the foundation of the Académie Royale des Science and the enthusiasm of French astronomer/technicians at the Paris Observatory (estab. 1667), there commenced two centuries of remarkable astronomical discoveries (see, in this French connection, the CASSINIs, FOUCAULT, the GUINANDs, the HENRYs, PRIN, REYNIER, SECRÉTAN).

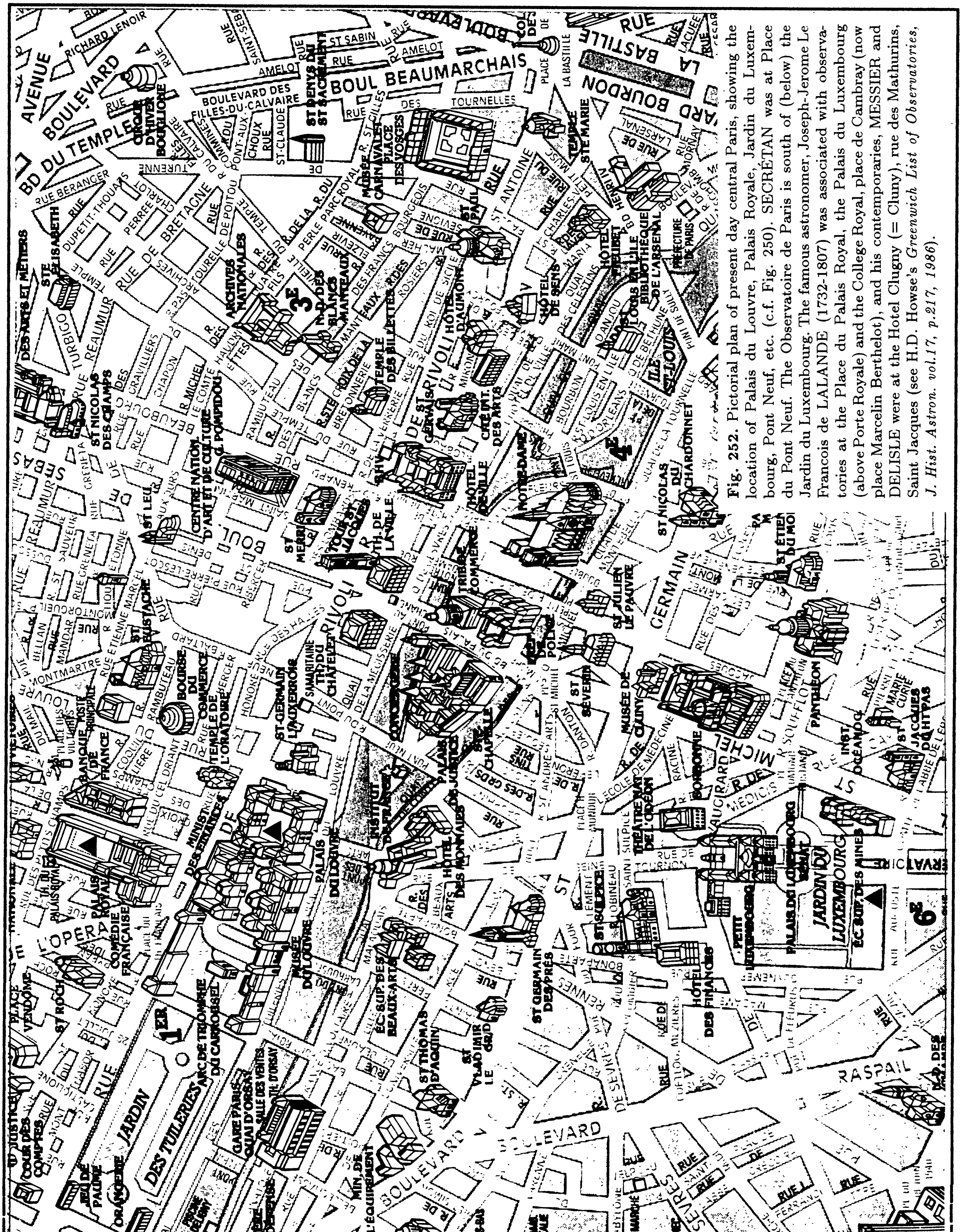
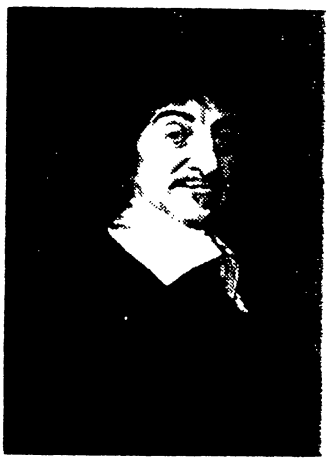
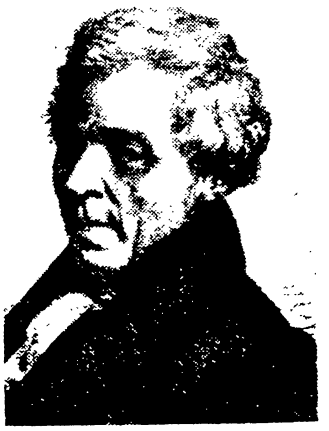


Fig. 252. Pictorial plan of present day central Paris, showing the location of Palais du Louvre, Palais Royale, Jardin du Luxembourg, Pont Neuf, etc. (c.f. Fig. 250). SECRÉTAN was at Place du Pont Neuf. The Observatoire de Paris is south of (below) the Jardin du Luxembourg. The famous astronomer, Joseph-Jerome Le Francois de LALANDE (1732-1807) was associated with observatories at the Place du Palais Royal, the Palais du Luxembourg (above Porte Royale) and the College Royal, place de Cambray (now place Marcelin Berthelot), and his contemporaries, MESSIER and DELISLE were at the Hotel Clugny (= Cluny), rue des Mathurins, Saint Jacques (see H.D. Howse's *Greenwich List of Observatories, J. Hist. Astron. vol.17, p.217, 1986*).

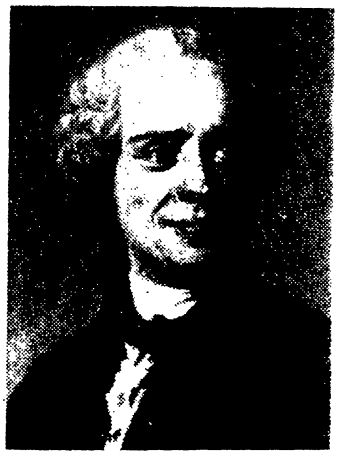


DESCARTES

Marquis de LAPLACE.

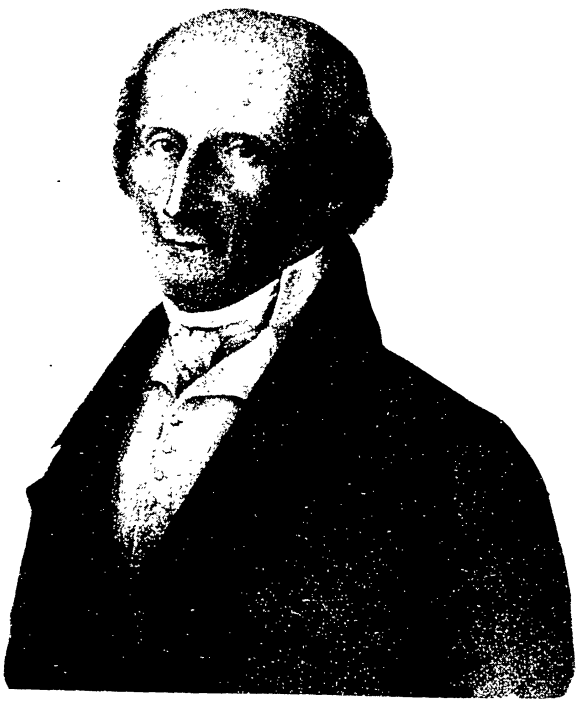


LAPLACE



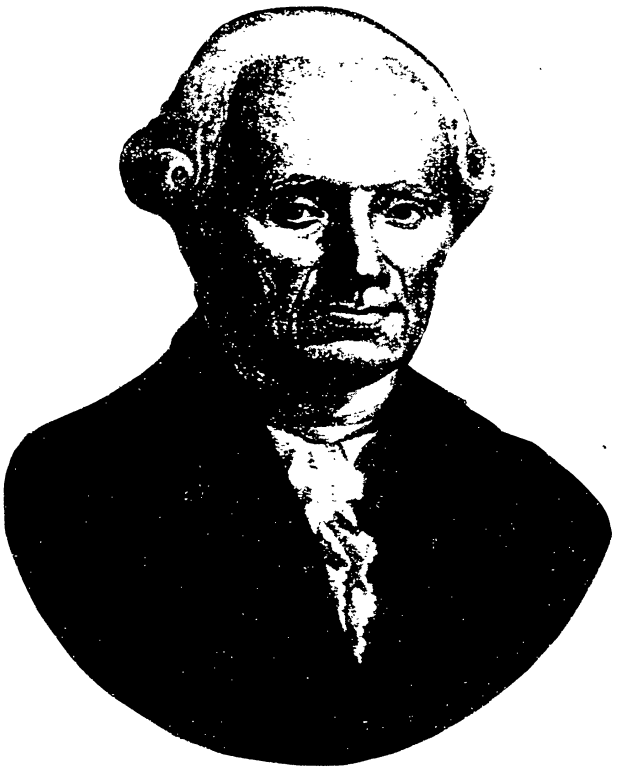
D'ALEMBERT

E. REYNIER.



GUINAND

Fig. 253. Portraits of the philosopher/ mathematicians, René DESCARTES (1596-1650) and Jean Le Rond d'ALEMBERT (1717-1783), the mathematician /astronomer, Pierre Simon LAPLACE (1749-1827, with and without his wig), and the two dedicated men who had a profound effect on French/Swiss optics, Pierre-Louis GUINAND (fl.c.1784-1824, famous for his flint glass) and his contemporary, E. REYNIER (see *Cyclop. Parts. 2 and 4*) are depicted.



MESSIER (1730-1817)

FRESNEL (1788-1827)

FLAMMARION (1842-1925),

LEVERRIER (1811-1877)

Fig. 254. Portraits of Charles MESSIER (1730-1817), Augustin FRESNEL (1788-1827) and Camille FLAMMARION (1842-1925), and the chemist/mathematician, Urbain Jean Joseph LEVERRIER (1811-1877) who, independently, but with John COUCH ADAMS (1819-1892), can claim mathematical credit for the discovery of Neptune in 1846 by Johann Gottfried GALLE and Heinrich Louis D'ARREST. FLAMMARION's popular writings on astronomy had a profound international impact on the man in the street, which, in turn, spurred the production of astronomical instruments. FLAMMARION, himself, with rich patronage, set up a 9-inch BARDOU telescope (see P. Moore's, Astronomy Yearbook 1995)

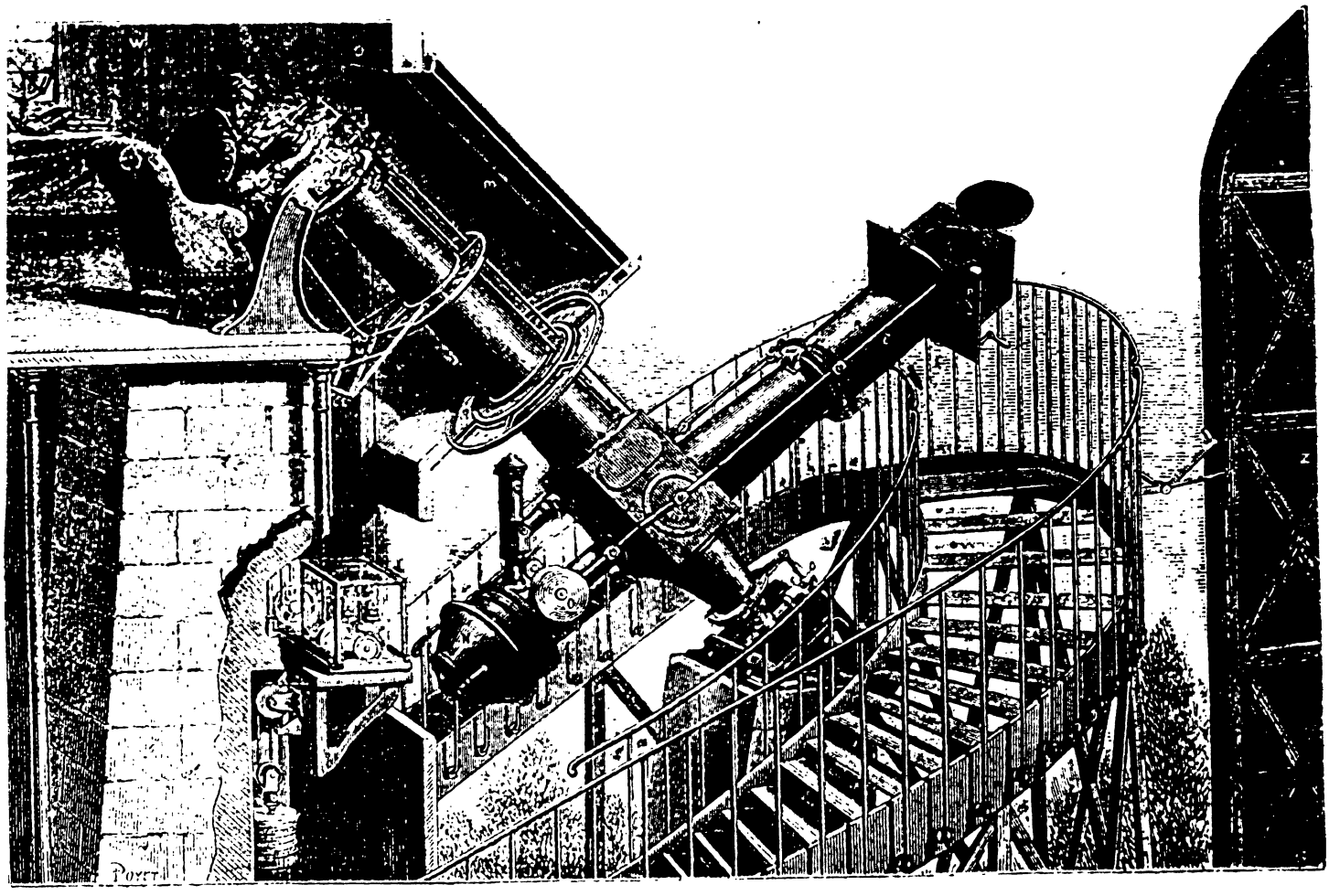


Fig. 255. One of the innovative giant telescopes in late-19C Paris was the LOEWY 10-inch Equatorial Coudé with optics by the HENRY brothers. It possessed 11-inch and 15.7-inch optical flat mirrors to divert the starlight to an observer sitting in a warm room (see Comptes Rendus 1883, vol.96, p.735). The LOEWY telescope was tested by GILL in 1884 (see *Encycl. Brit. 1875* under Telescope). We note that Thomas GRUBB had suggested a fixed focus siderostat earlier. Starting initially with aerial telescopes by CAMPANI, DIVINI and BORELLI (17C) and quadrants by COUPLE (1672) and LANGLOIS (mid 18C), the Paris Observatory acquired fine instruments by CHARITÉ, DOLLOND, Dom NOËL, BIRD, SISSON, LENOIR, RAMSDEN, SHORT, REICHENBACH, GAMBEY and REPSOLD (by 1843). There were private observatories at Palais du Luxembourg (1711-64), Rue des Postes (1731), Jardin du Convent des Capucins (1742-99), Cabinets de la Muette et de Passy (1756-86 and 1760-92, respect.), Place du Palais Royal (1770-75), Collége Royale (1775-1807), Rue Sainte-Avoye (1785-88) and Rue du Paradis (1787-99). The technical advances of FOUCAULT and others in the 19C, particularly with successful silvering of glass mirrors, brought giant telescopes to Paris, some mounted in the open air. See the 1.2 metre, f/6 MARTIN and EICHENS telescope (1875) in *Cyclopaedia Part 1, Fig. 40b, and Howse.*

Fig. 256. Several influential astronomers, opticians and men of science are depicted, FLAMMARION (founder of Société Astronomique de France), FAYE, DE LA GRYE, TISSERAND, JANSSEN, CORNU, CALLANDREAU, POINCARÉ, LIPMANN, CASPARI, DESLANDRES, BAILLAUD (SAF Presidents between 1887 and 1911. Courtesy SAF).

Fig. 257. More eminent French men of science, PUISEUX, PLUVINEL, APPELL, BONAPARTE, LALLEMAND, FERRIÉ, FICHOT, PERRIER, FABRY, ESCANGON, BAILLAUD (SAF Presidents between 1911 and 1937. Courtesy SAF). The Bureau des Longitudes' requirements spurred on the production of fine transit circles and meridian instruments in France and elsewhere.

CAMILLE FLAMMARION
Fondateur de la Société
(1887 à 1889).

HERVÉ FAYE
de l'Institut, Président du Conseil de
l'Observatoire de Paris (1889 à 1891).

O. CALLANDREAU
de l'Institut et de l'Observatoire de Paris
(1899 à 1901).

HENRI POINCARÉ
de l'Académie des Sciences
et de l'Académie Française
(1901 à 1903).

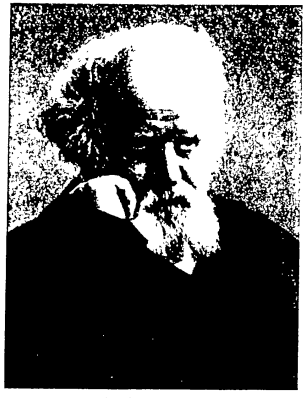
BOUQUET DE LA GRYE
de l'Institut et du Bureau des Longitudes
(1891 à 1893).

F. TISSERAND
de l'Institut, Directeur de l'Observatoire
de Paris (1893 à 1895).

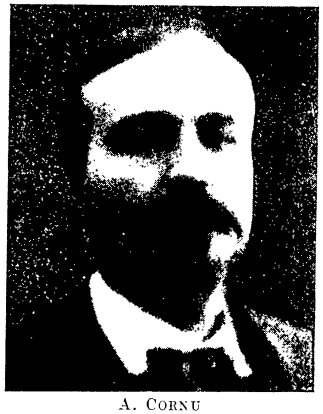
Fig. 256.

G. LIPPMANN
de l'Institut et du Bureau des Longitudes
(1903 à 1905).

ED. CASPARI
Ingénieur hydrographe en chef
de la Marine (1905 à 1907).

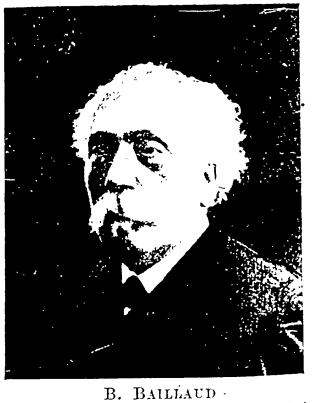


J. JANSSEN
de l'Institut, Directeur de l'Observatoire
de Meudon (1895 à 1897).



A. CORNU
de l'Institut et du Bureau des Longitudes
(1897 à 1899).

H. DESLANDRES
de l'Institut, Directeur de l'Observatoire
de Paris-Meudon (1907 à 1909).



B. BAILLAUD
de l'Institut, Directeur de l'Observatoire
de Paris (1909 à 1911).

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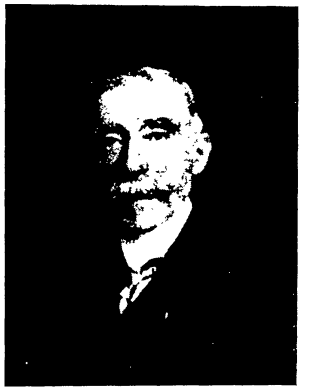
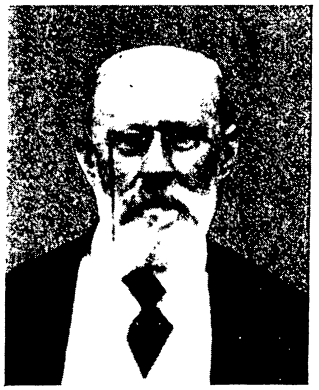
PIERRE PUISEUX
Membre de l'Institut,
Astronome à l'Observatoire de Paris
(1911 à 1913).

DE LA BAUME PLUVINEL
Membre de l'Institut.
Président du Comité National Français
d'Astronomie (1913 à 1919).

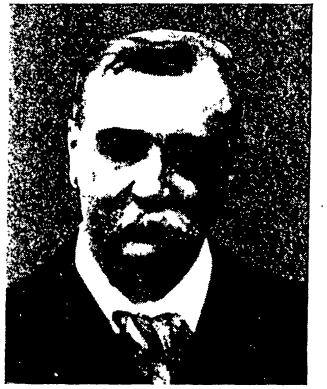


E. FICHOT
Membre de l'Institut, Directeur Général
du Service Hydrographique
de la Marine (1927 à 1929).

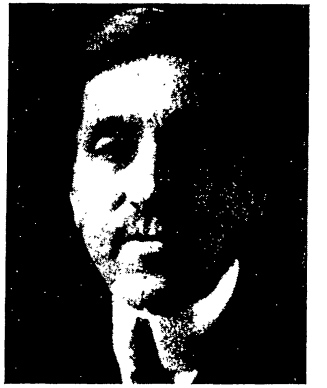
GÉNÉRAL G. PERRIER
Membre de l'Institut, Professeur de
Géodésie et d'Astronomie à l'Ecole
Polytechnique (1929 à 1931).



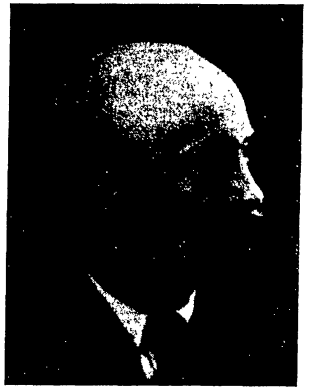
P. APPELL
Membre de l'Institut et du Bureau des
Longitudes, Recteur de l'Académie
de Paris (1919 à 1921).



PRINCE BONAPARTE
Membre de l'Institut
(1921 à 1923).

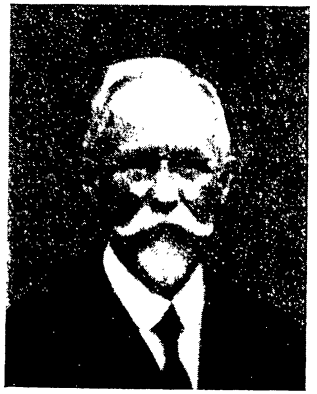


CH. FABRY
Membre de l'Institut, Professeur
à la Sorbonne, Directeur Général
de l'Institut d'Optique.
(1931 à 1933).



E. ESCLANGON
Membre de l'Institut,
Directeur de l'Observatoire
de Paris-Meudon (1933 à 1935).

Fig. 257.



CH. LALLEMAND
Membre de l'Institut et du Bureau
des Longitudes, Directeur du
Nivellement Général de la France.
(1923 à 1925).

GÉNÉRAL FERRIÉ
Membre de l'Institut.
Inspecteur Général de la Télégraphie
Militaire
(1925 à 1927).

JULES BAILLAUD
Astronome titulaire de l'Observatoire de Paris
(1935-1937).

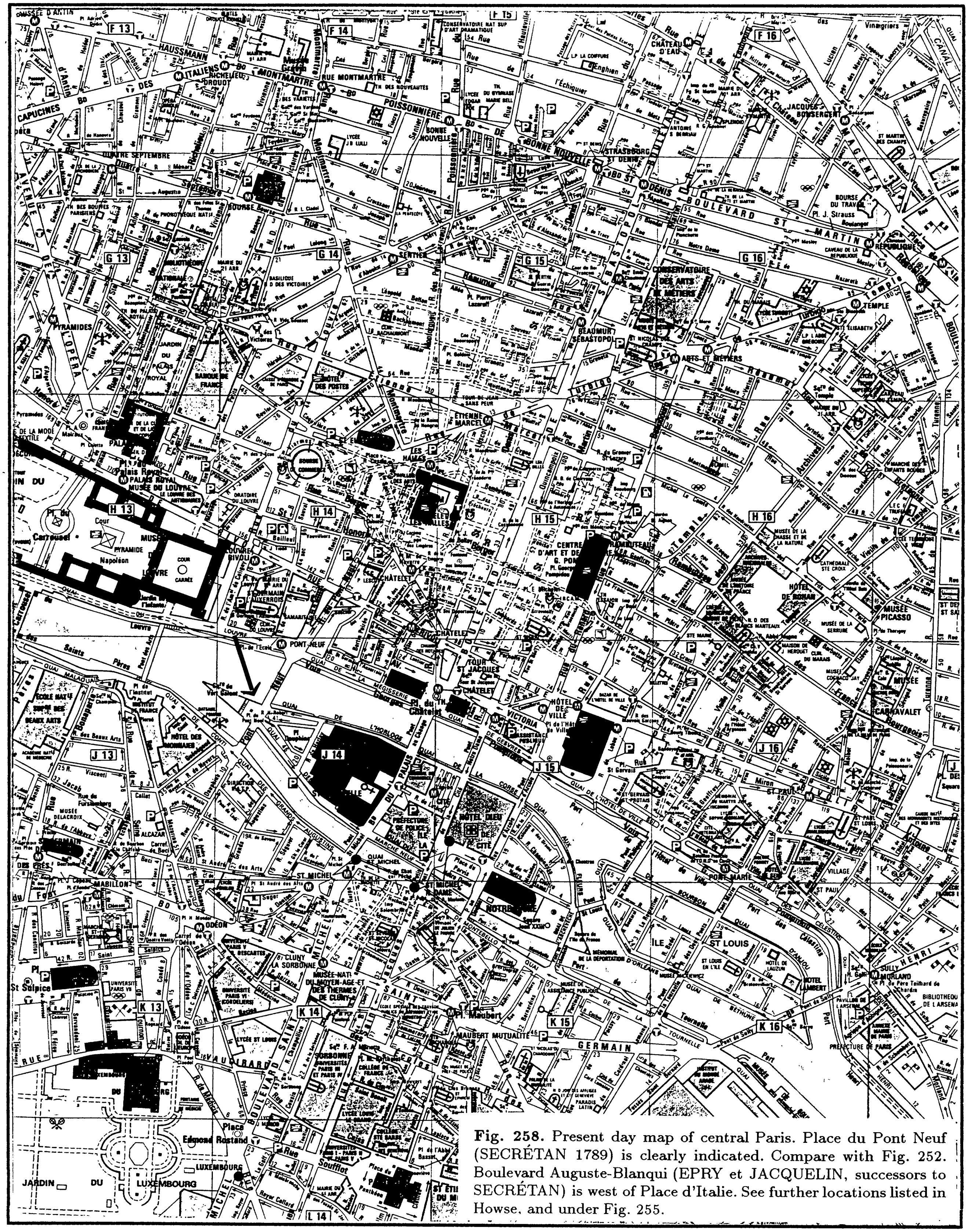


Fig. 258. Present day map of central Paris. Place du Pont Neuf (SECRÉTAN 1789) is clearly indicated. Compare with Fig. 252. Boulevard Auguste-Blanqui (EPRY et JACQUELIN, successors to SECRÉTAN) is west of Place d'Italie. See further locations listed in Howse, and under Fig. 255.

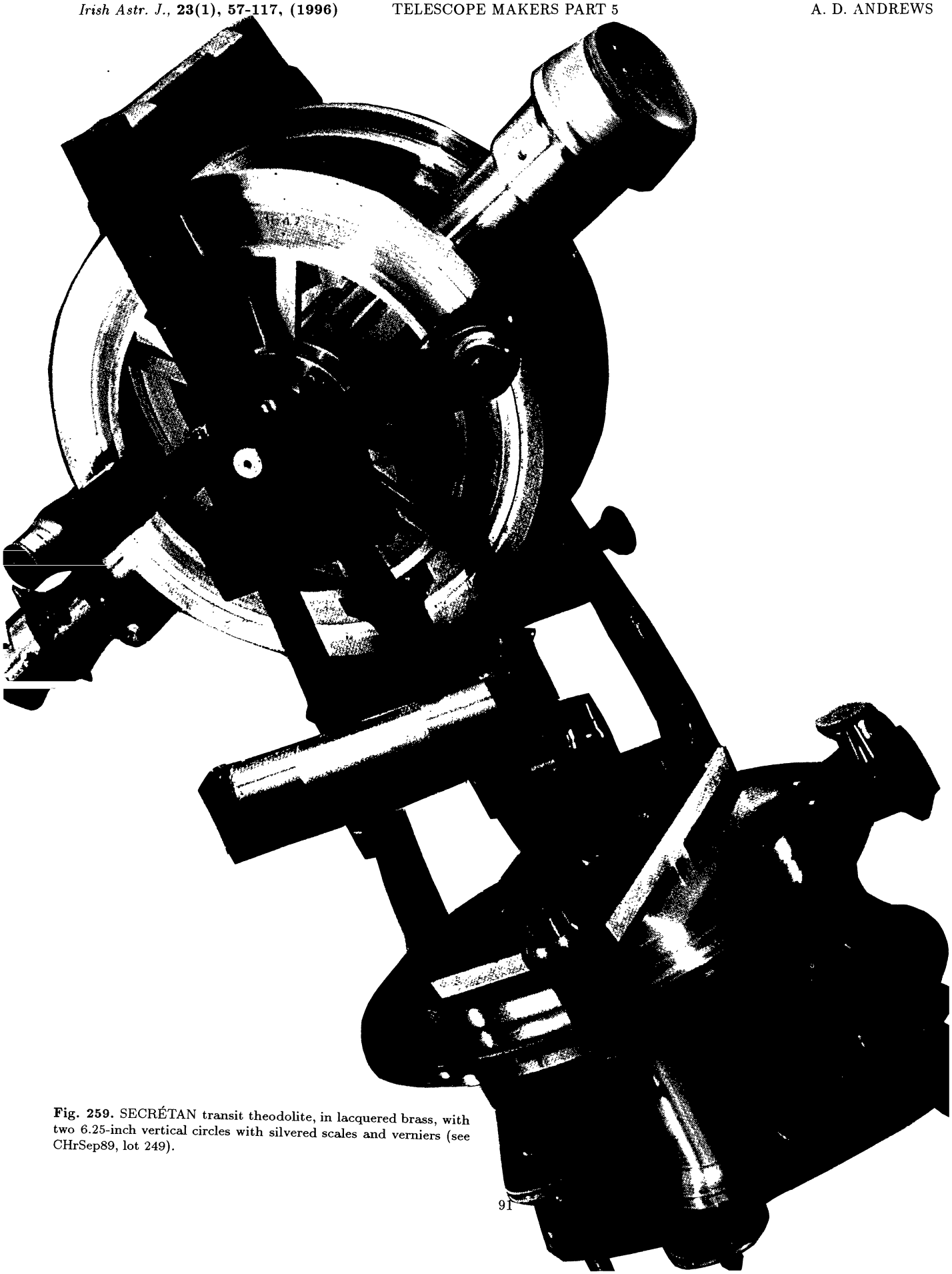


Fig. 259. SECRÉTAN transit theodolite, in lacquered brass, with two 6.25-inch vertical circles with silvered scales and verniers (see CHrSep89, lot 249).

Ancienne Maison LEREBOURS & SECRÉTAN

Fondée en 1795, 13, Place du Pont-Neuf

SECRÉTAN

40, rue Hallé (XIVe)

PARIS

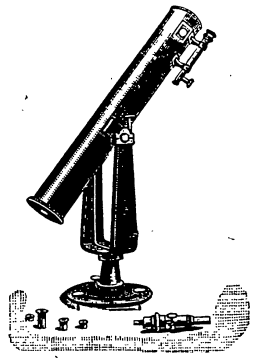
C. EPRY, Constructeur, Succr

Instruments pour les Sciences spécialement: Lunettes terrestres et astronomiques. Cercles méridiens. Coelostats. Jumelles pour l'étude du ciel, etc., etc.

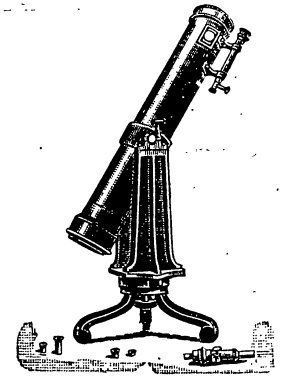
Objectifs de toutes dimensions, crown & flint de Para-Mantois, retouchés et vérifiés par un astronome de l'Observatoire de Paris.

Réflecteur nouveau modèle (offert à la *Société Astronomique de France* pour son Observatoire de l'Hôtel des Sociétés Savantes), miroir de 125 millimètres de diamètre, 1 mètre de distance focale, 3 oculaires grossissant 80, 180 et 280 fois. — Prix : **450** fr.

Réflecteur dit Télescope Foucault de 160mm, 200mm et 250mm de diamètre, distance focale 1 mètre, 1 m. 20 et 2 mètres, grossissements de 120 à 600 fois — Prix : **1.000, 1.750** et **2.500** fr.



Télescope nouveau modèle.



Télescope Foucault.

LUNETTES ASTRONOMIQUES & TERRESTRES

selon M. Camille FLAMMARION

Objectif de 75mm : 3 oculaires, 50, 80 et 150 grossissements. Boîte et trépied cuivre, avec chercheur..... Prix **265** fr.

Objectif de 95mm : 4 oculaires, 60, 80, 150, 240 grossissements. Boîte et trépied cuivre, avec chercheur..... Prix **485** »

Objectif de 110mm : 4 oculaires, 80, 100, 160, 250 grossissements. Boîte et trépied cuivre, avec chercheur..... Prix **735** »

Objectif de 135mm : 5 oculaires, 115, 140, 210, 300, 400 grossissemts Prix **1.450** »

Ces deux dernières lunettes montées équatorialement. Prix **1.550** et **2.200** »

Envoi Franco du Catalogue

C. EPRY, 40, Rue Hallé, PARIS (XIVe)

ASTRONOMIE - GÉODÉSIE - TOPOGRAPHIE

Ancienne Maison LEREBOURS et SECRÉTAN

Fondée en 1789 13, Place du Pont-Neuf

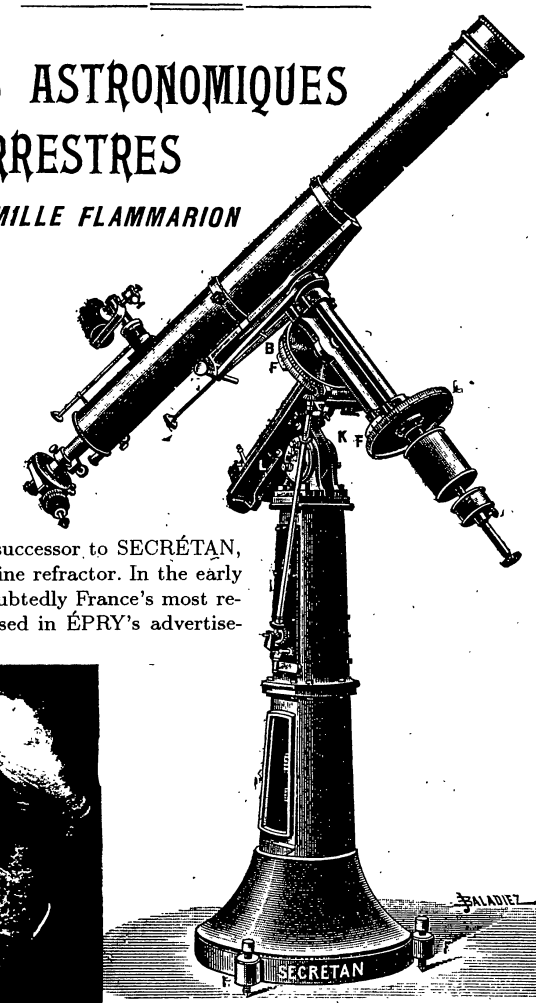
SECRÉTAN

40, Rue Hallé (XIVe)

Ch. ÉPRY, Constructeur, Succr

LUNETTES ASTRONOMIQUES ET TERRESTRES

Selon M. CAMILLE FLAMMARION



Envoi franco
DU NOUVEAU
Catalogue illustré
SUR DEMANDE

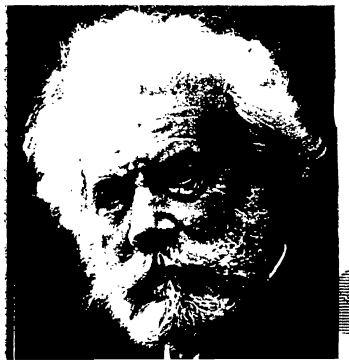


Fig. 260. Advertisements from ÉPRY, successor to SECRÉTAN, showing two reflecting telescopes and a fine refractor. In the early 1900s, the name, FLAMMARION, undoubtedly France's most respected gentleman astronomer, was utilised in ÉPRY's advertisements.

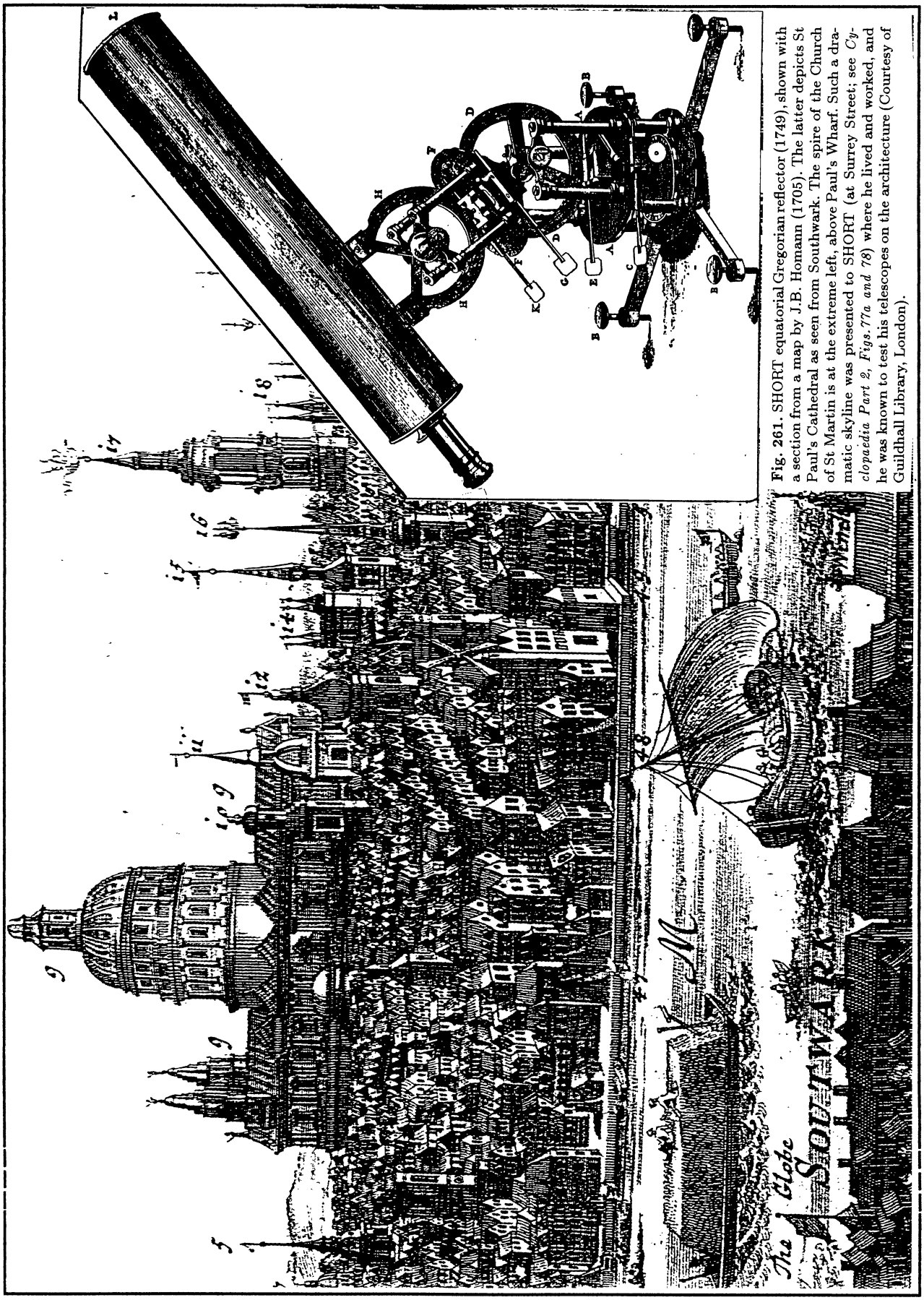


Fig. 261. SHORT equatorial Gregorian reflector (1749), shown with a section from a map by J.B. Homann (1705). The latter depicts St Paul's Cathedral as seen from Southwark. The spire of the Church of St Martin is at the extreme left, above Paul's Wharf. Such a dramatic skyline was presented to SHORT (at Surrey Street; see *Cyclopædia Part 2, Figs.77a and 78*) where he lived and worked, and he was known to test his telescopes on the architecture (Courtesy of Guildhall Library, London).

Fig. 262. James SHORT (1710-68), eminent maker of reflecting telescopes. This Scots speculum maker came to live permanently in London in 1738.

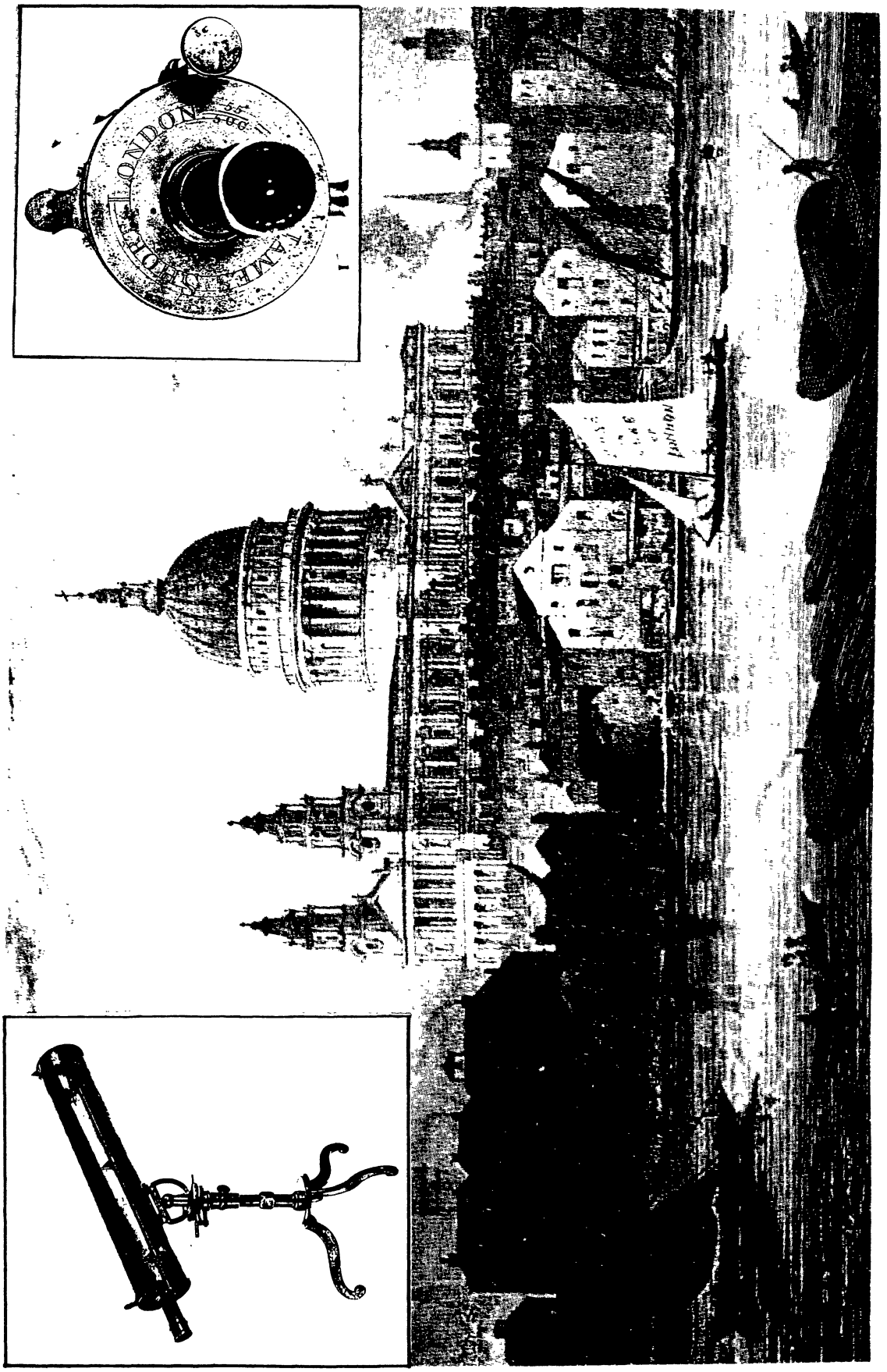


Fig. 263. A SHORT reflecting telescope and and a detail of the inscribed back plate. The 3-inch reflecting telescope, 18 inches long, signed by James SHORT (senior) on the back plate, was sold in a fine mahogany veneered oak case (see CHrJul92). It is inscribed with SHORT's code, 55/500 = 12, and is from c.1747. The backcloth is similar to that in Fig.261 a century later (Shepherd 1819).

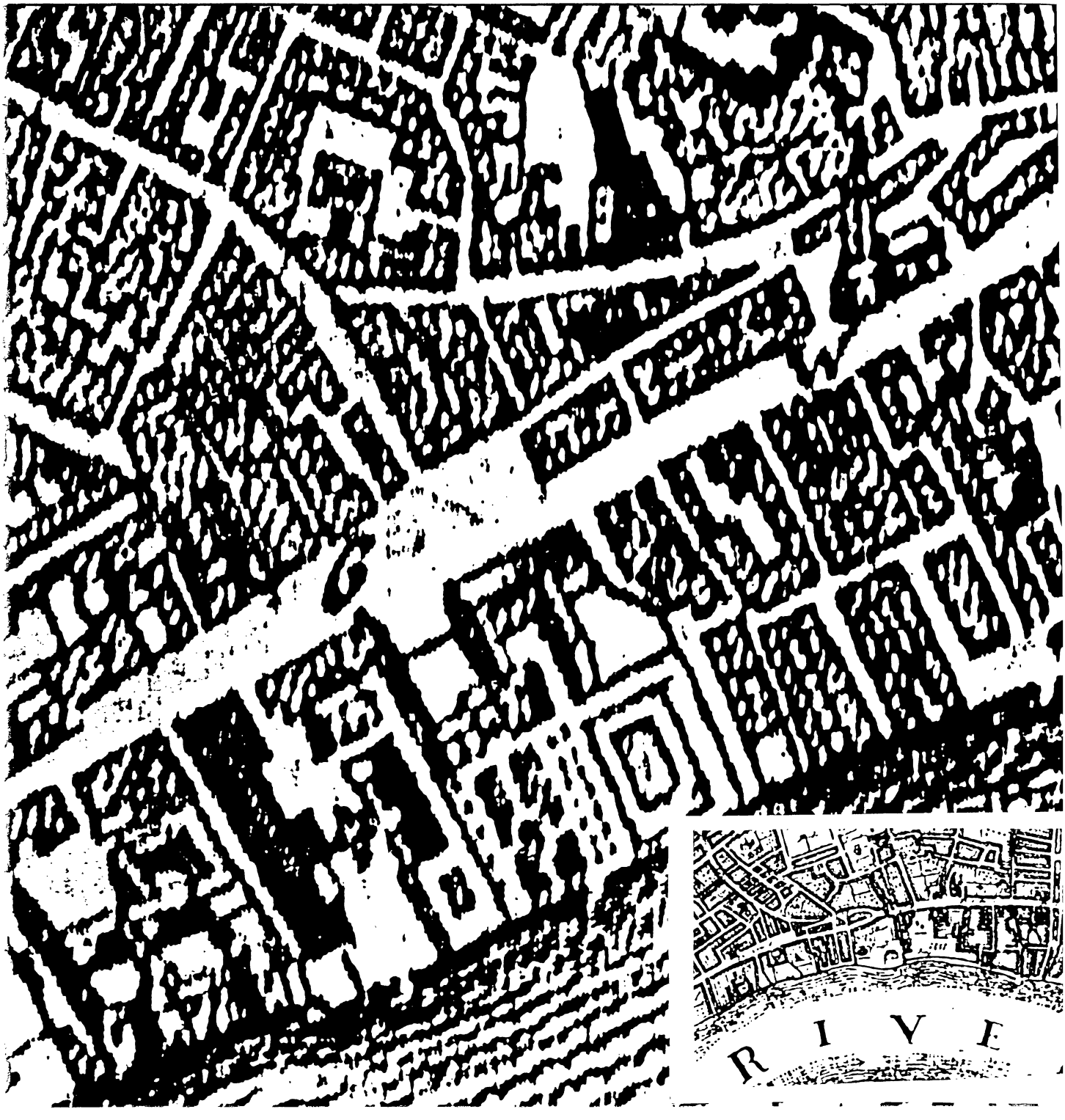


Fig. 264. James SHORT set up business in a thriving but lowly part of London. Remarkable changes had taken place around Surrey Street (c.f. Homann 1705 and Senex 1720 inset). The area shown is that to the left of Figs. 261 and 263 at the riverside.

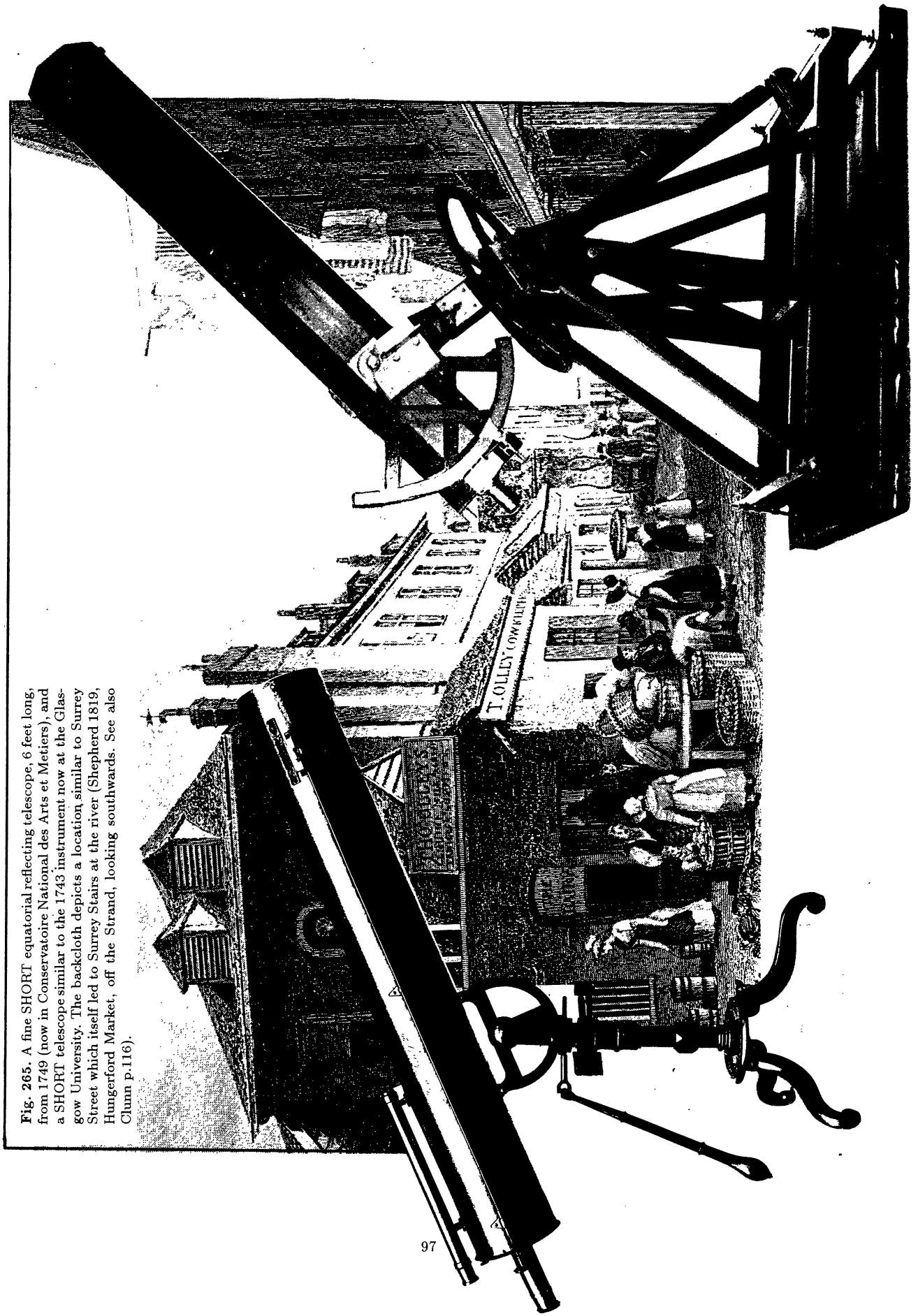


Fig. 265. A fine SHORT equatorial reflecting telescope, 6 feet long, from 1749 (now in Conservatoire National des Arts et Metiers), and a SHORT telescope similar to the 1743 instrument now at the Glasgow University. The backcloth depicts a location similar to Surrey Street which itself led to Surrey Stairs at the river (Shepherd 1819, Hungerford Market, off the Strand, looking southwards. See also Clunn p.116).

Fig. 266. Map of Birmingham (1843) showing Coleshill Street (No.44), and nearby Litchfield Street, where SIMMS' forebears lived and worked (c.1780). (From *Soc. Diffusion for Useful Knowledge.* See also Mennim's biography of SIMMS for a 1781 map). The SIMMS family had many connections in London, e.g. in White Cross Street, north of St Giles.

by LEE at Hartwell, on the 5.9-inch TULLEY telescope. [31] SHEEPSHANKS assisted TROUGHTON in engineering tasks, and was a valuable friend to SIMMS. He is remembered in the great 12.5-inch Sheepshanks polar coudé telescope (designed by GRUBB, photo-visual triplet by H. D. TAYLOR) at the Observatories, Cambridge, England. Also, there was the 6.7-inch Sheepshanks equatorial used by the Astronomer Royal AIRY.

SHORT James (I) - eminent Scots optician and telescope maker, b.1710, d.1768, flourished in *Edinburgh* (1734-38), and later, *Surrey Street, Strand, London, overlooking the river Thames* (1738-68). [32]

A most celebrated personality he accrued a fortune by supplying excellent instruments (about 1360) to amateurs and professionals. He had received early encouragement from the mathematician Colin MACLAURIN, and subsequently from both the Earls of MACCLESFIELD and MORTON. Usually Gregorians, his telescopes contained specula thought to have been made always by himself. [33]

SHORT James (II) - born in *Virginia*, 1752, d.1774-1776. He lived in James (I)'s *Surrey Street* house until 1773. Probably acted as telescope retailer in *London*. He was the nephew of James (I). He probably only assembled his uncle's telescopes (after 1768). Returning to *Edinburgh* in 1776(?), he founded the *Calton Hill Observatory*. [34]

SHORT Thomas - optician , telescope maker, brother of James (I), probably managing James (I)'s shops, *Foot of the Broad Wynd, Leith* (1748), and *Surrey Street, London* (1768-76), b.1711, d.1788. [35]

SHEW Henry - apprenticed (1842) to John DOBSON, optician, Merchant Taylors' Co. of *London*, 19C. [36]

SHUCKBURGH George Augustus William (Sir) - English gentleman astronomer, *Shuckburgh, Warwickshire*, 1751-1804. RAMSDEN completed the exquisite 4.1-inch English equatorial (with two pillars and an 8-foot polar axis) for SHUCKBURGH in 1791. [37]

SHUTTLEWORTH Henry Raines - instrument maker, apprenticed to John CUFF in 1746, worked at *27 Ludgate Street, London*, where BLEULER was later to be found, b.c.1732, d.1811. SHUTTLEWORTH's son continued in the business. [38]

SIGLER R - optical designer, 20C. He modified the MAKSUTOV system (1970), hence the name SIMAK today. [39]

SIMMS James (I) - grandfather of the famous William SIMMS (II), who was trading in *Birmingham* (b.1710, d.1795), but came to *London* in later life. [40]

SIMMS William (I) - father of the famous William SIMMS (II), who was trading as a gold and silversmith, dial and compass maker, *Birmingham* (1793), *London* (1794), *Bowman's Buildings, Aldersgate Street, London* (1808-12), *4 Broadway, Blackfriars, London* (1818-22), *44 Coleshill Street, Birmingham* (1780-81), b.1763, d.1828. [41]

SIMMS William (II) - eminent English optical and mathematical instrument maker, astronomical, nautical and surveying instruments, freed 1815, *136 Fleet Street, London* (1828-43), *138 Fleet Street and adjoining Peterborough Court* (1843-46), b.1793, d.1860. He dwelt at *Bowman's Buildings, Aldersgate, London, and 14 Camden Cottages* (1823), and *Lower Islington Terrace* (1824), with original workshop in *Aldersgate*. SIMMS was co-founder of TROUGHTON and SIMMS with Edward TROUGHTON (1826), and provided major instruments to the Royal Observatory at Greenwich. He, together with his son (William (III), b.1817), was engaged in the construction of the famous TROUGHTON and SIMMS theodolites for the surveys of England, Ireland and India, mural circles, altazimuths and transits for worldwide observatories; the firm provided instruments, graduated circles and precision parts for equatorials for many individuals and institutes, and, of course, for the Northumberland Equatorial for Cambridge (1839) and the Great Equatorial for Greenwich (1859). SIMMS (and TROUGHTON until he died) was associated, thereby, with names like COLBY (surveying), AIRY, SOUTH, SCHUMACHER, GAUSS, SHEEPSHANKS, WROTTESLY, CARRINGTON, DAWES and famous institutes at Edinburgh, Brussels, Liverpool, Lucknow, Washington, West Point, Oxford, Harvard, Cape, Melbourne, Madras and Sydney. The firm TROUGHTON and SIMMS was operating from *Charlton Works, Woolwich* by 1866, but by 1922 the firm was bought out by T. COOKE and SONS York (under VICKERS control) becoming COOKE, TROUGHTON and SIMMS Ltd. [42] By 1916 COOKE [43] was already a major holder in Adam HILGER Ltd., and C. BAKER Ltd. at Croydon and CASELLA were

[31] George DOLLOND made the replacement polar axis to take the SHEEPSHANKS clockdrive. See King p.194, and *Cyclopaedia Part 3, Irish Astr. Journ. vol.21, p.185, Figure 128.*

[32] The Hackney coach office was at the bottom of Surrey Street at the Surrey Stairs on the River Thames at the end of the 18C.

[33] See SIMON. Also D.J. Bryden, *James Short and his Telescopes*, Roy. Scot. Museum 1968. The earliest SHORT reflector (with serial number) is from 1734, and a few are inscribed 1735 (without serial number). See Clarke et al.'s *Brass and Glass, NMS 1989* (hereafter BG). See also CHrMar89, CHrApr88, CHrDec89.

[34] Bryden 1968, and G.L'E. Turner in SIMON. Note uncertainty concerning Calton Hill date. Perhaps he died the same year.

[35] See SIMON. Thomas SHORT is associated with the dual-observer innovation. Also at Armagh Observatory there is a 6-inch reflecting telescope by Thomas SHORT (serial number 2/1371 = 24) employing a triple system (alternative Newtonian, Gregorian and Cassegrain). See J. McFarland, regarding the George III collection, *Historical Instruments of Armagh Observatory. Vistas vol.33, p.149, 1990.*

[36] See CHrNov86, lot 127, a 1.25-inch 3-draw brass telescope with mahogany covered tube is signed by SHREW, possibly a typographical error.

[37] Bennett p.126. It was said that RAMSDEN's equatorial was not of great scientific value when transferred to the Royal Observatory in 1811, although its influence on future design was highly significant.

[38] Daumas p.322.

[39] See Wallis and Provin's *A Manual of Advanced Celestial Photography* (hereafter MACP).

[40] See Mennim's *Transit Circle* for the *Birmingham* connection. The SIMMS family had a prodigious birthrate.

[41] SIMON. Mennin records that William (I) and wife, Sarah, moved to *Whitecross Street* where James (I) had a workshop at his house.

[42] COOKE, TROUGHTON and SIMMS (without the Ltd.) was retained for opthalmic work.

[43] The great Dennis TAYLOR of COOKEs had retired in 1915.

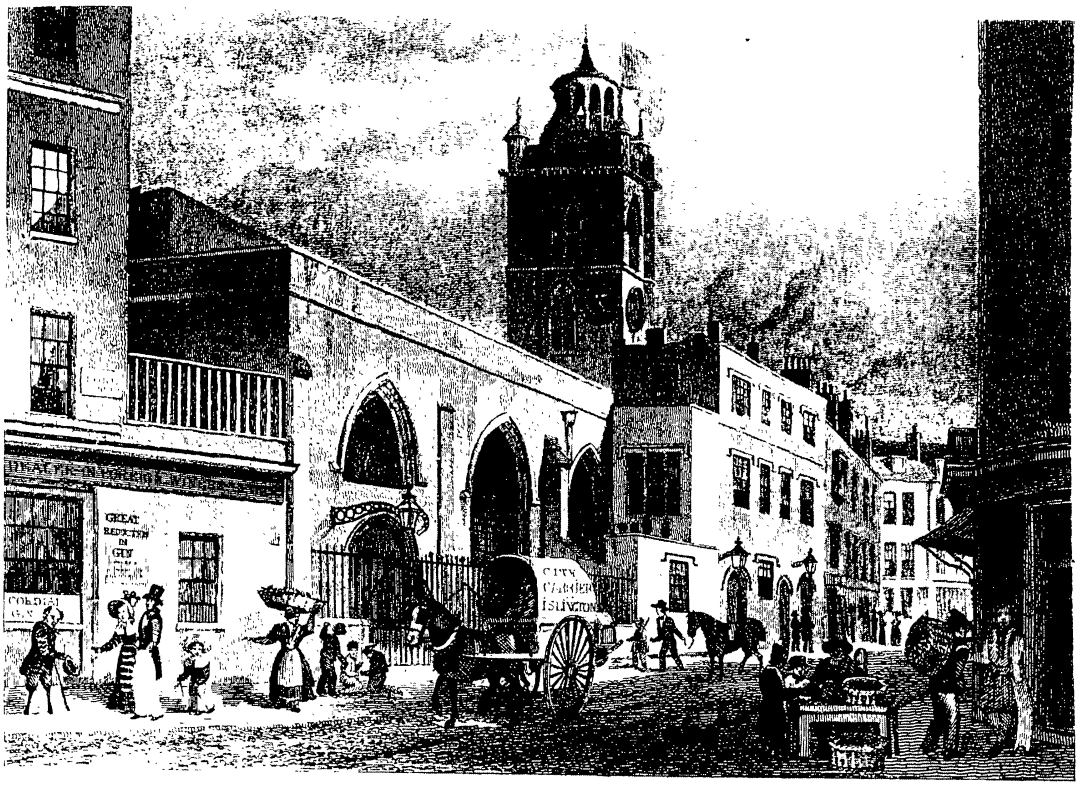


Fig. 267. SIMMS' London; St Gile's Cripplegate, at the west end of Fore Street, and another view from Fore Street on market day. The map depicts Fore Street, and Doby Court in Monkwell Street (south of St Giles). The famous SIMM's father and grandfather lived here. Sadly, the Museum of London and the Barbican Theatre dominate this historical area near the old London Wall today.

Fig. 268. William SIMMS 1793-1860. An early TROUGHTON and SIMMS equatorial telescope is shown, and the backcloth is from Aldersgate Street, approximately opposite Bowman's Buildings where SIMMS lived at the beginning of his career. SIMMS was initially a pupil of BENNETT, one of RAMSDEN's men, but was apprenticed to Thomas PENSTONE c.1808, and then to his father, also William, and freed in 1815. One of SIMMS' finest instruments was the AIRY 8-inch f/17 telescope (still in use in 1870) with a 6-foot cast-iron circle graduated to 1 arcsecond. SIMMS employed a self-acting steam engine machine for dividing the circles (see Fig. 273).

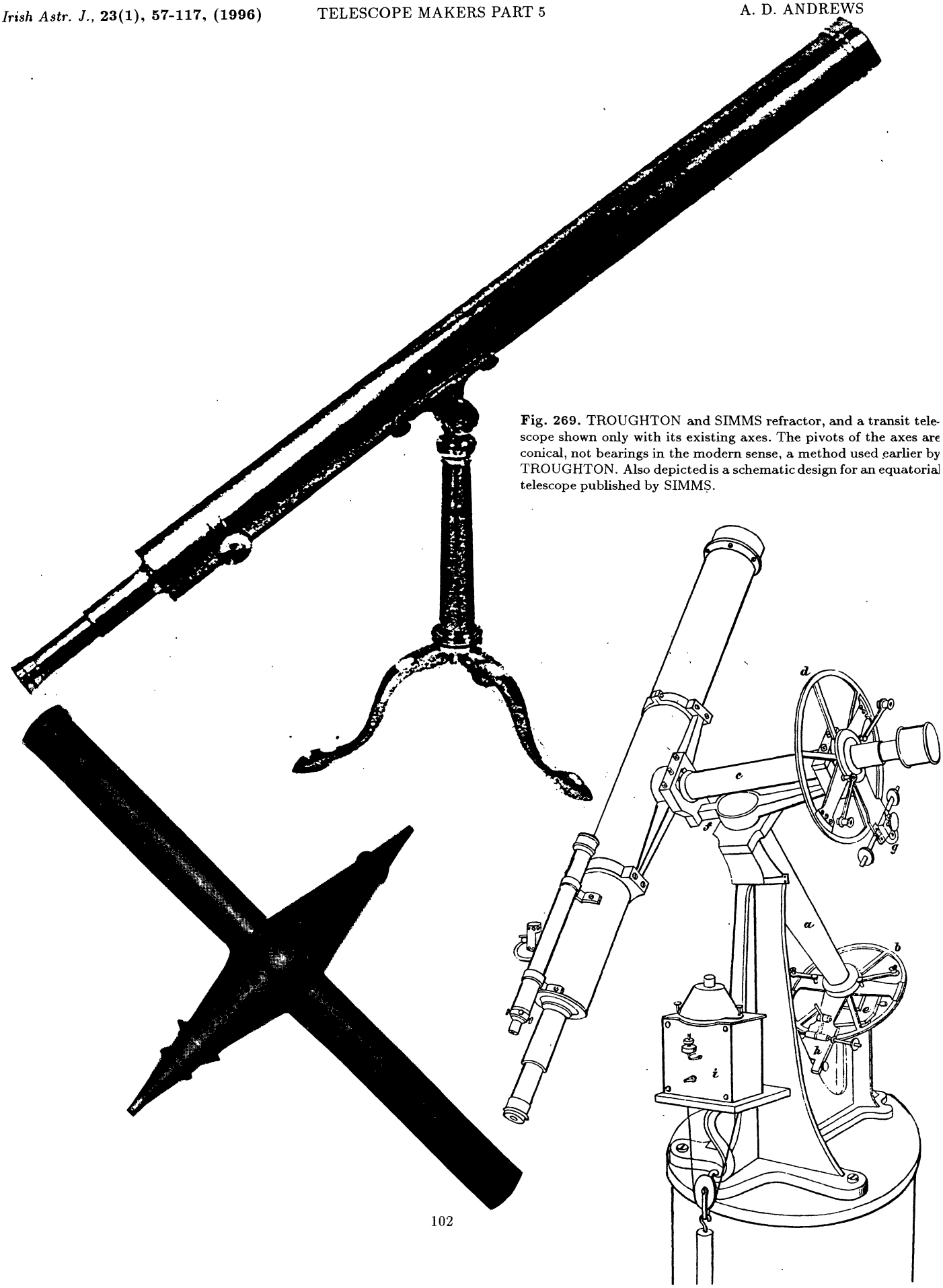


Fig. 269. TROUGHTON and SIMMS refractor, and a transit telescope shown only with its existing axes. The pivots of the axes are conical, not bearings in the modern sense, a method used earlier by TROUGHTON. Also depicted is a schematic design for an equatorial telescope published by SIMMS.

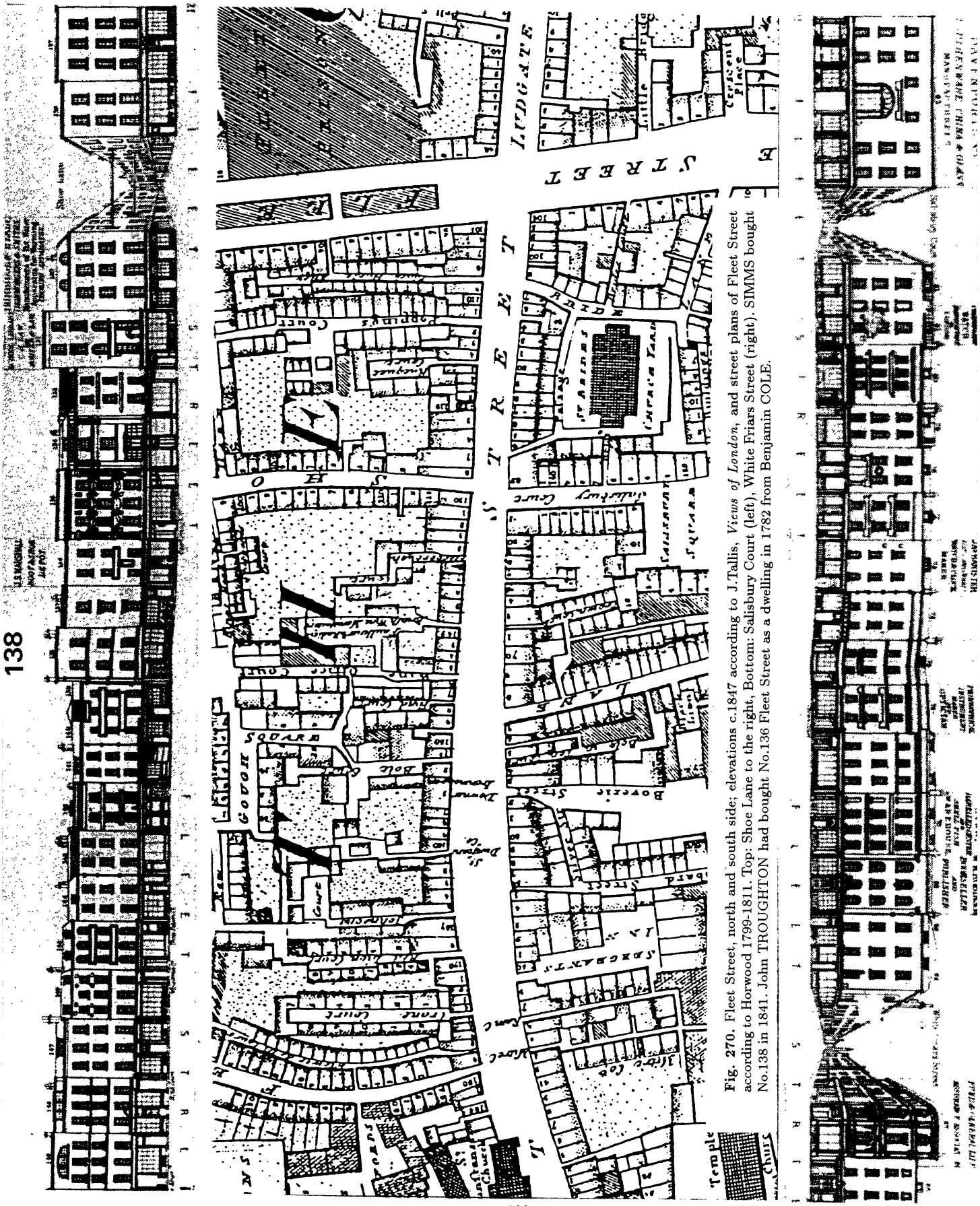


Fig. 270. Fleet Street, north and south side; elevations c.1847 according to J.Tallis, *Views of London*, and street plans of Fleet Street according to Horwood 1799-1811. Top: Shoe Lane to the right, Bottom: Salisbury Court (left), White Friars Street (right). SIMMS bought No.138 in 1841. John TROUGHTON had bought No.136 Fleet Street as a dwelling in 1782 from Benjamin COLE.

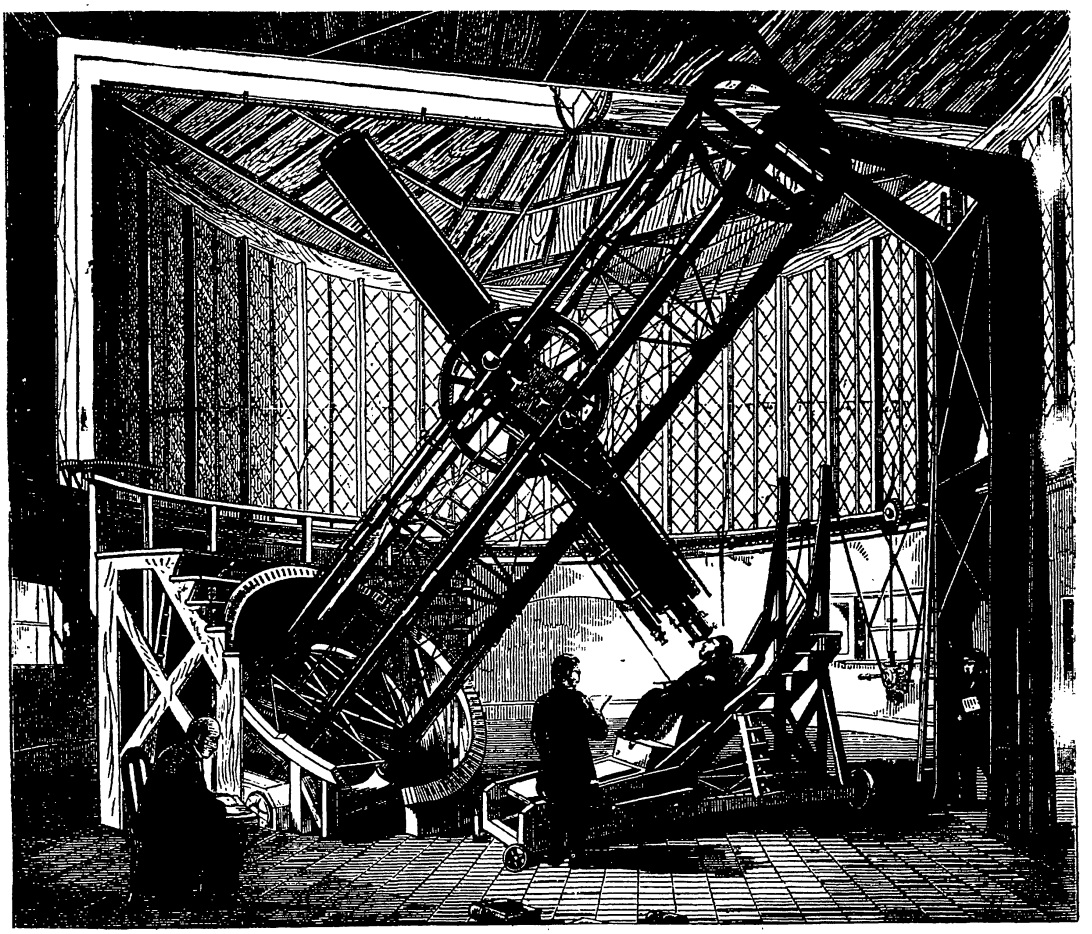
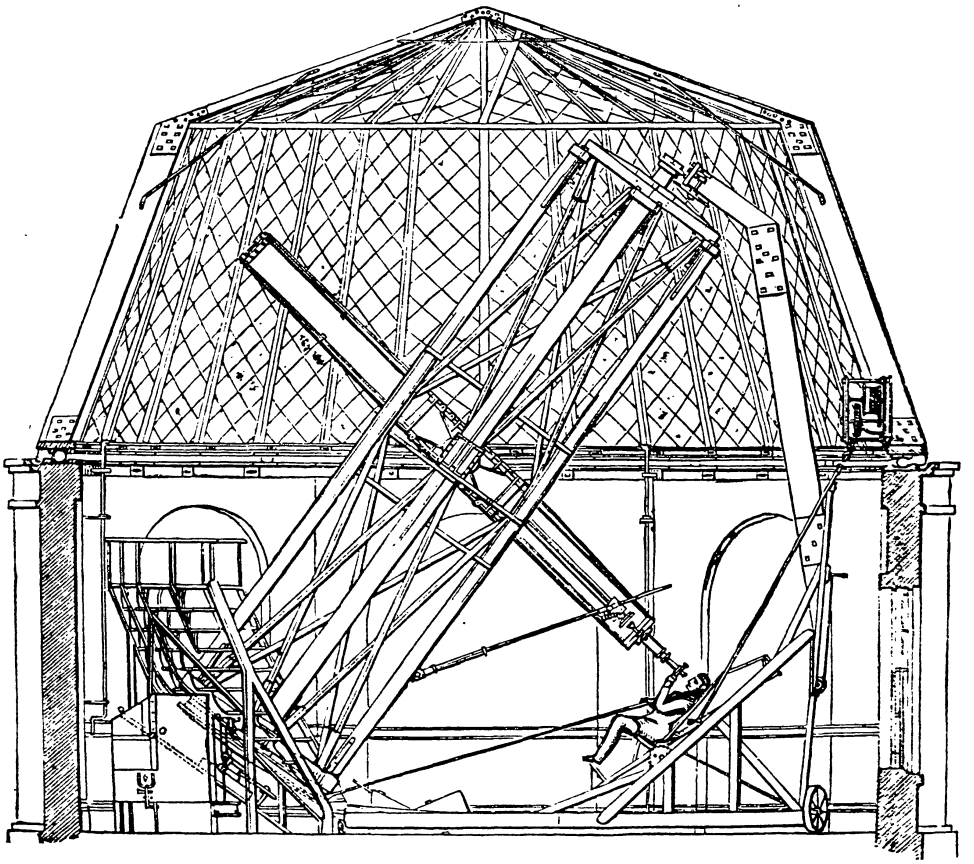


Fig. 271. Engraving of the Great Equatorial Telescope (Greenwich) and the Northumberland Telescope (Cambridge).



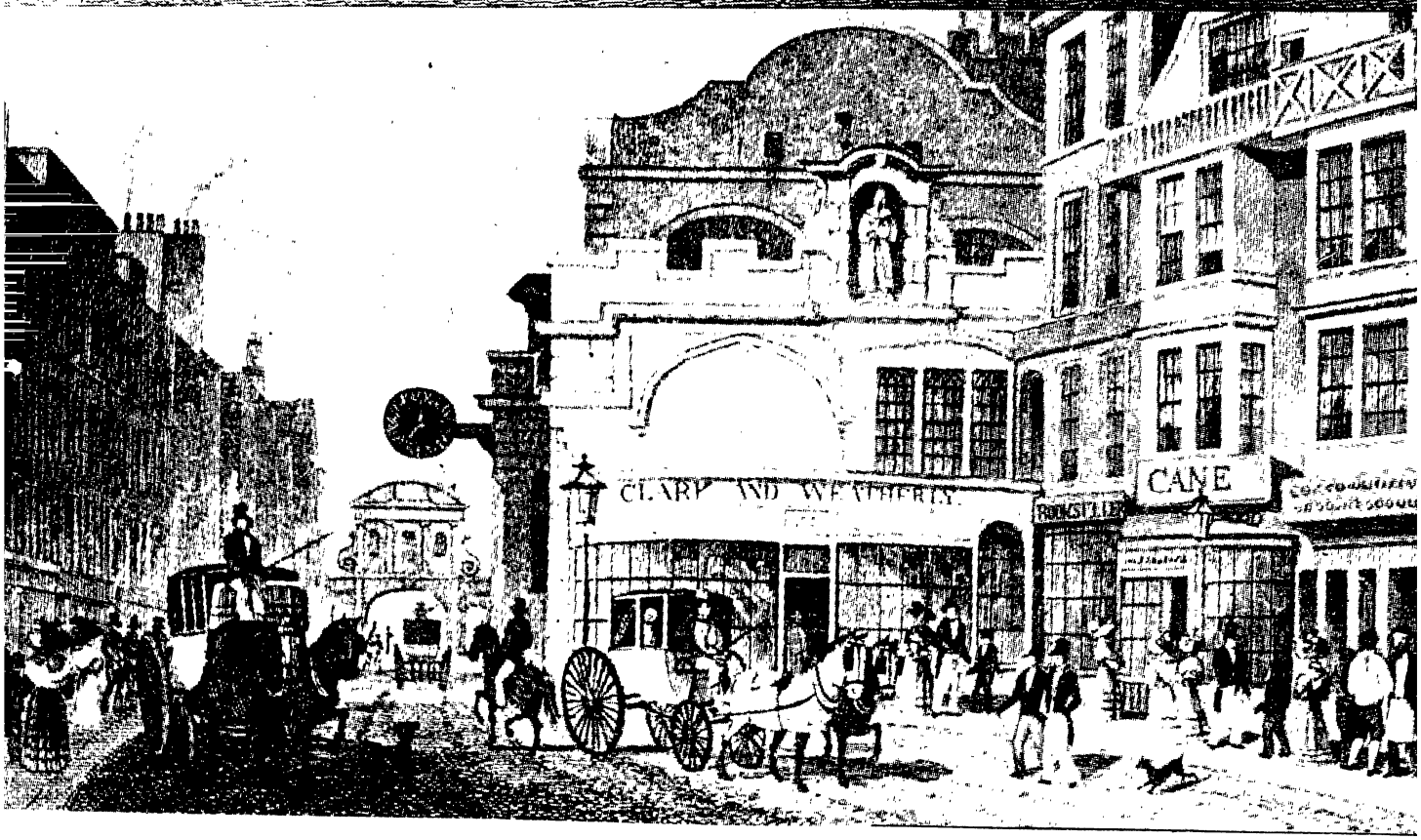


Fig. 272. Two views of Fleet Street (Shepherd 1829); Fleet Market from Holborn Bridge (over Fleet Ditch) looking east, and Fleet Street with Temple Bar in the distance (looking west).

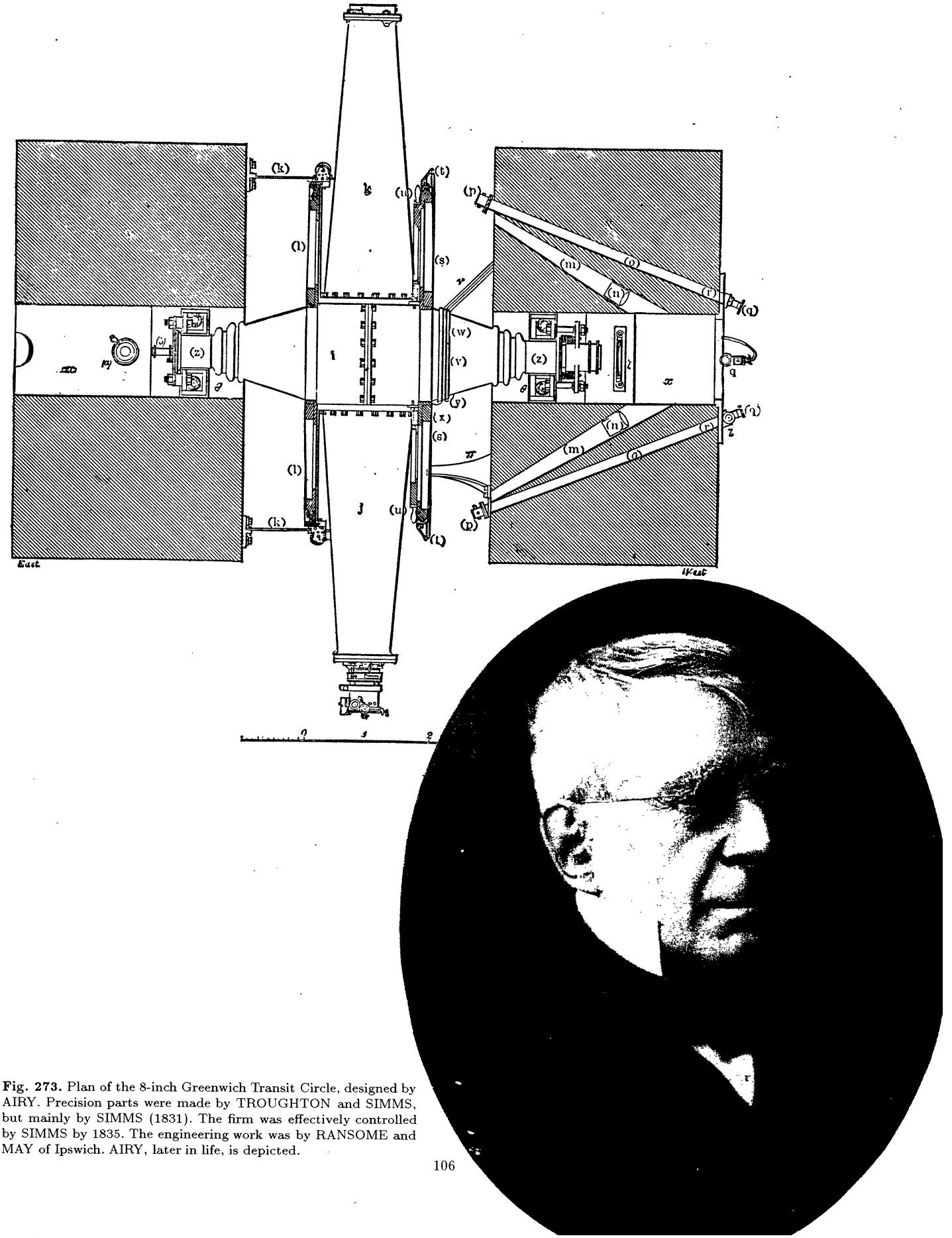


Fig. 273. Plan of the 8-inch Greenwich Transit Circle, designed by AIRY. Precision parts were made by TROUGHTON and SIMMS, but mainly by SIMMS (1831). The firm was effectively controlled by SIMMS by 1835. The engineering work was by RANSOME and MAY of Ipswich. AIRY, later in life, is depicted.

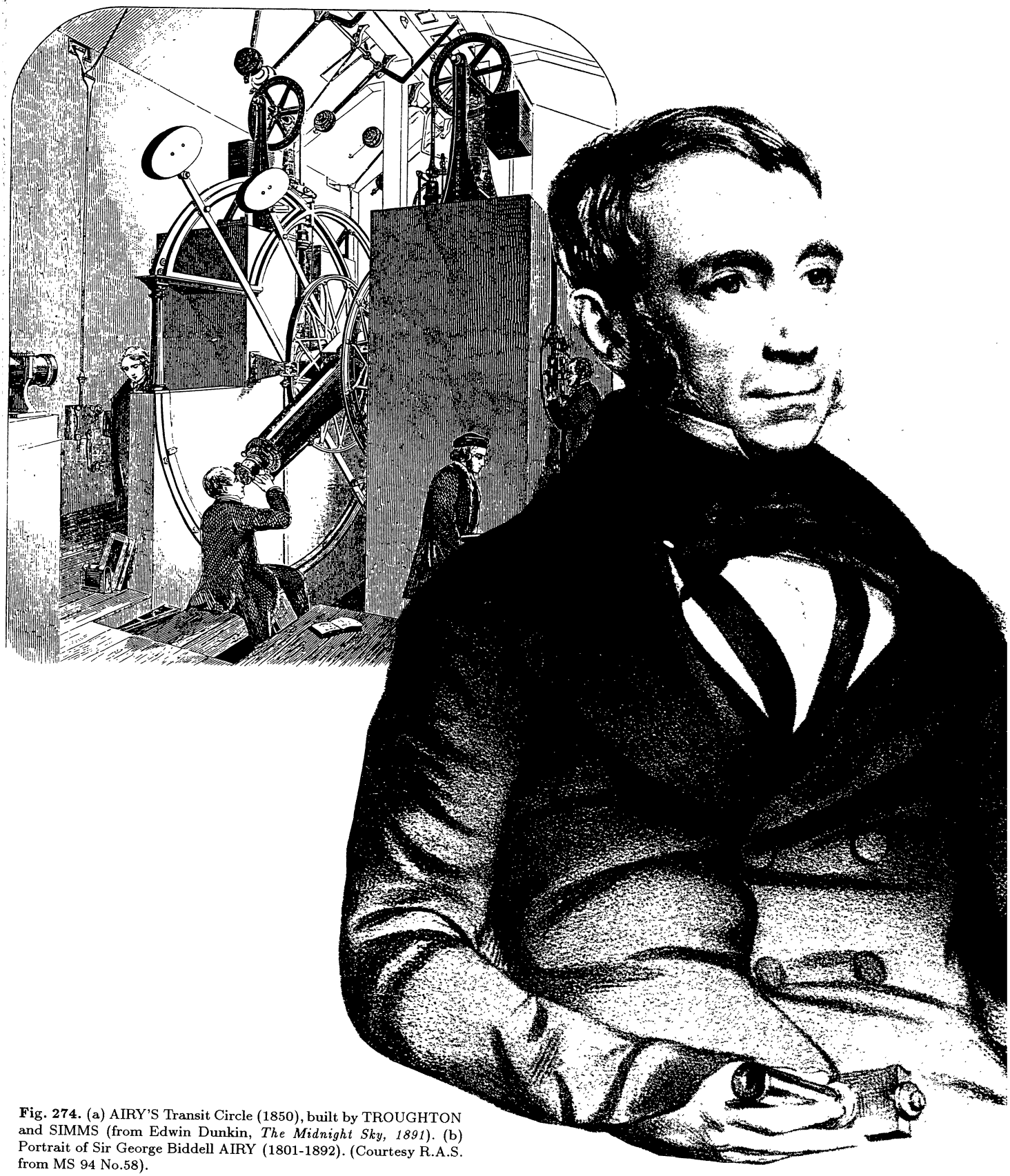


Fig. 274. (a) AIRY'S Transit Circle (1850), built by TROUGHTON and SIMMS (from Edwin Dunkin, *The Midnight Sky, 1891*). (b) Portrait of Sir George Biddell AIRY (1801-1892). (Courtesy R.A.S. from MS 94 No.58).

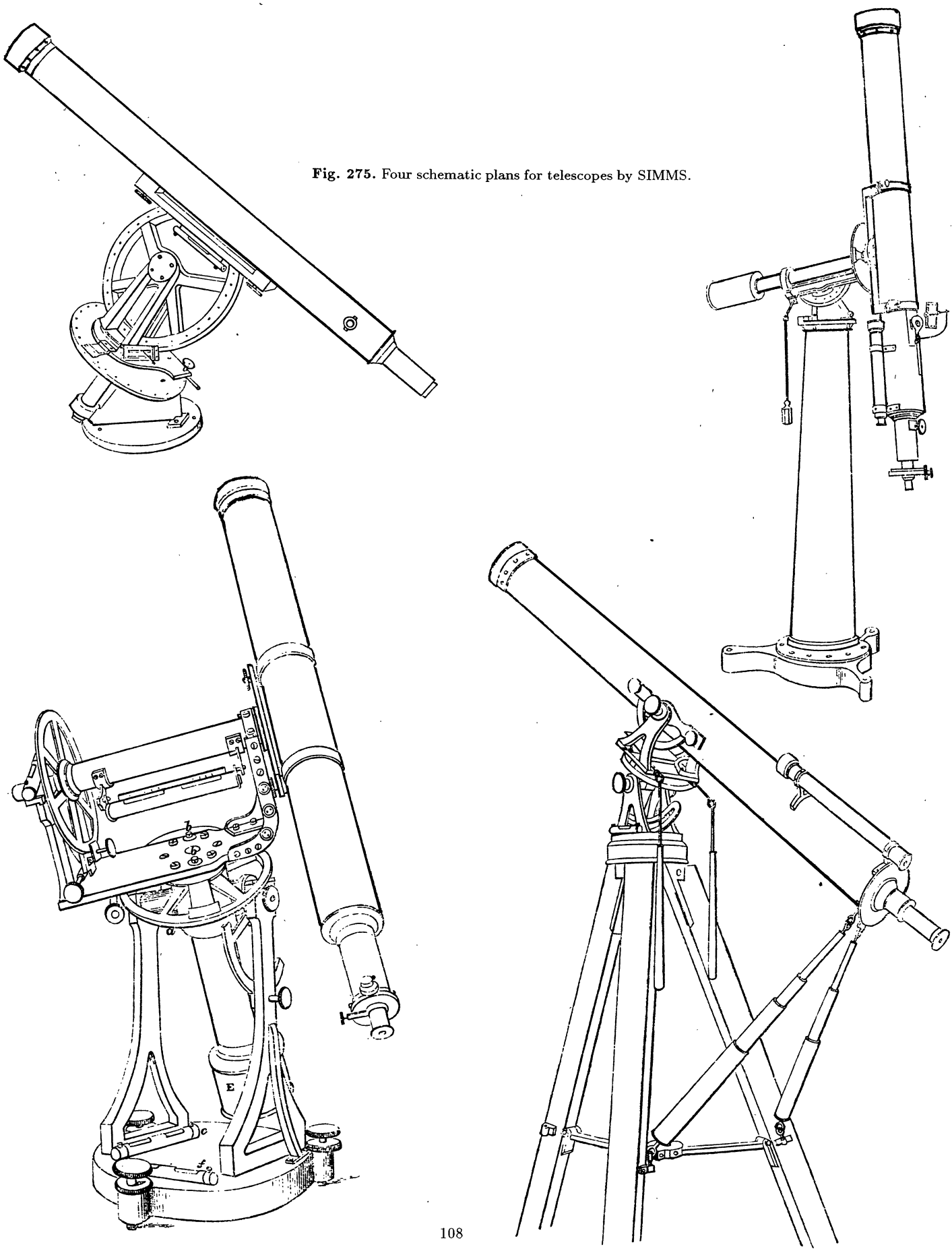


Fig. 275. Four schematic plans for telescopes by SIMMS.

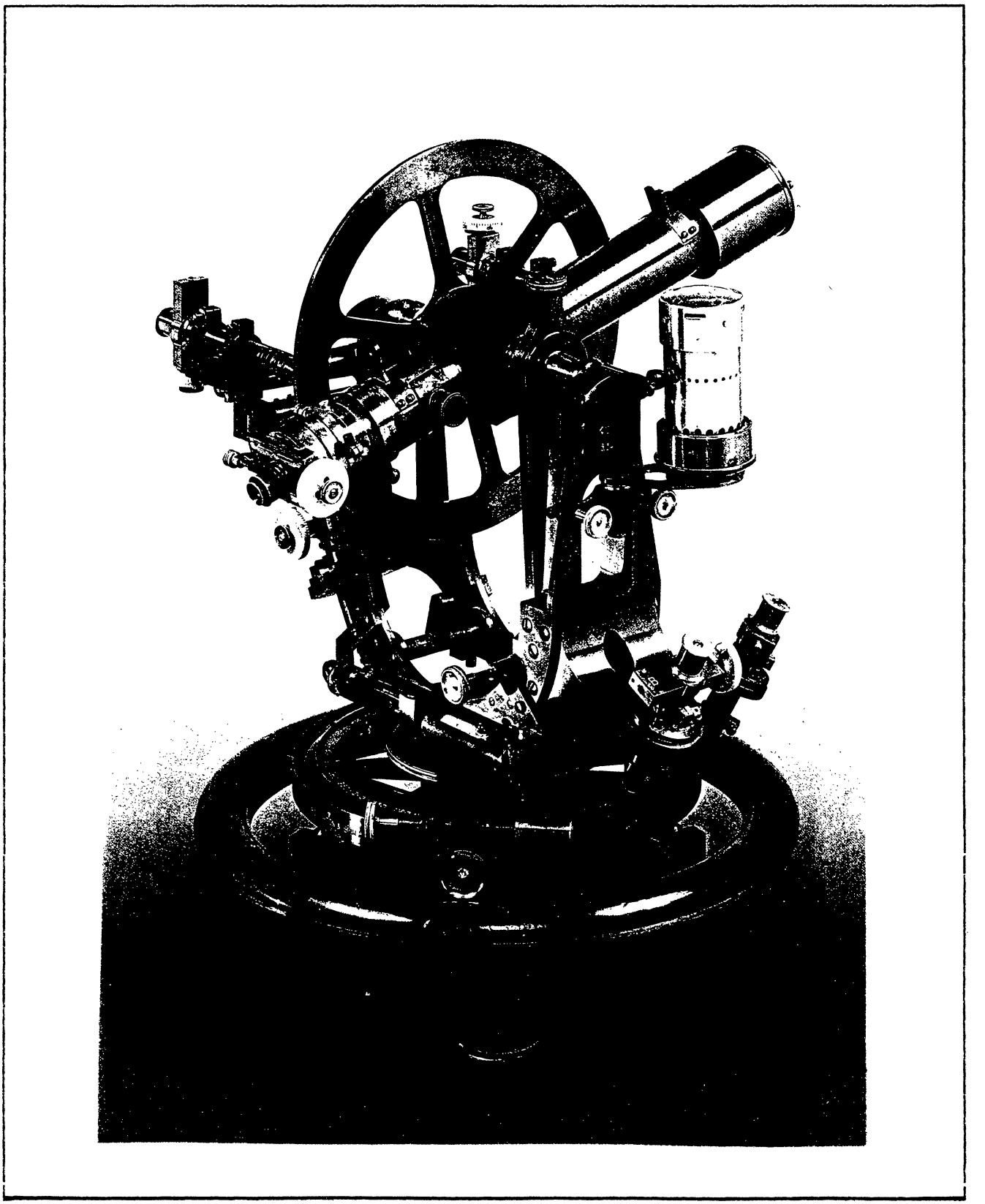


Fig. 276. TROUGHTON and SIMMS geodesic transit theodolite (see CHrApr88).

Fig. 277. Sir David GILL, H.M. Astronomer at the Cape, influential in astronomical circles in mid 19C when precision telescope engineering was of paramount importance, e.g. concerning positional and astrographic telescopes.

Artist's Name and Residence.	Public or Private Observatory of	Aperture in English Inches.*	Focal length in D
Peter Dollond, London	Sir James South, Camden Hill, Kensington	3·75	60
George Dollond „	G. Bishop, Esq., Regent's Park, London	7	129
Tulley, London	Dr. Lee, Hartwell House, Aylesbury (formerly Adml. Symth's)	5·9	102
„ „	Sir J. Herschel, Slough, and Feldhausen, Cape of Good Hope	5	84
„ „	Radcliffe Observatory, Oxford (Equatorial)	7·1	120
Fraunhofer, Munich	Imperial Observatory, Dorpat (Equatorial)	9·6	174
„ „	Royal Observatory, Berlin (Equatorial)	9·6	174
„ „	Royal Observatory, Munich (Equatorial)	11·2	192
Merz and Mahler or Merz and Son, Munich	Royal Observatory, Palermo, Sicily	9·8	173
„ „	Observ. of Collegio Romano, Rome (Equatorial)	9·6	...
„ „	Royal Observatory, Cape of Good Hope (Equatorial)	7	102
„ „	Observatory, Liverpool (Equatorial)	8·5	144
„ „	Royal Observatory, Greenwich (Equatorial)	12	210
„ „	National Observatory, Washington, United States (Equatorial)	9·6	183
„ „	Observatory of Cincinnati, United States (Equatorial)	12	204
„ „	Observatory of Cambridge, United States (Equatorial)	15	270
„ „	Imperial Observatory, Poulkova, Russia (Equatorial)	15·9	289
Cauchoix, Paris	Northumberland Equatorial, Observatory of Cambridge	11·5	234
„ „	Sir J. South, Camden Hill, Middlesex	11·7	228
„ „	Sheepshanks Equatorial, Royal Observatory, Greenwich	6·7	98
„ „	E. Cooper, Esq., Observatory, Markree, Ireland	14	302
Simms, London	Royal Observatory, Greenwich (Transit Circle)	8·0	138
„ „	Do. do. Cape of Good Hope, do. do	8·0	142
„ „	Observatory, San Fernando, do. do	8·0	142
Lerebours, Paris	Imperial Observatory, Paris (only 8·4 in. quite perfect)	9·2	132

* The *effective* aperture is in a few cases acknowledged to be some few tenths of an inch less than the nominal aperture her set down. Thus, in the Markree telescope of Mr. Cooper, 13·3 is considered by its owner to be the effective aperture. We cannot of course, answer for the performance of all these glasses, but there can be no doubt that the large majority of them are of first-rat excellence.

Artist's Name and Residence.	Public or Private Observatory of	Aperture in English Inches.	Focal length in D
Lerebours, Paris	Imperial Observatory, Paris	12·8	192
„ „	Observatory, Madras (Equatorial)	6·3	90
Ertel and Son, Munich	Imperial Observatory, Poulkova, Russia (Vertical Circle)	6·3	90
„ „	Do. do. (Great Meridian Telescope)	6·2	10[illegible]
„ „	National Obs., Washington, United States (Refraction Circle)	7·0	102
Alvan Clarke, Boston, United States	Rev. W. R. Dawes, Hopefield Lodge, Haddenham, Berks	8·25	110
„ „	Observatory, Amherst College, United States (Equatorial)	7·25	101
A. Ross, London	——— Strutt, Esq., Worcester	5	...
„ „	——— King, Esq., Ipswich*	5	70
„ „	Made by order of W. Delarue, Esq.*	5	60
„ „	In process of Completion by Mr. Dallmeyer*	8	...
Cooke and Sons, York	J. Fletcher, Esq., Tarn Bank, Cockermouth (Equatorial)	6	84
„ „	In progress for Mr. F., to replace the above, and nearly completed	9·4	144
„ „	——— Barclay, Esq., Walthamstow (Equatorial)	7·5	120
„	Sir W. K. Murray, Ochtertyre	9	156
„ „	Rev. C. Pritchard, Clapham (Equatorial)	6·6	100
Secretan, Paris	Observatory, Madras	6·0	90
„ „	Imperial Observatory, Paris (Equatorial)	12·4	206
Repsold, Hamburg	Imperial Observatory, Poulkova (Meridian Circle)	6	84
Porro, Paris	Under trial at the Imperial Observatory, Paris	9·45	163
„ „	In progress. (No precise report of performance)	20·5	590
Pistor and Martens	Washington, United States (Prime Vertical Transit)	5·0	78
„ „	Royal Observatory, Berlin (Meridian Circle)	5·5	60
Grubb, Dublin	Queen's College Observatory, Cork, Ireland	8	126
„ „	Observatory, Armagh, Ireland. Quadruple object-glass, Equatorially mounted	7	68
„ „	Equatorially mounted, complete	12	232

* Mr. Dallmeyer (son-in-law of the late A. Ross), working for the latter, with his mechanism and under his instructions, i understood to lay claim to the personal execution of these glasses, and the computation of their curvatures.

Fig. 278. List of important astronomical instruments (prior to 1875, according to Sir David GILL). These illustrate most of TROUGHTON and SIMMS' competitors and optical suppliers in Europe in mid 19C.

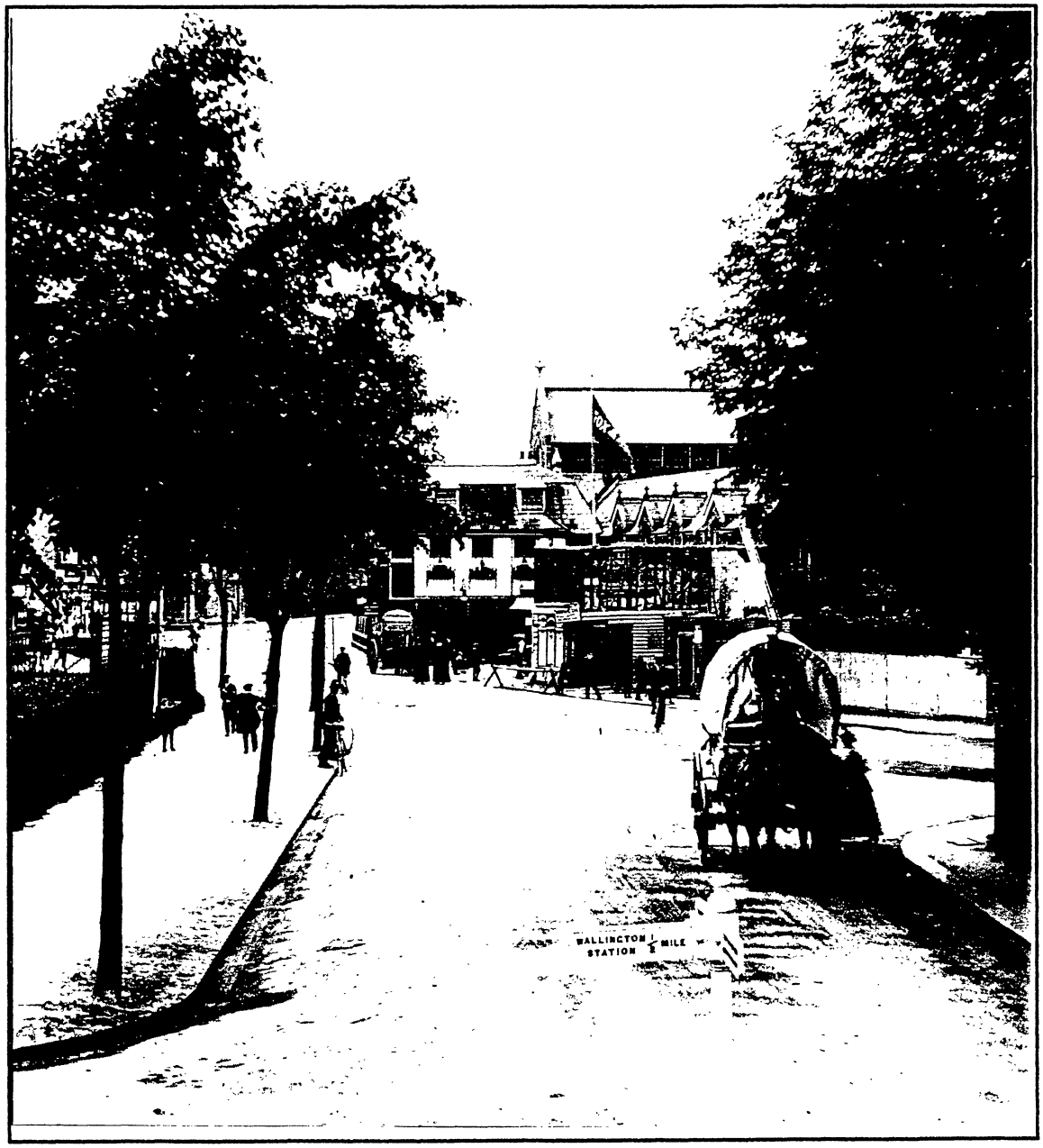
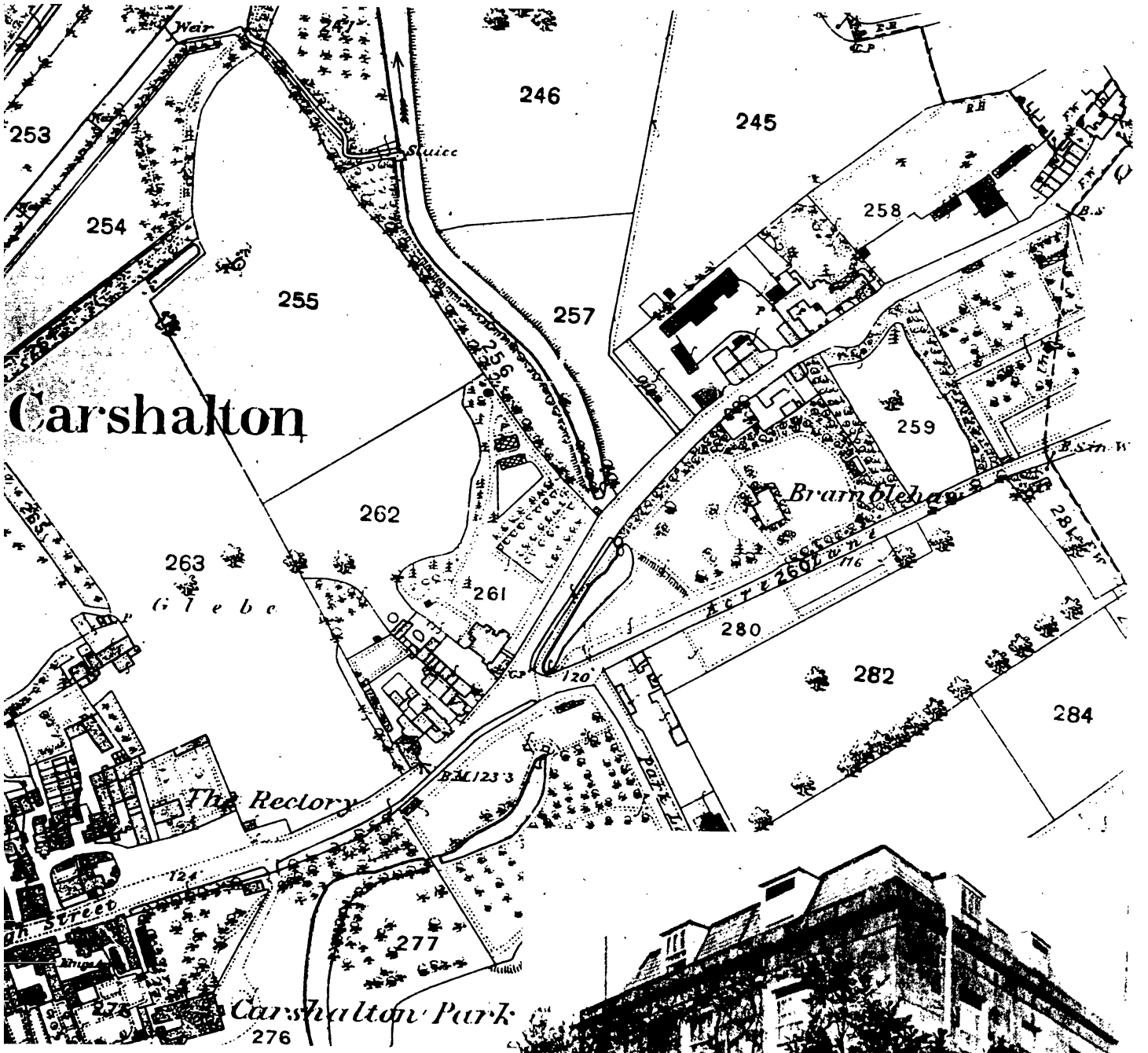
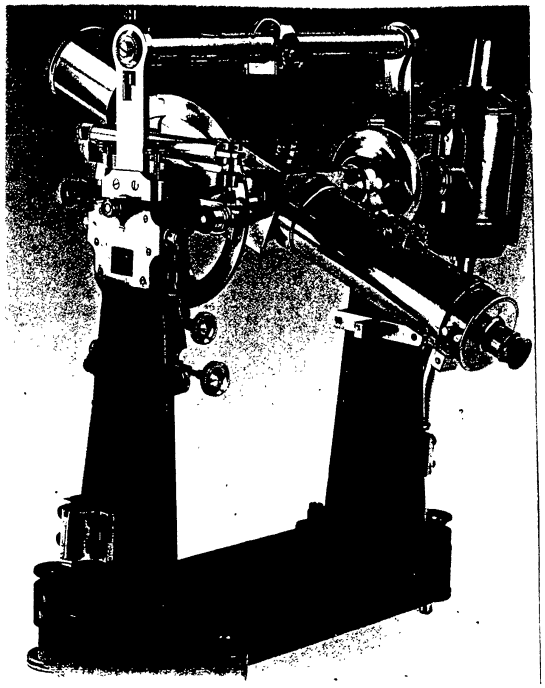
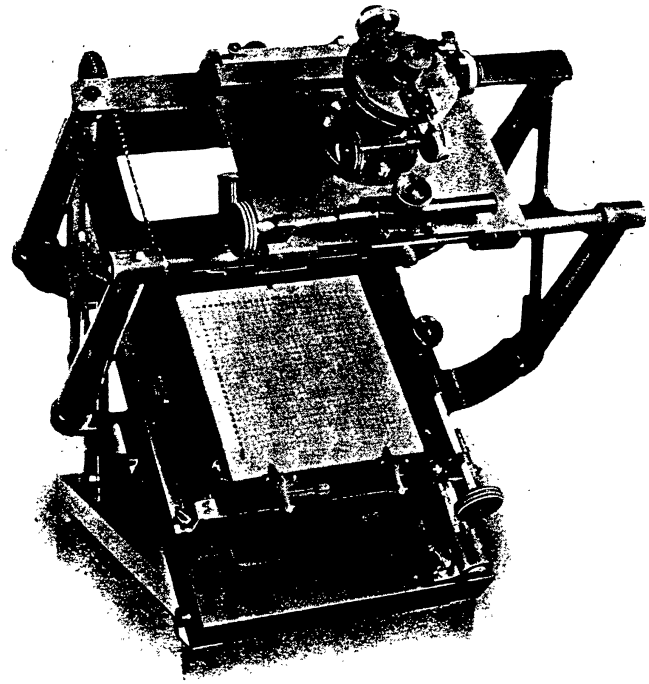


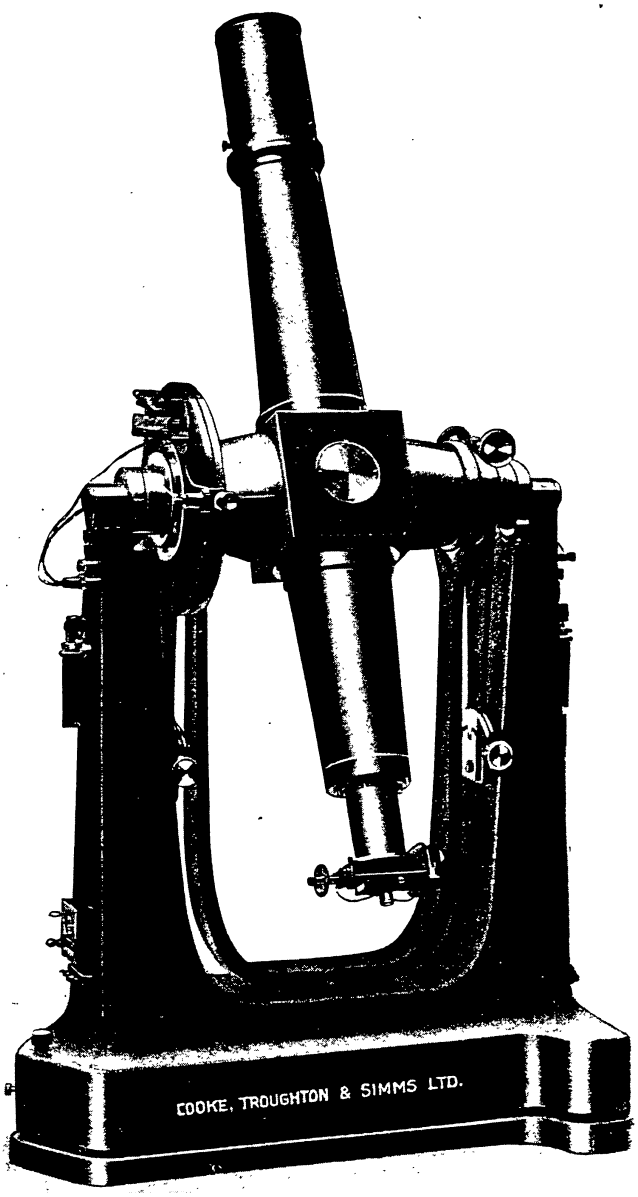
Fig. 279. Carshalton High Street, Surrey (in 1913) from Acre Cottage nearby to where SIMMS retired at Bramble Haw in 1846. The Chestnut Tearooms, demolished after 1913 to allow extensions to the Fox and Hounds, may be seen in the background (Courtesy of Sutton Libraries and Arts Services). SIMMS, friend and colleague of the great Edward TROUGHTON and the Astronomer Royal, Sir George AIRY, is remembered for his Greenwich zenith sector (1833), the altazimuth (1847), the transit circle and reflex zenith sector (1851), and the Greenwich 12.8-inch Great Equatorial (1858; replaced by a 28-inch f/12 GRUBB telescope with MERZ optics).



g. 280. Street plan of Carshalton showing Bramble Haw, SIMMS' i house. Here SIMMS erected a small observatory (Courtesy of tton Libraries and Arts Service). See, also, engraving of Carshal- Ponds, west of Bramble Haw, on title page of Part 5.







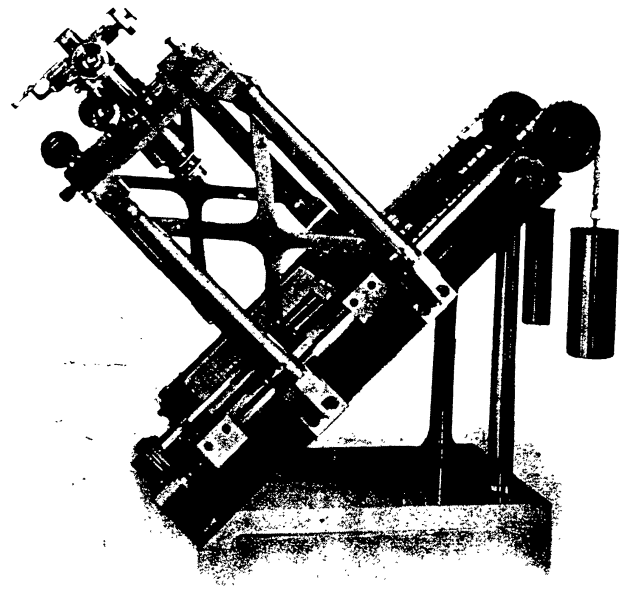


Fig. 281. COOKE, TROUGHTON and SIMMS instruments, two transits and a travelling (measuring) microscope. The upper-left illustrated instrument is a 1.75-inch transit telescope on axis with balance, with a 6-inch vertical circle and silvered scale, two verniers and magnifiers, bubble level and tangent screw fine adjustment, with cross bubble and lamp, on an iron stand with three levelling screws (in a case, 20 inches wide). See CHrJun92.

William Simms (1817-1905). From MHS Oxford, 37-42.

Frederick William Simms (1833-1891).

James Simms (1828-1915).

James Simms Wilson (1893-1976).

Arthur Simms (1891-1976).

Fig. 282. Portraits of several of the SIMMS' family from 19C and 20C (Courtesy of A. McConnell).

Thomas Cooke (1807-68).

Thomas Cooke (1839-1919).

Charles Frederick Cooke (1836-98

Francis Smith.

Fig. 283. (a) Portraits of the COOKEs, father and two sons, and (b) a portrait of Francis SMITH, internationally renowned optical designer in COOKEs c.1950, and (c) an advertisement from REKAB, originally BAKER (mid 20C), one of the firms which emerged out of COOKE, TROUGHTON and SIMMS (Courtesy of A. McConnell).

absorbed in 1956. BAKER Holborn became Rekab Ltd. Astronomical work of COOKE had actually passed to GRUBB, PARSONS Ltd. in 1937. Sadly, the name SIMMS has disappeared, but GRUBB lives on, in a sense, in SINDEN. SIMMS, himself, retired to *Bramble Haw, Carshalton, Surrey* (1846) where he built his own observatory. [44]

SIMMS Frederick Walter - younger brother of William (II), for five years assistant at Royal Observatory, civil engineer, 1803-65. [45]

SIMMS James (II) and George - brothers of the famous William SIMMS (II), trading independently as opticians, nautical and mathematical instrument makers, having taking over their father's business,*4 Broadway, Blackfriars, London* (1822), *9 Greville Street, Hatton Garden, London* (1840-55). [46]

SIMMS James (III) - son of the famous William SIMMS (II). Partner (with cousin William (IV) in TROUGHTON and SIMMS. Mennim records that James (III) (b.1828, d..1915) attempted to continue the famous business at *south of the Woolwich Road, near Royal Observatory.* He employed 100 men at *Charlton Works* in 1871, but business slumped after WWI. The old premises at 136 Fleet Street were enveloped by the *Birmingham Daily Post* and *Liverpool Daily Post*, and eventually the *Daily Telegraph* premises.

SIMMS William (IV) - one of famous William (II)'s grandsons, James (III)'s elder son, 1860 -1938. In 1915 the TROUGHTON and SIMMS firm passed to him and his brother, James (IV), and Ltd. added to the name.

SIMMS James (IV) - another of famous William (II)'s grandsons, or James (III)'s younger son, 1862 -1939. [47] Partner with brother William (1915) in TROUGHTON and SIMMS.

SIMMS Arthur Davison - son of James (IV), 1891- 1976. Sales manager to COOKE, TROUGHTON and SIMMS (at *London* office).

SIMMS WILSON James - cousin to Arthur, 1893 -1976. Director of COOKE, TROUGHTON and SIMMS *York* in 1922.

SIMONS George - optical instrument maker, *4 and 8 Crooked Lane, London*, fl.1792-1799. [48]

(to be continued)

[44] SIMMS' family biography by E. Mennim, *Transit Circle*, Sessions, Ebor Press 1993. See, also, a technical biography in A. McConnell's *Instrument Makers to the World, A History of Cooke, Troughton and Simms,* Sessions, Ebor Press 1992.

[45] See Mennim p.221 for portrait.

[46] See SIMON.

[47] There were, at least, two other James SIMMS', not noted here, i.e. James (I)'s son and grandson.

[48] E.G.R. Taylor gives a certain James SIMONS, opt. instr. maker at *Isaac Newton's Head, 17 Marylebone Street, London*, fl.1791.