Brass Protractor owned by Benjamin Rittenhouse and made by him. In the Historical Society of Pennsylvania.


Instrument made by James Ham, Jr., December 10, 1781. Owned by the Franklin Institute.

SOME EARLY PHILADELPHIA INSTRUMENT MAKERS.

BY HARROLD E. GILLINGHAM.

It is well known that astronomers and mathematicians for two thousand years have had instruments with which to carry on their investigations. In the days of Rameses II the Egyptians had made a survey of their country, but no mention is made of the instruments they used for that purpose. Several centuries before the Roman period instruments were used for surveying, and the Astrolabe was used for measuring the heights of mountains or buildings.

One reads in Dr. R. T. Gunther’s Early Science in Oxford (1920) that in the third century A. D. the Dioptrè was used by land surveyors, and the libraries of Oxford and Cambridge possess many manuscript works describing the various instruments used by astronomers, surveyors and mariners of old. In 1618 Edmund Gunter invented the portable Quadrant bearing his name, and in 1624 he wrote a treatise on the use of the Sector and Cross-staff.

That the early colonists of Pennsylvania had need of mathematical and scientific instruments is quite natural, and that many of such instruments were made in Philadelphia shortly after the settlement of the city by William Penn and his followers is the more interest-
ing. It speaks well for the intellectual character of the inhabitants that they had the knowledge and ability to produce instruments of the best quality.

Knowing he would have need to properly apportion the land of his new colony among the settlers, it was quite natural that Penn came well prepared for the purpose, and he no doubt brought with him such surveying instruments as were necessary, as well as all other mathematical implements which he desired. Unfortunately few of these are known to exist, that the student of today may see under what handicaps our early settlers worked.

The Historical Society of Pennsylvania possesses one instrument which is said to have been brought by William Penn; a pair of wooden compasses with curved legs, and very well preserved. These were found at "Pennsbury" and are said to have come over in the good ship "Welcome" when our founder first arrived in 1682. As compasses were made of iron as early as 1100 A. D. the reason for this wooden instrument is unknown, for they were readily obtainable in that year, made of steel, brass or silver.

In the museum of the American Philosophical Society, Philadelphia, is a surveyor's Theodolite which is said to have been owned by the Proprietory family and used to survey and lay out the streets of the Quaker City. It bears the maker's name engraved thereon,—Tho. Heath, Londini Fecit. As Heath was working in The Strand in London from 1714 to 1774, it seems to disprove the above tradition. This instrument may have been owned by a member of the Penn family, but it could not have been used by the early surveyors of Philadelphia's streets during the seventeenth century.

A short account of Some early Philadelphia Mathematical Instrument Makers might not be out of place here.
THOMAS GODFREY. In 1730 Thomas Godfrey, a Philadelphia born mathematician and glazier, invented an improvement on the Davis Quadrant or Back-staff; an instrument made in the 16th century, and popular with the English mariners of the day until Godfrey’s improved instrument appeared. That Philadelphia was an important shipping centre in 1730 is quite evident, and Godfrey evidently came much in contact with seafaring men of his day; probably knew the difficulties they must have had with their navigating instruments, with which they calculated their time and location at sea, and set himself to perfecting the needed apparatus. Godfrey so impressed James Logan with his invention, that he, Logan, sent a description of the instrument to Edmund Halley, Royal Astronomer of London, and an authority on astronomy, dialling and mathematical subjects.

Halley apparently ignored Logan’s communication, and a second copy of the invention was sent to Peter Collison and Sir Hans Sloane, requesting them to send it to the Royal Society. What Halley had done with Logan’s first description is not known, but about the time the second description was presented to the Royal Society, a similar invention was handed in by James Hadley, whose nephew had seen Godfrey’s instrument in the West Indies, when in the possession of Captain Wright, who at the request of James Logan, had taken it on his voyage for test and comparison with the older implements of the kind then in use.

The Royal Society was evidently in a quandary; Godfrey was a colonist 3000 miles away, Hadley was their Vice President, so they decided that both were entitled to the invention and awarded the equivalent of 200 Pounds to Thomas Godfrey. It was generally believed in Philadelphia at the time that Godfrey’s invention preceded that of Hadley by at least two years, though he received but little credit for his ideas.
As early as 1730 Godfrey had loaned his instrument to Joshua Fisher for trial in his surveys of the Delaware River and Bay. The position of Cape Henlopen, on Fisher’s map of the Delaware Bay (London 1756) is ascribed to the observations made by Joshua Fisher and Thomas Godfrey with the new instrument.

Thomas Godfrey was born 1704 in Bristol Township, Philadelphia, about one mile from “The German Town,” on the farm of his father Joseph Godfrey, and which his grandmother Thomas Godfrey had purchased in 1697 from Samuel Carpenter. His father died in 1705 and his mother soon remarried, so Thomas was apprenticed to a glazier and became quite proficient at the trade.

In those early days the trade of a plumber and glazier was quite an important one; they not only made the leaden frames for windows, but they soldered the glass therein. Godfrey did most of the work on the State-House in 1732–3; at Bush Hill” in 1740 for Andrew Hamilton; and at “Stenton” for James Logan, who became his staunch friend. He is also supposed to have made some of the leaden frames and glazed them for Christ Church. In the Dreer collection of Manuscripts, owned by the Historical Society of Pennsylvania, is a certificate for the amount of earth dug and hauled from the South side of the Western office of the State-House, dated 7-29-1758, signed by Thomas Godfrey and Ebenezer Tomlinson.

Godfrey and his wife resided in the same house with Benjamin Franklin, with whom he became quite intimate. He prepared the Almanac which Franklin printed, and later prepared Bradford’s Almanac. He was a member of Franklin’s Junto, that society of savants and students, wherein was planned the American Philosophical Society; the Philadelphia Library; the Pennsylvania Hospital; as well as a fire insurance company, the Philadelphia Contributionship.
Thomas Godfrey died in Philadelphia in 1749, was interred in the family burial lot on the farm near Germantown, from whence he was moved by John Fanning Watson in 1838, together with his parents, and reinterred in Laurel Hill Cemetery, where a suitable monument was erected to his memory.

The Historical Society of Pennsylvania possesses a reflecting Octant said to have been invented by Godfrey, but it bears the label of Thomas Ripley, Hermitage Bridge, London; evidently having been made from Godfrey’s description. It is indeed unfortunate that no specimen of Godfrey’s own handiwork remains. Nor does history tell us that he made other mathematical instruments. Perhaps his unfortunate experience with his first invention and the Royal Society of London discouraged his further attempts.

Benjamin Condy. The first knowledge we have of another Philadelphia Mathematical Instrument maker is from a wooden Octant about 20 inches high, in the museum of the Historical Society of Pennsylvania. Though called a Quadrant, this is really an Octant. It bears an inlaid white bone label, inscribed, “Made by Benjamin Condy Philadelphia 1763 for Mr. Joseph Volens.” Nothing has been found of Mr. Volens, and little is known of Condy, his birth, where he came from, or his death. In the earliest city Directory, that of Captain John Macpherson, published in 1785, is given, “Condy, Benjamin, 522 Front Street.” With Macpherson’s peculiar method of numbering the then existing houses, little is to be gained by that information. In Biddle’s Directory for 1791 is given “Condy, Benjamin, Mathematical Instrument Maker, 81 South Front Street.” This was about midway between Chestnut and Walnut Streets. It was natural that he should locate near the river front and at a point near Dock Creek (where most of the vessels landed in those days), thus meeting the sea-faring men and catering to their
needs. Condy apparently retired from business in 1792 as he appears no longer in the city directories, and in that year Thomas Biggs advertises that he succeeds Condy, with whom he had been apprenticed. Benjamin Condy died in 1798, his will signed March 31, 1796, was proved December 4, 1798, and recorded in Book J, page 96/97. He mentions children, grandchildren, some real estate, but no other possessions; nor does the inventory of the estate include mention of instruments or other property than household effects.

James Ham. Our first knowledge of this Philadelphia craftsman is from his advertisement of October 18, 1764, in the Pennsylvania Journal. Ham calls himself a “Mathematic and Optical instrument maker,” giving his address as “below the Drawbridge, in Front and Water Streets, at Hadley’s Quadrant, near Emanuel Powell’s wharf.” This was between Spruce and Pine Streets. It is interesting to note the name of his shop—“Hadley’s Quadrant;” as he evidently was from England, and following the European custom of the day, gave his shop the name of the man whom the English claimed had invented a new instrument.

James Ham advertised all kinds of instruments “in silver, ivory and brass;” “Ivory billiard balls, dice and dice boxes;” evidently catering to the gaming fraternity of the day as well as to the scientific. As the watches of 1764 were probably not always to be depended upon, and the inhabitants of the Quaker City were not bothered with daylight-saving time, he advises the public that he sold “large brass pocket dials, fitted to the latitude of Philadelphia.” These no doubt were generally used to set the town clocks and local watches and were more dependable.

Many of the French officers who came to the assistance of our colonists in the War for Independence, carried silver pocket sun-dials to give them the correct
time of day. One of these is now in the Washington Museum at Morristown, New Jersey. James Ham's advertisement closes with the announcement, "To be sold by James Ham, a likely active Negro boy, about 15 years of age, fit for town or country." Here was a son of Ham being sold in the colonies by another Ham.

James Ham, Jr., advertised in the Pennsylvania Journal March 22, 1780, from the same address as his father, as a Mathematical Instrument maker, and that he made "Hadley's and Davis's Quadrants." We are fortunate in having a specimen of his handwork in the Franklin Institute, Philadelphia, which is said to have been copied from Thomas Godfrey's instrument, but it is unlike the so-called Godfrey Quadrant owned by the Historical Society and which bears the label of Thomas Ripley, Hermitage Bridge, London.
This Ham instrument bears evidence of its having had an inserted label in the upper arm; but the records of the Franklin Institute show it was made by James Ham, Jr., and was given to them by Dr. Charles M. Wetherill.

The piece was made December 10, 1781, and is mute evidence that the patriotic Colonial sea-captains of the day preferred goods of home production to those made in England, during our War for Independence.

This instrument resembles the Davis Quadrant or Back-staff, illustrated on page 356, Vol. 1, of that valuable work by Dr. E. T. Gunther, *Early Science in Oxford*, 1920, where we read, "The English Quadrant or Back-staff was invented by Captain John Davis, of Limehouse, about the year 1540 for the observation of the sun's altitude at sea without the painful necessity of looking direct at the sun. It is often known as Davis' Back-staff. . . . It consisted of a combination of an arc and a chord mounted on a staff. Both arc and end of staff have sights; the chord ended in a shadow vane which cast a shadow on the sight staff. It was the observer's task to adjust the arc sight until he saw the horizon line and chord shadow coincide."

David Rittenhouse. So much has already been written of David Rittenhouse (1732-1796), the early American born astronomer and clock maker, Treasurer of Pennsylvania (1777-1789) and Director of the United States Mint (1792-1795), that little need be said here of his career. At the age of thirty-one he was employed to survey the boundaries of some of the colonies and from 1779 to 1786 was again so occupied. He was elected a Fellow of the Royal Society of London and a member of the American Philosophical Society, of which he became president in 1791. The brass protractor shown here is in the museum of the Historical Society of Pennsylvania, and was not only owned and
used by David Rittenhouse, but made by that scientific and versatile citizen of Philadelphia.

In the American Philosophical Society’s rooms is a telescope made by David, through which he and his associates viewed the transit of Venus, June 6, 1769, from his observatory at Norriton. This, together with his clock, was given to the Society by Elizabeth Sargeant and Hester Waters, descendants of Rittenhouse and Executors of his estate, on April 6, 1810.

With David at the time of this astronomical phenomenon were Dr. William Smith, Provost of the College of Philadelphia; John Lukens, Surveyor General of Pennsylvania; and John Sellers, Representative in the Assembly. In reporting this event to the Philosophical Society Dr. Smith stated that they used an Equal-latitude instrument, a Transit Telescope and an excellent time-piece, all made by David Rittenhouse. At the same time another committee of the Philosophical Society, consisting of Joseph Shippen, Dr. Hugh Williamson, Charles Thomson, Rev. John Ewing and Thomas Pryor (himself a maker of instruments) observed the transit of Venus from the observatory in the State-House yard, through a telescope made by John Bird (1709-1776) of London, and which is now in the Old City Hall Museum at Fifth and Chestnut Streets, Philadelphia.

In 1769 Dr. Smith reported to the Philosophical Society a description of a new Orrery “planned and now nearly finished by David Rittenhouse.” This most unusual piece had been made for The College of Philadelphia and is now in College Hall of the University of Pennsylvania, in quite good condition and readily operated by those who understand its mechanism.

Of all the instruments left us by David Rittenhouse, this piece is the outstanding specimen of his ability as an astronomer and mechanical worker in scientific instruments.
Benjamin Rittenhouse. It is not surprising to find another member of the Rittenhouse family making instruments for mathematical calculations. Benjamin Rittenhouse, a brother of David's, was born on the farm of his father, Mathias, at Norriton, Montgomery County, Pennsylvania, in 1740, where he was reared and educated. He assisted his brother David in making a chronometer for use in surveying and became an excellent mechanician. David K. Cassel writes "one of these fine instruments bearing on its face the name of Benjamin Rittenhouse as the maker and the date of the year 1786 is now in the possession of Mr. Norton Prior, of Philadelphia, so says William Borton, 1813." Benjamin joined the patriot army in the war of the Revolution, was wounded at the battle of Brandywine and taken a prisoner. He was made Superintendent of a Gun-lock factory in Philadelphia February 15, 1778, thus assisting in the equipment of the Continental forces.

In 1791 he was commissioned by Governor Mifflin as a Judge of the Court of Common Pleas for Montgomery County, Pennsylvania.

The instrument illustrated here was given by William Brooke Rawle in 1906 to the Historical Society of Pennsylvania, and shows to what extent Benjamin Rittenhouse became proficient as a maker of such apparatus. Several high-case clocks made by Benjamin Rittenhouse are still doing service in homes in this vicinity.

In the Smithsonian Institution at Washington, D. C., is a Surveyor's Compass in a brass case, engraved, Rittenhouse Philadelphia, and labeled "Surveyor's Compass owned by Washington at Mount Vernon, from the Lewis Collection No. 92,538." Unfortunately we are not positive which of the versatile and mathematical student brothers made this fine piece, although it is presumably one of Benjamin's instruments. We
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read in Robinson’s Philadelphia Directory for 1807, *Benjamin Rittenhouse, Surveying Instrument Maker*, while the Directory for 1819 lists him as a Mathematical Instrument Maker at Pine Street above Twelfth, and the following year gives his location at 258 Arch Street.

Andrew Ellicott. No record of mathematical instrument makers or of scientists would be complete without mention of this patriotic citizen; who, while not a maker of instruments for commercial purposes, nevertheless constructed several complicated pieces for his own use. Born in Bucks County, Pennsylvania, January 25, 1754, of English-Quaker ancestry, Andrew Ellicott received his early education at a Quaker school in Solebury Township. He later studied under Robert Patterson (who became Professor of Mathematics at the University of Pennsylvania in 1779 and held that position for thirty-five years). After completing his education, Andrew married Sarah Brown of Newtown, Bucks County, Pennsylvania, on December 31, 1775, and soon after moved to Maryland to join his father’s colony at Ellicott’s Mills, near Baltimore.

Though of Quaker origin, Andrew joined the Continental forces in 1778 and was commissioned a Major in the Elk Ridge Battalion of the Maryland militia. In 1781 he published the United States Almanac for the year 1782. He was appointed by Virginia in 1784 to survey and mark the boundary between Virginia and Pennsylvania, west of the Mason and Dixon Line, then unfinished. With him on this expedition were Dr. James Madison (President of William & Mary College), Robert Andrews and John Page (a friend of Thomas Jefferson’s) representing Virginia. The Pennsylvania surveyors were John Lukens (Surveyor General), Thomas Hutchins, John Ewing (Provost of the University of Pennsylvania) and David Rittenhouse.
On May 5, 1785, he was selected by the Executive Council of Philadelphia to run the West boundary of Pennsylvania, from the Ohio River to Lake Erie; together with David Rittenhouse, Andrew Porter and others. The following year he surveyed the Northern boundary between Pennsylvania and New York, and so well was this accomplished, that a century later the Commissioners, who again surveyed it, reported "The operations of the early Commissioners do their memory great credit. The variation from the true geographical parallel is small, when the difference in precision between the instrument of that day and this is taken into consideration."* We read that "His instruments were always hand made, usually his own work or that of his brother Benjamin, or of his friend David Rittenhouse."† His certificate as a member of the American Philosophical Society is dated January 20, 1786, and he was a frequent contributor to their literature. In 1789 Andrew Ellicott returned to Philadelphia with his wife and nine children—six girls and three boys—and resided at No. 16 North Sixth Street. In 1792 Robert Morris employed him to survey his lands in Western New York, near Geneva, and in all subsequent surveys Ellicott's line was conceded to be correct. This was run by means of a transit instrument which he himself had made. The only other such instrument in the United States at the time was made by David Rittenhouse.

In addition to surveying the ten mile square for the District of Columbia, he succeeded Major L'Enfant and completed the plan for the City of Washington. The road to Presque' Isle (Erie) as well as the towns of Franklin, Waterford and Warren, Pennsylvania, were surveyed by Ellicott. From 1796 to 1800 he was

* Andrew Ellicott, His Life and Letters, by Catharine VanCourtlandt Mathews, N. Y., 1908.
† Ibid., p. 69.
engaged in surveying the Southern boundary of the United States from the Atlantic to the Mississippi; between the States and the Spanish possessions in Florida. The boundary between Georgia and North Carolina was also run by him, and shortly before his death he made the observations necessary to determine the 45th Parallel of Latitude—our Northern New York-Canadian boundary. Thus it will be seen that at first while a citizen of Maryland, Virginia employed him, then his native state Pennsylvania, and later Georgia and the United States. All speaks well for the ability of Andrew Ellicott.

In 1813 Major Ellicott was appointed Professor of Mathematics at West Point Military School, which position he retained until his death on August 25, 1820. The work which he did for his country is part of its history and of the times, often called the critical history of America. It is much to be regretted that none of his own made instruments are preserved in museums of the country.

THOMAS BIGGS. In the Federal Gazette of September 14, 1792, appears the following—

“To THE PUBLIC. Thomas Biggs, Mathematical Instrument Maker, from New York, At No. 81, South Front Street, the house lately occupied by Mr. Benjamin Condy, begs leave to inform the Public, the mercantile and sea-faring part in particular, that Mr. Benjamin Condy having retired from Business, in consequence he has been induced to leave a very good establishment in the city of New York, for the purpose of carrying on the aforesaid business in this city, and he flatters himself, that, in consideration of his being brought regularly up to the business, having served his apprenticeship to the aforesaid Mr. Condy in this city, and being a native of it—his experience by having followed it upwards of eight years in New-York, where his reputation was firmly established, and having been upwards of five years in the service of his country during the war—that he will be so far patronized, that eventually he will have no occasion to regret the exchange he has made, being determined to pursue his business with that degree of care and punctuality that must merit attention, by ensuring satisfaction.”

This Philadelphia-born patriot again advertises (May 15, 1793) that his instruments are “manufac-
tured by himself,” and again thus appeals to the readers of the Gazette, “he therefore continues to solicit their patronage, on conducting an American Manufacture of so great utility.”

Biggs seems to have prospered in business as his advertisements appear from time to time until March 2, 1795. It is to be regretted that such a patriotic citizen’s instruments are not now available for inspection.

William Dean, a Mathematical Instrument Maker, “Informs the public he has commenced business at 43 South Front Street, directly opposite the Post Office;” so says his advertisement in Dunlap’s American Daily Advertiser of June 4, 1792. By a later announcement we read that he “makes and sells Surveying instruments—Telescopes, Sextants, Quadrants,—and every article requisite for navigation, surveying, levelling &c.” Dean’s shop was on the East side of Front street, the fourth house North of Chestnut, and his advertisement indicates where the Post Office was during that year. Eight years later the directory tells us the Post Office was at 27 South Third Street.

We learn from the early directories that 43 South Front Street was also occupied by Michael Davenport, Cooper, from 1791 to 1795 and from 1797 to 1801 by Widow Davenport. William Davenport, Mathematical Instrument Maker, is listed from the same address from 1802 to 1804, and we may assume that he was a son of Michael, the Cooper, and was an apprentice of William Dean (who advertised from this address as late as January 3, 1794) and carried on Dean’s business at his parents’ house. Davenport’s shop is given in the directories of 1805 to 1814 as 45 South Front Street, which may have been a renumbering of the houses; while from 1816 to 1820 his address is given as No. 25 South Front Street.

Unfortunately no specimen of their instruments is known in Philadelphia, but in the Peabody Museum
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of Salem, Massachusetts is a brass surveyor’s compass marked “Wm. Davenport, Maker, Philad.” and undated.

Thomas Pryor. Little advertising seems to have been done by this instrument dealer. We read in the Royal Pennsylvania Gazette of April 19, 1778, that “Sea, Surveying and Pocket Compasses, Touched, glazed and otherwise repaired at Thomas Pryor’s, the fourth door above Chestnut Street on the east side of Water Street.” Thus minutely advising the readers of that journal which was published by the English during their occupation of Philadelphia. Pryor is listed in the directory of 1795 as gentleman, and at the same address; so he had evidently ceased to carry on his business. He was one of those mentioned as having viewed the transit of Venus from the State-House Yard. His will was made in 1800, proved June 6, 1801 (Book Y, page 519, No. 49), and mentions wife Sarah (Parker), son Matthias; granddaughter Tacy (daughter of a deceased son Charles), also five tracts of land in Westmoreland County, Pennsylvania.

Charles Taws is listed in the directory for 1795 as an Instrument Maker at 60 Walnut Street—on the South side at the corner of Third Street, but no other information or advertisement has been obtained.

John Gould. This enterprising merchant and manufacturer came from London and opened a shop at 47 Walnut Street opposite the Custom House. So says his advertisement in the Pennsylvania Packet of July 4, 1794. Here he sold sextants, quadrants, compasses and opera glasses “to shew a person to the right or left unobserved,” as well as spectacles of silver, tortoise shell and steel. He likewise advertises “Mirrors concave or convex” and we can imagine some of the elaborate girandoles in the old Philadelphia mansions coming from the shop of John Gould. He moved to “70 South Front Street, corner of Norris’s Alley, at
the sign of the Quadrant’’ in 1796, where he apparently
remained but two years, as Thomas Whitney adver-
tised from that location in 1798; evidently being his
successor.

Sharp Delaney, the Collector of Customs, was at 40
Walnut Street, the Southeast corner of Second Street,
which was, as Gould states, opposite his shop. Gould’s
second shop at 70 South Front Street had been occu-
pied by Samuel Williams, one of the early silversmiths
of Philadelphia in 1795, and was between Chestnut and
Walnut Streets.

George Evans. In June 22, 1796, Evans, having
arrived from London, opened a shop at 33 North Front
Street, which was on the East, or bank, side of Front
above High Street. He solicited through the news-
papers of the city “the favors and patronage of the
gentlemen, merchants, captains, mates and inhabitants
of Philadelphia and the United States;’’ so says his
advertisement in the Federal Gazette of that date.
One year later his notice states “that he has just re-
ceived from his Manufactory in London an elegant
assortment of Instruments,—globes from 3 to 12 inches
diameter, charts of all parts of the world;’’ thus ap-
pealing to the geographical student as well as the
mariner and merchant. The large shell spectacles of
today are by no means new, for Evans’ notice states
that he had “Spectacles made to accord with all ages,
in silver, tortoise shell, and steel.” His was evidently
one of our earliest department stores, for he also sold
“Bibles mounted in silver—embroidery silk, cheneals,
and frostings.” Stained paper, ribbons, cutlery and
ladies’ pocketbooks could also be had in his shop.

George Evans died in 1798 and his estate was adver-
tised in the Federal Gazette November 12th of that
year.

Thomas Whitney advertised in the Federal Gazette
of April 12, 1798, as from London, and “moved from
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72 (late Mr. Gould's) to No. 74 South Front Street where he makes various instruments in the most approved and accurate manner." Whitney did not depend solely on the sale of instruments for his income. Bunting by the piece was sold, writing slates and razors, silversmith's anvils and files; pen-knives and sailor's pocket knives, scissors and bone moulds—whatever they may be—could all be purchased at the shop of Thomas Whitney from London. We read in the city directory of 1801 that John Whitney occupied No. 74 South Front Street and his occupation is given as a Mathematical Instrument Maker and Optician. John evidently was a son and succeeded his father.

The makers of mathematical and scientific instruments of metal were not our only instrument craftsmen. Scientific and philosophical implements of glass were also needed and these were likewise made in our early city. The wine and spirit merchants as well as those who recorded weather conditions desired apparatus of glass for their various purposes. These too were supplied.

John Denegan (or Donegan) advertised in 1785 as "Late of Italy," though the name does not so indicate. Two years later, according to the Pennsylvania Evening Herald of March 17, 1787, "John Denegan, Begs leave to inform his friends and the public, that he has removed to the house of Mr. Charles Kugler, sign of the Seven Stars, corner of Race and Fourth Streets" where he made Thermometers, Barometers and glasses for philosophical experiments.

Alloysius Ketterer advertised in the Pennsylvania Packet of May 19, 1789, from the same address, "at the sign of the Seven Stars," that he made and sold "the best Barometers, Thermometers, and Glass Bubbles to prove spirits, of different kinds." According to the Federal Gazette of April 20, 1790, Ketterer had moved to the house of "Mr. Nicholas Hess's in Race-street,
next door to the German Church," and he appears to have been succeeded by Martin Fisher.

Martin Fisher informed the public, in Dunlap’s American Daily Advertiser of December 16, 1791, that "he makes and sells a great variety of curious Glasses, such as shews the Slowness or Quickness of the Pulse, the Blood causing of Spirits or Wine to boil, and many other Curiosities in the Glass way, at the house of Nicholas Hess, No. 118, next door to the German Presbyterian Church, Race Street." This was also called the "Reformed" Church, and was on the South side of Race—or Sassafras—Street, East of Fourth Street. It was occupied by the English as a hospital, during their occupancy of Philadelphia.

Here Fisher remained for two years or more, and we read of him being at No. 5 Apple Tree Alley in 1795, making Thermometers and Hydrometers.

Joseph Gatty. In the Federal Gazette of May 31, 1796, one reads that "Joseph Gatty, Artist-from Italy, No. 79, South Front Street" not only makes thermometers and barometers, but blew "glass in every form to any Lady’s or Gentleman’s fancy," besides which he made and sold "all sorts of Artificial Fire-Works," and probably thus instilled into the minds of the Philadelphia youth the idea of making a noisy Fourth of July. Gatty’s shop was about where No. 127 South Front Street is today and was next door to the shops of Benjamin Condy and Thomas Biggs, his successor. The directory for 1800 gives Joseph’s occupation as Weather Glass Maker and his shop at the same address.

With so many local instrument makers it seems strange that but few specimens of their productions are to be found today. Perhaps this article may be the means of having others placed in the museum of the Historical Society of Pennsylvania for observation and study.
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One naturally wonders how these craftsmen of the 18th century acquired the knowledge to so skilfully produce these delicate and necessarily accurate instruments. England had many expert makers of mathematical and scientific instruments during the 16th and 17th centuries; such as Humphrey Cole (1568–1582); John Prujean (c. 1676); Elias Allen (1606–1654); Walter Hayes (1670–1680); James Atkinson (c. 1679); John Bird (1709–1776) and many others quite well known and proficient. These men undoubtedly had their apprentices who naturally started out for themselves and thus passed along the knowledge of the craft; some may even have come to our colonies. In addition to which the publications of the men at Oxford and Cambridge imparted much valuable information to the student of the subject. From France one could readily procure Nicholas Bion’s Traité de la Construction et des principaux usages des Instruments de Mathématique; first published in 1686 and of which six editions have been issued. Bion’s work was translated into English by Edmund Stone and published in 1723.

In the 1686 edition Bion illustrates and describes the making of the Pedometer as well as the “Plume sans fin” or Fountain pen, as if they were not even novelties at that period. Twenty years earlier Pepys is reported to have had and used a “silver pen, to carry inke in, given him by Mr. Coventry.” And thus we say “Is there anything whereof it may be said, See this is new? It hath been already of old time, which is before us.”

What a surprise it would be to us in our strenuous times to come suddenly upon a group of those dignified scientists, attired in their picturesque colonial costumes, holding earnest discourse “At the sign of the Seven Stars, corner of Race and Fourth Streets,” on the subject of Godfrey’s new invention or the Rittenhouse chronometer.
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But would not their astonishment be equally as great, were they to hear the remarks of the casual passer-by concerning telephones, radios, automobiles and the moving pictures, or to walk to Camden over the new bridge and to see the aeroplanes sailing gracefully over the Delaware River?