r (since $\pi s_1^2 = \frac{c_1^2}{4\pi}$, $\pi s_2^2 = \frac{c_2^2}{4\pi}$, &c.)

$$= \frac{1}{\pi}\frac{a}{12}\{c_1^2 + c_n^2 + 2(c_2^2 + c_3^2 + \ldots + c_{n-2}^2) + 4(c_2^2 + c_4^2 + \ldots + c_{n-1}^2)\},$$

a formula more convenient in practice, as it is sometimes more easy to measure equidistant circumferences than equidistant radii.

J. *Theorems of Pappus.*

§ 110. The following general propositions concerning surfaces and solids of revolution, usually called Guldin's theorems, are worth the reader's attention.

If any plane curve revolve about any external axis situated in its plane, then

(α) the surface of the solid which is thereby generated is equal to the product of the perimeter of the revolving curve and the length of the path described by the centre of gravity of that perimeter;

(β) the volume of the solid is equal to the product of the area of the revolving curve and the length of the path described by the centre of gravity of the revolving area.

We content ourselves with an example or two of the application of these theorems, referring to the article INFINITESIMAL CALCULUS for the proofs.

Example 1.—To find the surface and volume of a circular ring.—Let a be the distance of the centre of the generating curve, in this case a circle, from the axis of rotation, and r the radius of the circle, then

$$\text{perimeter of generating curve} = 2\pi r,$$
$$\text{area of generating curve} = \pi r^2, \text{ and}$$

path described by the centre of gravity either of the perimeter or area $= 2\pi a$; hence

$$\text{surface of ring} = 2\pi r \times 2\pi a = 4\pi^2 ra, \text{ and}$$
$$\text{volume of ring} = \pi r^2 \times 2\pi a = 2\pi^2 r^2 a.$$

Example 2.—To find the volume swept out by an ellipse whose axes are $2a$ and $2b$, revolving about an axis in its own plane whose distance from the centre of the ellipse is c.

Here area of generating curve $= \pi ab$,
and path described by centre of gravity of area $= 2\pi c$; hence
$$\text{volume generated} = \pi ab \times 2\pi c = 2\pi^2 abc.$$

Example 3.—A circle of r inches radius, with an inscribed regular hexagon, revolves about an axis a inches distant from its centre, and parallel to a side of the hexagon; to find the difference in area of the generated surfaces and volumes.

$$\text{Here perimeter of circle} = 2\pi r,$$
$$\text{and perimeter of hexagon} = 12 \times r \sin 30° \text{ (§ 17)} = 6r;$$
$$\text{also area of circle} = \pi r^2,$$
$$\text{and area of hexagon} = 3r^2 \sin 60° \text{ (§ 18, } \beta) = \tfrac{3}{2}\sqrt{3}r^2;$$

hence difference of surfaces generated

$$= 4\pi^2 ra - 12\pi ar = 4\pi ar(\pi - 3);$$

and difference of volumes generated

$$= 2\pi^2 r^2 a - 3\pi r^2 \sqrt{3}a = \pi r^2 a(2\pi - 3\sqrt{3}).$$

PART III. GAUGING.

§ 111. By gauging is meant the art of measuring the volume of a cask, or any portion of it. The subject is one of great interest and practical importance, but space will only permit us to discuss it very briefly. If the cask whose capacity we wish to determine be a solid of revolution, then its volume can at once be computed, either exactly or approximately, by the methods already described.

It is usual to divide casks into the following four classes according to the nature of the revolving curve:—

(α) the middle frustum of a spheroid;
(β) the middle frustum of a parabolic spindle;
(γ) two equal frusta of a paraboloid, united at their bases;
(δ) two equal frusta of a cone, united at their bases.

Casks of the second, third, and fourth variety are rarely met with in practice, and we shall accordingly confine our attention to the first kind, which is considered the true or model form of cask.

Let ABCD (fig. 56) be a section of the cask, and assume it to be the middle frustum of a prolate spheroid, then

$$\text{its volume} = \tfrac{1}{3}\pi(2b^2 + b_1^2)k,$$

where $b = OY$, $b_1 = AX$, and $k = XX'$ (§ 99).

YY′ is called the bung diameter, and AB or CD the head diameter.

An imperial gallon contains 277·274 cubic inches, and therefore the number of gallons in the above cask

$$= \frac{\pi(2b^2 + b_1^2)k}{3 \times 277 \cdot 274} = \frac{\pi}{831 \cdot 822}(2b^2 + b_1^2)k$$
$$= \left(\frac{2d^2 + d_1^2}{1059 \cdot 1}\right)k, \text{ where } d = 2b,\ d_1 = 2b_1;$$

whence we have the rule:—to the square of the head diameter add twice the square of the bung diameter, multiply the sum by the length and divide the result by 1059·1, and the answer is the content in imperial gallons.

Casks as ordinarily met with are not true spheroidal frusta, but it is better to consider them as such, calculate their capacity on this assumption, and then make allowance for the departure from the spheroidal form. The determination of the proper allowance to be made in each case is a matter depending on the skill and experience of the gauger, and proficiency in the art can only be attained by considerable practice.

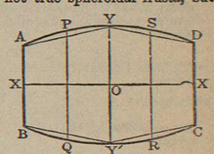

Fig. 56.

§ 112. If the cask be very little curved, we obtain an approximation to its capacity by considering it as made up of two equal frusta of a cone, united at their bases. Hence from § 83 we have

$$\text{volume of cask} = \tfrac{1}{3}\pi h(r_1^2 + r_1 r_3 + r_3^2) \text{ nearly.}$$

Here we neglect the small volumes generated by APY, YSD, BQY′, and Y′RC; and therefore the volume is too small.

If we put $r_1 r_3 = r_2^2$ we obtain

$$\text{volume} = \tfrac{1}{3}\pi h(2r_1^2 + r_3^2),$$

which is a little too large, and therefore the true volume lies between these two limits, and a very close approximation to it is said to be given by the formula

$$\tfrac{1}{3}\pi h\{2r_1^2 + r_3^2 - \tfrac{1}{5}(r_1^2 - r_3^2)\}.$$

§ 113. *Ullage of a Cask.*—The quantity of liquor contained in a cask partially filled and the capacity of the portion which is empty are termed respectively the wet and dry ullage.

(α) *Ullage of a standing cask.*—By means of the method applied in § 105, the following rule is deduced:—

Add the square of the diameter at the surface, the square of the diameter at the nearest end, and the square of double the diameter half-way between; multiply the sum by the length between the surface and the nearest end, and by ·000472.

The product will be the wet or dry ullage according as the lesser portion of the cask is filled or empty.

(β) *Ullage of a lying cask.*—The ullage in this case is found approximately on the assumption that it is proportional to the segment of the bung circle cut off by the surface of the liquor. The rule adopted in practice is

$$\text{ullage} = \tfrac{4}{7} \text{ content} \times \text{segmental area.} \qquad \text{(W. T.*)}$$

MENTAL DISEASES. See INSANITY.

MENTON (Ital., *Mentone*), a cantonal capital in the department of Alpes-Maritimes, France, situated 15 miles north-east of Nice, on the shores of the Mediterranean. The town, which has a population of about 8000, rises like an amphitheatre on a promontory by which its semicircular bay (5 miles wide at its entrance, and bounded on the W. by Cape Martin and on the E. by the cliffs of La Murtola) is divided. It is composed of two very distinct portions: below, along the sea-shore, is the town of hotels and of foreigners, which alone is accessible to wheeled vehicles; above is that of the native Mentonese, with steep, narrow, and dark streets, spread over and clinging to the mountain, around the strong castle which was once its protection against the attacks of pirates. Facing the south-east, and sheltered on the north and west by high mountains, the Bay of Menton enjoys a delicious climate, and is on this account much frequented by invalids requiring a mild and equable temperature. The mean for the year is 61° Fahr., exceeding that of Rome or of

Pisa, and equalling that of Naples. Frost occurs on the average only once in ten years; in one particular year the thermometer did not fall below 46° Fahr. In summer the heat is never very great, the temperature rarely exceeding 86° Fahr. Winter and summer are the most agreeable seasons; in autumn the rain storms are accompanied by sudden changes of temperature, and in spring the sea breezes are apt to be violent. Besides the charms of its climate, Menton offers those of an almost tropical vegetation. Lemon-trees, olive-trees, and pines, rising above each other in successive stages, adorn the surrounding slopes. The district produces forty millions of lemons yearly, and this is the principal source of its natural wealth. The live-trees are remarkable for the great size they have attained in the course of the centuries during which they have continued to bear. Of their wood a multitude of fancy objects are made for sale to strangers.

The origin of Menton is unknown. During the Middle Ages it was successively occupied by the Saracens, the Genoese, and the princes of Anjou. In the middle of the 14th century it was purchased as a single domain by the Grimaldis, lords of Monaco. During the times of the republic and the first empire it belonged to France; but in 1815 it again became the property of the princes of Monaco, who subjected it to such exactions that in 1848 its inhabitants, weary of finding their reasonable demands put off with empty promises, proclaimed their town free and independent, under the protection of Sardinia. Menton, with the neighbouring commune of Roquebrune, was united to France in 1860, at the same time as Nice and Savoy.

MENTZ. See MAINZ.

MENZEL, WOLFGANG (1798–1873), poet, critic, and historian, was born June 21, 1798, at Waldenburg in Silesia, studied at Breslau, Jena, and Bonn, and after living for some time in Aarau and Heidelberg finally settled in Stuttgart, where, from 1830 to 1838, he had a seat in the Würtemberg "landtag." His first work, a clever and original volume of poems, entitled *Streckverse* (Heidelberg, 1823), was followed in 1824–25 by a popular *Geschichte der Deutschen* in three volumes, and in 1829 and 1830 by *Rübezahl* and *Narcissus*, the ballads upon which his reputation as a poet chiefly rests. In 1851 he published the romance of *Furore*, a lively picture of the period of the Thirty Years' War; his other very numerous writings include *Geschichte Europa's*, 1789–1815 (1853), and histories of the German war of 1866 and of the Franco-German war of 1870–71. From 1825 to 1848 Menzel edited a "Literaturblatt" in connexion with the *Morgenblatt*; in the latter year he transferred his allegiance from the Liberal to the Conservative party, and in 1852 his "Literaturblatt" was again revived in that interest. In 1866 his political sympathies again changed, and all his energies were employed to oppose the "particularism" of the Prussian "junkers" and the antiunionism of South Germany. He died on April 23, 1873. His large private library of 18,000 volumes was afterwards acquired for the university of Strasburg.

MEPHISTOPHELES, the name of one of the personifications of the principle of evil. In old popular books and puppet-plays the word appears in various forms,—as Mephistopheles, Mephistophiles, Mephistophilis, and Mephostophilis. In the *Tragical History of Doctor Faustus*, Marlowe writes "Mephistophilis"; in the *Merry Wives of Windsor* we find "Mephistophilus." The etymology of the word is uncertain. According to one theory, it may be taken to represent μηφωστοφίλης; in which case the meaning would be "one who loves not light." Another theory is that the word is a combination of the Latin "mephitis" and the Greek φίλος, signifying "one who loves noxious exhalations." Probably it is of Hebrew origin,—from מַפִּיץ, a destroyer, and בַּעַל, taken to mean a liar. This view is supported by the fact that almost all the names of devils in the magic-books of the 16th century spring from the Hebrew. In the old Faust legends the character of Mephistopheles is simply that of a powerful and wicked being who fulfils Faust's commands in order to obtain possession of his soul. Marlowe attributes to him a certain dignity and sadness, and there can be little doubt that the Mephistophilis of the *Tragical History* suggested some important traits of Milton's Satan. The name has been made famous chiefly by Goethe, whose conception of the character varied at different periods of his career. In the fragment of *Faust* published in 1790, but written many years before, Mephistopheles has a clearly marked individuality; he is cynical and materialistic, but has a man's delight in activity and adventure, and his magical feats alone remind us that he is preternatural. In revising and extending this fragment, which forms the chief portion of the first part of *Faust*, Goethe treated Mephistopheles as the representative of the evil tendencies of nature, especially of the tendency to denial for its own sake, rather than as a living person. This character Mephistopheles maintains in the second part, where, indeed, the name often stands for a pure abstraction.

See Julius Mosen, *Faust*; Düntzer, *Erläuterungen zu Goethe's Werken: Faust*; Vischer, *Goethe's Faust*.

MEQUINEZ (the Spanish form of the Arabic *Miknâsa*), a town of Morocco, the ordinary residence of the emperor, is situated in a fine hilly country about 70 miles from the west coast and 35 west-south-west of Fez on the road to Sallee, in 34° N. lat. and 5° 35′ W. long. The town-wall, with its four-cornered towers, is kept in good condition; and a lower wall of wider circuit protects the luxuriant gardens with which the outskirts are embellished. In the general regularity of its streets, and in the fairly substantial character of its houses, Mequinez ranks higher than any other town in Morocco; but it possesses few buildings of any note, except the palace, and the mosque of Mulei Ismael, which serves as the royal burying-place. At one time the palace (founded in 1634) was an imposing structure, but the finest part has been allowed to go to ruin. In 1721 Windhus described it as "about 4 miles in circumference, the whole building exceeding massy, and the walls in every part very thick; the outward one about a mile long and 25 feet thick." The best part consisted of oblongs enclosing large open courts or gardens. Mortar or concrete was the principal material used for the walls, but the pillars were in many cases marble blocks of great beauty and costliness (*A Journey to Mequinez*, London, 1725). Most of the inhabitants of Mequinez are connected more or less directly with the court. Their number has been very variously estimated by different travellers. Gråberg de Hemsö gives 56,000 in 1834, Rohlfs in 1861 from 40,000 to 50,000, and Conring in 1880 about 30,000. The town was formerly called Tákarart. Edrisi refers the present name to a Berber chief Meknás.

MERAN, a favourite health resort, and the capital of a district in South Tyrol, Austria, is picturesquely situated at the foot of the vine-clad Küchelberg, on the right bank of the Passer, about half a mile above its junction with the Adige, and 45 miles to the south of Innsbruck. Meran proper consists mainly of one long narrow street, called the Laubengasse, flanked by covered arcades. In a wider sense, the name is often used to include the adjacent villages of Untermais, Obermais, and Gratsch. The most noteworthy buildings are the Gothic church of St Nicholas, with its lofty tower, dating from the 14th and 15th centuries; the Spitalkirche, built in the 15th century, and restored in 1880; and the quaint old Fürstenhaus, or residence of the counts of Tyrol. The town contains a gymnasium, a nunnery and school for girls, an institution for sick priests, and several other charitable establishments.

Meran owes its high reputation as a resort for consumptive and nervous invalids to the purity of its air and its comparative immunity from wind and rain in winter. It stands in 46° 41′ N. lat., at a height of 1050 feet above the sea, and has a mean annual temperature of about 54° Fahr. Meran enjoys three seasons, being also visited in spring for the whey-cure and in autumn for the grape-cure. The arrangements for the comfort of the visitors are very complete; and the environs afford opportunity for numerous pleasant walks and excursions. The favourite promenade of the inhabitants is on a massive dyke, built to protect the town against the encroachments of the Passer. Nearly twenty old castles and chateaus are visible from the bridge over the Passer, the most interesting being Schloss Tyrol, an ancient edifice which has given its name to the entire country. Meran is now frequented by about 6500 patients and 8000 to 9000 passing travellers annually. In 1880 its population, including Obermais and Untermais, amounted to 5334 souls.

Meran is probably the representative of the Roman Urbs Majensis, afterwards known as Maiania. It became a town in 1290, and down to 1490 was the capital of the counts and dukes of Tyrol. The town suffered somewhat during the Peasants' War in the 16th century, and subsequently from destructive floods. As a health-resort it has been known for about forty years. The whole region in which it lies is singularly rich in historic interest.

Authorities.—Beda Weber, *Meran*; Dürlingsfeld, *Aus Meran*, 1868; Noë, *Der Frühling von Meran*; Stampfer, *Chronik von Meran*, 1867, and *Geschichte der Stadt Meran*, 1872; Fircher, *Meran als Klimatischer Kürort*, 1870; Plant, *Führer durch Meran*, 2d ed., 1879; Knoblauch, *Meran*, 5th ed., 1881.

MERCATOR, Gerardus (Latinized form of Gerhard Krämer) (1512–1594), mathematician and geographer, was born at Rupelmonde in Flanders, May 5, 1512. Having completed his studies at Louvain, he devoted himself to geography, and, after being for some time attached to the household of Charles V., he was appointed cosmographer to the duke of Juliers and Cleves in 1559, taking up his residence at Duisburg, where he died December 2, 1594. One of his earliest cartographical works was a terrestrial globe (1541), followed in 1551 by a celestial globe. In 1552 he published a treatise *De usu annuli astronomici* (Louvain), and at Cologne in 1569 his *Chronologia, hoc est temporum demonstratio . . . ab initio mundi usque ad Annum Domini* 1568, *ex eclipsibus et observationibus astronomicis, sacris quoque Bibliis, &c.* In the same year was published the first map on Mercator's well-known projection, with the parallels and meridians at right angles, for use in navigation. At Cologne, in 1578, appeared his *Tabulæ geographicæ ad mentem Ptolemæi restitutæ et emendatæ*. The work by which he is chiefly known is his atlas, published in 1594 at Duisburg, in folio, under the title of *Atlas, sive Cosmographicæ meditationes de fabrica mundi*. It contains, besides the maps, cosmographical and other dissertations, some of the theological views in which were condemned as heretical; it was completed by Hondius in 1607. Several of the maps had been previously published separately, the atlas being delayed to allow Ortelius to complete his. Mercator also published in 1592 a *Harmonia Evangeliorum*.

MERCURIAL AIR-PUMP. This name is given to two distinct instruments, one of which is founded on statical, the other on hydrodynamical principles.

1. *The Statical Pump.*—The famous spiritualist Swedenborg was the first to conceive an air-pump in which a mass of mercury, by being made to rise and fall alternately within a vertical vessel, should do the work which in the ordinary instrument is assigned to the piston. He published a description of his pump in 1722; but it is questionable whether his design was ever realized. Of numerous subsequent inventions the only one which, in fact, has survived is the admirably simple and yet efficient instrument first described in 1858, but constructed some time before, by H. Geisler of Bonn, which at once, and justly, met with universal acceptance.

The general scheme of Geisler's pump is shown in fig. 1. A and B are pear-shaped glass vessels connected by a long narrow india-rubber tube, which must be sufficiently strong in the body (or strengthened by a linen coating) to stand an outward pressure of 1 to 1½ atmospheres. A terminates below in a narrow vertical tube *c*, which is a few inches longer than the height of the barometer, and to the lower end of this tube the india-rubber tube is attached which connects A with B. To the upper end of A is soldered a glass two-way stop-cock, by turning which the vessel A can either be made to communicate through *s* and a hole in the hollow cock with the vessel to be exhausted (I., fig. 2), or through *g* with the atmosphere (II., fig. 2), or can be shut off from both when the cock holds an intermediate position. The apparatus, after having been carefully cleaned and dried, is charged with pure and dry mercury, which must next be worked backwards and forwards between A and B to remove all the air-bells. The air is then driven out of A by lifting B to a sufficient level, turning the cock into position II., and letting the mercury flow into A until it gets to the other side of the stop-cock, which is then placed in the intermediate position. Supposing the vessel to be exhausted to have already been securely connected with *b*, we now lower the reservoir B so as to reduce the pressure in A sufficiently below the tension in the gas to be sucked in, and, by turning the cock into position I., cause the gas to expand into and almost fill A. The cock is now shut against both *a* and *b*, the reservoir lifted, the gas contents of A discharged through *a*, and so on, until, when after an exhaustion mercury is let into A, the metal strikes against the top without interposition of a gas-bell. In a well-made apparatus the pressure in the exhausted vessel is now reduced to $\frac{1}{10}$ or $\frac{1}{20}$ of a millimetre, or even less. An absolute vacuum cannot be produced on account of the unavoidable air-film between the mercury and the walls of the apparatus.

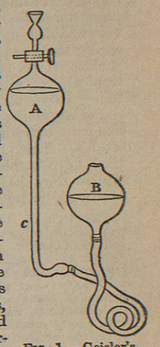

Fig. 1.—Geisler's Mercurial Air-Pump.

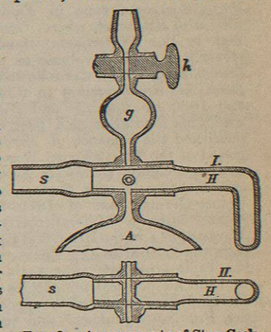

Fig. 2.—Arrangements of Stop-Cock in Air-Pump.

The great advantage of the mercurial over the ordinary air-pump is that it evacuates far more completely than the latter, that it affords direct and unmistakable evidence of the exhaustiveness of its work, and—last not least—that it enables one to transfer the gas sucked out to another vessel without loss or contamination, so that it can be measured and analysed. On account of this latter feature more especially, the instrument is highly valued as an auxiliary in gasometric researches. Without it the researches on which rests our present knowledge of the gases of the blood could not have been carried out. The actual instrument, as constructed for various kinds of work, has of course various complexities of detail omitted in the above description. For these the reader must refer to handbooks of practical physiology.

As it takes a height of about 30 inches of mercury to balance the pressure of the atmosphere, a Geisler pump necessarily is a somewhat long-legged and unwieldy instrument. It can be considerably shortened, the two vessels A and B brought more closely together, and the somewhat objectionable india-rubber tube be dispensed with, if we connect the air-space in B with an ordinary air-pump, and by means of it do the greater part of the sucking and the whole of the lifting work. An instrument thus modified was constructed by Poggendorff (see his *Annalen*, vol. cxxv. p. 151, 1865), and another, on somewhat different principles, by Prof. Dittmar (see the "*Challenger*" *Reports*).

Even a Geisler's stop-cock requires to be lubricated to be absolutely gas-tight, and this occasionally proves a nuisance. Hence a number of attempts have been made to do without stop-cocks altogether. In Töpler's pump[1] this is attained by using both for the inlet and the outlet vertical capillary glass tubes, soldered, the former to somewhere near the bottom, the latter to the top of the vessel. These tubes, being more than 30 inches high, obviously act as efficient mercury-traps; but the already considerable height of the pump is thus multiplied by two. This consideration has led Alexander Mitscherlich (*Pogg. Ann.*, cl. 420, 1873), and quite lately F. Neisen (*Z. f. Instrumentenkunde*, 1882, p. 285) to introduce glass valves in lieu of stop-cocks. As glass floats on mercury, such valves do not necessarily detract from the exhaustive power of the pump.

2. *The Dynamic Pump.*—This was invented in 1865 by H. Sprengel. The instrument, in its original (simplest) form (fig. 3), consists of a vertical capillary glass tube *a* of about 1 mm. bore, provided with a lateral branch *b* near its upper end, which latter, by an india-rubber joint governable by a screw-clamp, communicates with a funnel. The lower end is bent into the shape of a hook, and dips into a pneumatic trough. The vessel to be exhausted is attached to *b*, and, in order to extract its gas contents, a properly regulated stream of mercury is allowed to fall through the vertical tube. Every drop of mercury, as it enters from the funnel, entirely closes the narrow tube like a piston, and in going past the place where the side tube enters entraps a portion of air and carries it down to the trough, where it can be collected. If the vertical tube, measuring from the point where the branch comes in, is a few inches greater than the height of the barometer, and the glass and mercury are perfectly clean, the apparatus slowly but surely produces an almost absolute vacuum.

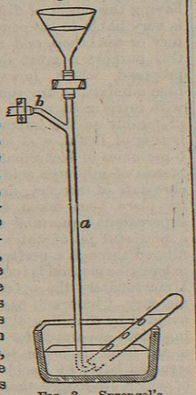

Fig. 3.—Sprengel's Air-Pump.

The great advantages of Sprengel's pump lie in the simplicity of its construction and in the readiness with which it adapts itself to the collecting of the gas. It did excellent service in the hands of Graham for the extraction of gases occluded in metals, and since then has become very popular in gas-laboratories, especially in Britain. Many improvements upon the original construction have been proposed. One of these which deserves mention is to pass the mercury, before it enters the "falling" tube, through a bulb in which a good vacuum is maintained, by means of an ordinary air-pump or a second "Sprengel." (W. D.)

MERCURY was the Roman god who presided over barter, trade, and all commercial dealings. His nature is probably more intelligible and simple than that of any other Roman deity. His very name, which is connected with *merx*, *mercator*, &c., shows that he is the god of merchandise and the patron of merchants. In the native Italian states no merchants and no trade existed till the influence of the Greek colonies on the coast introduced Greek customs into the cities of the land. All the usages and terminology of trade, and all the religious ceremonies connected with it, were borrowed by the Romans from the Greeks. It was no doubt under the rule of the Tarquins, when the prosperity of the state and its intercourse with the outer world were so much increased, that merchants began to ply their trade in Rome. Doubtless the merchants practised their religious ceremonies from the first, but their god Mercurius was not officially recognized by the state till the year 495 B.C. Rome frequently suffered from scarcity of corn during the unsettled times that followed the expulsion of the Tarquins. Various religious innovations were made to propitiate the gods; in 496 the Greek worship of Demeter, Dionysus, and Persephone was established in the city (see Liber), and in 495 the Greek god Hermes (*q.v.*) was introduced into Rome under the Italian name of Mercurius (Livy, ii. 21, 27). Preller thinks that at the same time the trade in corn was regulated by law, and a regular college of merchants was instituted. This *collegium* was under the protection of the gods their annual festival was on the Ides of May, on which day the temple of the god had been dedicated at the southern end of the *circus maximus*, near the Aventine; and the members were called *mercuriales* as well as *mercatores*. The Ides of May was chosen as the feast of Mercury, obviously because Maia was the mother of Hermes, *i.e.*, of Mercury (see Maia); and she was worshipped along with her son by the *mercuriales* on this day. According to Preller, this religious foundation had a political object; it established on a legitimate and sure basis the trade between Rome and the Greek colonies of the coast, whereas formerly this trade had been exposed to the capricious interference of the Government officials for the year. Like all borrowed religions in Rome, it must have retained the rites and the terminology of its Greek original (Festus, p. 257). Mercury became the god, not only of the *mercatores* and of the corn trade, but of buying and selling in general; and it appears that, at least in the streets where shops were common, little chapels and images of the god were erected. There was a spring dedicated to Mercury between his temple and the *Porta Capena*; every shopman drew water from this spring on the Ides of May, and sprinkled it with a laurel twig over his head and over his goods, at the same time entreating Mercury to remove from his head and his goods the guilt of all his deceits (Ovid, *Fasti*, v. 673 *sq.*). The art of the Roman tradesman was evidently like that of an Oriental tradesman in modern times, and the word *mercurialis* was popularly used as equivalent to "cheat." In the Latin poets Mercury is often gifted with some of the manifold characters of the Greek Hermes, but this finer conception seems to have had no real existence in Roman religion.

Roman statuettes of bronze, in which Mercury is represented, like the Greek Hermes, standing holding the caduceus in the one hand and a purse in the other, are exceedingly common. The caduceus must have been introduced as a symbol of Mercury at a very early time, for it is found on Italian coins as early as the 4th century before Christ, and we learn that several were kept as sacred objects in the *adytum* of the sanctuary at Lavinium (Dion. Hal., i. 67). But its foreign origin is shown by the fact that, although it was a sign of peace, it was never borne by the *fetiales*, the old Italian heralds. The very name is derived from the Greek κηρύκειον. Preller's view (*Röm. Myth.*) that *mercuriales* and *mercatores* are the same guild is a tempting one, but its truth is very doubtful. Mommsen thinks that *mercuriales* were a purely local guild, viz., the *pagani* of the Circus valley.

MERCURY, in chemistry, is a metal (symbol Hg) which is easily distinguished from all others by its being liquid at even the lowest temperatures naturally occurring in moderate climates. To this exceptional property it owes the synonyms of *quicksilver* in English (with the Germans *quecksilber* is the only recognized name) and of *hydrargyrum* (from ὕδωρ, water, and ἄργυρος, silver) in Græco-Latin.

[1] See *Dingler's Polytechn. Journal*, 1862; an improved form by Bessel-Hagen is described in *Wiedemann's Annalen*, xii. 425, 1881.