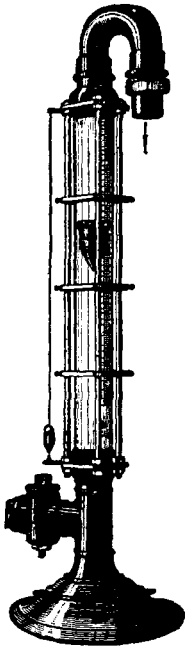
this rotation always keeps it in a vertical position and pre friction on the wall of the tube. On the body of the float is a white, spiral line, which makes visible its quick rotation, and thus one can note if the meter is working or not.



The glass tube is graduated on the outside, and the calibration is obtained empirically, since its interior cannot be made with absolutely uniform slope. The scale on the glass tube may be made to read directly in cubic feet per hour (minutes or seconds) or in millimeters. In the latter case, tables are furnished with the meter for the determination of the exact volume of gas in cubic feet flowing through the meter. The instrument works as follows:

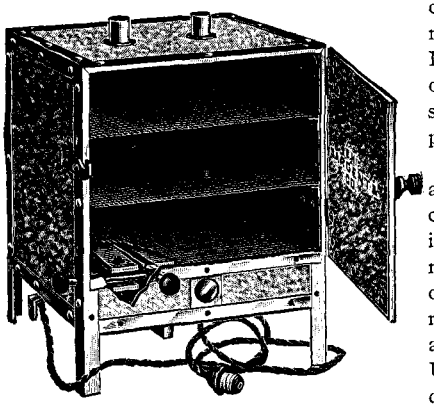
The float is lifted by the gas until the power which forces the gas current past it —*i. e.*, the loss of pressure at that point—is equal to the weight of the float; or, in other words, the float is lifted so high that it leaves an opening between itself and the inside wall of the tube which allows the gas to flow through with a drop in pressure equal to the weight of the float.

The reading of the meter depends, of course, upon the density of the gas, as a denser gas, for the like loss in pressure requires a larger area for the passing of the same amount of gas. It, therefore, lifts the float higher and gives an apparently larger reading than a lighter gas.

Rotameters are adapted to measure, regulate and control the quantity (or the velocity) of gases in pipe lines. They are installed directly in the line. The smallest current will, it is claimed, lift the float at once and hold it at a height corresponding or proportional to the velocity of the gas in the line. The scale on the outside of the glass tube gives directly the quantity of gas per hour (minute or second).

AN AUTOMATIC ELECTRIC DRYING OVEN

A drying oven, said to be practical and inexpensive, and designed especially to meet the requirements of the industrial chemist, is being marketed by Messrs. E. H. Sargent & Co., of Chicago, Ill. It is shown in the accompanying illustration.



Electrically heated and automatically controlled, the claim is made that the oven may be set for any desired heat above room temperature and under 160° C. Under proper conditions, the manufacturers state, it will maintain that temperature within 1° C.

The oven has as much working space as the ordinary 10-inch × 12-inch single copper wall oven, it does not occupy any more space, and it may be easily moved from place to place. It has a working space 10 inches high, 12 inches wide and 10 inches deep, and is provided with 2 shelves. The heating device with the thermostatic control is located in the base of the oven, a locking device is provided to insure against an accidental movement of the control mill-head on the outside, and there is a peep-hole for observing the heating coils. The manufacturers state that each unit of the heating element is easily accessible and replaceable in case of injury, without the employment of tools or the dismounting of the whole heating element. Adjustible ventilation is provided to facilitate drying. The current consumption is very small, and the oven may be operated from an ordinary lamp socket.

A number of these ovens, which are constructed of asbestos composition bound with metal, have been installed for practical trial; the manufacturers report that no complaint has been received.

THE MINERAL PRODUCTION OF SWEDEN

The official report of the Swedish mineral output for 1912 shows the following (*Eng. Min. J.*, **96**, 507, 510):

There were 6,700,556 metric tons of iron ore produced. Of this amount, 5,945,394 tons were considered first-class. The Swedish iron works consumed for the entire production of iron 43,219,576 hectoliters of wood charcoal; 359,584 tons of coal, 136,472 tons of coke; and, for the production of ingots, 337,321 metric tons of pig iron and 212,143 metric tons of scrap iron. The average Swedish blast furnace produces 20.07 metric tons of pig iron per day.

There were also mined the following ores in metric tons: zinc, 50,036; silver-lead, 2,877; iron pyrites, 31,835; manganese, 5,101; copper, 3,059. The metal production, excluding iron, was as follows: copper, 3,957 metric tons; zinc, 3,228; lead, 1,072 metric tons; silver, 961 kg.; gold, 30 kg. Other products and by-products of the mineral industry were: zinc sulfide, 33,522 metric tons; copper sulfate, 870; feldspar, 34,305; quartz, 22,365; alum, 144; ferrous sulfate, 335; graphite, 79; and powdered pyrolusite, 62 metric tons. All figures are arranged in the order of descending value.

THE PRODUCTION OF CALCIUM CARBIDE

It is reported that the world's production of calcium carbide is increasing. According to statistics published in *Chemical News*, **108**, 106, it reached 300,000 tons in 1912. In Europe, Germany is the principal consumer of carbide. In 1911, 37,000 tons were imported, and in 1912 the importations amounted to 48,000 tons; no exportations were reported. Sweden produces the largest quantity of calcium carbide and consumes the least. The factories at Odda are capable of producing 80,000 tons per annum. In 1912, Switzerland exported calcium carbide valued at $1,000,000; Austria-Hungary exports about 11,000 tons per year; England imports only between 14,000 and 18,000 tons; while France imported 3,302 tons and exported 6,225 tons in 1912. It is especially the development of lighting by acetylene in the French colonies which has increased so regularly the exports of carbide.

PROGRESS OF THE ELECTRIC STEEL INDUSTRY

A list of electric furnaces in operation by steel manufacturers in the United States is given in *Iron Age*, July 10, 1913.

Seven of these furnaces are of the Héroult design and include that of the Halcomb Steel Co., Syracuse, N. Y., a five-ton furnace producing tool steel; the Firth-Sterling Steel Co.'s furnace at McKeesport, Penn., of the same size and producing the same material; another belonging to the same company and at the same place, 2½-ton size, also producing tool steel; the Illinois Steel Co., Chicago, Ill., 15-ton capacity, producing rails; the American Steel & Wire Co., Worcester, Mass., 16-ton, producing wire rods; National Malleable Castings Co., Sharon, Penn., 3-ton capacity, producing castings; Treadwell Engineering Co., Easton, Penn., 2-ton capacity, also producing castings.

Of the Girod design there is the one-ton tool-steel furnace of the Simonds Manufacturing Co., Lockport, N. Y.; the Bethlehem Steel Co., South Bethlehem, Penn., a 10-ton tool-steel furnace; the 3-ton furnace, producing castings, of the Washington Iron Works, Seattle, Wash., and the 5-ton castings furnace of the

Portland Bronze & Crucible Steel Foundry, Portland, Ore. The Hering design includes the 1/2-ton castings furnace of the Niagara Steel Castings Co., Buffalo, N. Y., and the 1/2-ton tool-steel furnace of the Firth-Sterling Steel Co., McKeesport, Penn. The 2-ton castings furnace of the Crucible Steel Castings Co., Lansdowne, Penn., is of the Roechling-Rodenhauser design, while the 3/4-ton castings furnace of Deere & Co., of Moline, Ill., is of the Kjellin type. The 1 1/2-ton castings furnace of the Buchanan Electric Steel Co., Buchanan, Mich., is of the modified Stassano design, and the 1 1/2-ton furnace of the Crucible Steel Castings Co., Milwaukee, Wis., together with the 1 1/2-ton castings furnace of the Chicago Electric Castings Co., are designed by the Metallurgical Engineering Co., Chicago, Ill. The 1-ton special steel furnace of the Harrow Spring Co., Kalamazoo, Mich., is of the Greene induction type. The accompanying table shows the installations of electric furnaces by countries.

ELECTRIC FURNACES BY COUNTRIES

Countries	Number	Countries	Number
Germany	34	Spain	1
Italy	20	Mexico	4
England	16	Canada	3
France	13	Japan	1
Austria	10	Brazil	1
Sweden	6		—
Russia	4	Total, foreign	121
Belgium	3	United States	19
Norway	3		—
Switzerland	2	Grand total	140

IRON CASTINGS TO RESIST CORROSION

The Canadian Engineer, July 17, 1913, states that some practical rules laid down by the American Foundrymen's Association for obtaining castings resistant to corrosion are the following: (1) Use white iron if possible (white irons are especially useful where any acidity is to be encountered); (2) if it is not practicable to use white iron castings, chill those surfaces which are to be in contact with corrosive solutions; (3) if gray iron must be used, obtain dense, close-grained castings through the use of steel scrap or otherwise; (4) avoid oxidized metal, using pig irons of good quality, together with good cupola practice; and (5) keep the sulfur as low as possible. If possible, use deoxidizing agents, such as titanium or vanadium.

THE PRODUCTION OF FINISHED STEEL IN 1912

The Bureau of Statistics of the American Iron and Steel Institute in a special bulletin issued August 7th, announced complete statistics of the production of iron and steel merchant bars, concrete bars, skelp, nail plate, hoops, bands and cottonties, sheet piling, etc., in the United States in 1912; also statistics of the production of all kinds of finished rolled forms.

PRODUCTION OF FINISHED ROLLED IRON AND STEEL BY STATES
(Gross tons)

STATE AND SUBDIVISIONS	1912	1911
Maine, Mass.	193,401	157,448
R. I., Conn.	81,410	73,788
New York	1,034,071	768,763
New Jersey	175,143	154,563
Pennsylvania	12,254,040	9,426,827
Del., Virginia	32,888	30,487
Maryland	284,617	264,222
West Va.	591,333	472,177
Ky., Tenn., N. C., Ga., Tex.	192,737	187,149
Alabama	532,247	356,609
Ohio	4,330,487	3,382,063
Indiana	1,873,906	1,156,411
Illinois	2,253,664	1,939,350
Mich., Wis.	246,991	148,285
Missouri	82,883	68,961
Kan., Colo., Wash.	438,622	407,314
Ore., Cal.	58,401	44,754
Total	24,656,841	19,039,171

The bulletin shows the following totals for 1912 of all kinds of finished rolled forms of iron and steel, etc., with the production of similar articles in 1911, in gross tons:

ROLLED IRON AND STEEL	1911	1912
Rails	2,822,790	3,327,915
Plates and sheets	4,488,049	5,875,080
Nail and spike plate	48,522	45,331
Wire rods	2,450,453	2,653,553
Structural shapes	1,912,367	2,846,487
Merchant bars	3,047,362	3,697,114
Bars for concrete work	258,741	274,332
Skelp, flue, etc.	1,980,673	2,446,816
Long angle splice bars, etc.	(a)	571,772
Hoops	225,074	270,007
Bands and cotton ties	342,810	587,395
Sheet piling	22,827	22,276
Railroad ties	39,197	41,396
All other finished rolled	1,169,191	1,187,108
Rolled forg. blms. and billets	231,115	462,476
Exports blooms, billets, etc.	(a)	347,783
Total	19,039,171	24,656,841

(a) Statistics not collected in 1911.

THE COMPOSITION OF WATER GAS

Vignon (*Compt. rend.*, **156**, 1995) confirms the observation of Clement and Desormes and of Langlois that water gas always contains some methane. Investigation has shown that the formation of the methane is due to the presence of calcium oxide in the coke used. Experiments on the action of steam at 1000° on mixtures of coke and lime showed that the percentage of methane in the water gas increased with increasing proportions of lime. The formation of the methane is considered by Vignon to be due to the following reactions:

$$4CO + 2H_2O = 3CO_2 + CH_4,\ 2CO + 2H_2 = CO_2 + CH_4 \text{ and}$$
$$CO_2 + 4H_2 = CH_4 + 2H_2O$$

The lime is said to act as a catalyst in these reactions.

THE PAPER INDUSTRY OF AUSTRIA-HUNGARY

Paper, September 10, 1913, reports that new features have marked the close of the business year of the Austro-Hungarian paper industry.

This is particularly the case as regards the arrangements for uniform prices and terms. In this matter the example of the German Association seems to have been followed.

The Balkan troubles seem to have exercised a special effect upon the Austrian paper industry, of which the Balkan territory had long been special outlet. Among the measures of a social-political order, to which the attention of the association has been directed, was the question of resting from work on Sundays and the prohibition of juvenile night work. The question of the increased cost of wood and other raw materials had engaged the attention of the Government in connection with the augmented difficulty of procuring supplies. The proposed imposition of an export duty on rags had also been much discussed on the same lines as have marked that proposal in Germany. Another question of importance has been the revision of commercial treaties with foreign nations.

According to the statistics of production issued by Herr Franz Kramany the figures show in 1912:

	Tons
Paper of all kinds	424,785
Board of all kinds	49,521
Wood pulp	258,036
Cellulose	292,195
Bleached straw pulp	2,762
Total, 1912	1,027,299
Total, 1911	981,740
Total, 1910	954,036
Total, 1909	893,856