

### THE CONDENSATION OF GASES ON GLASS.

It is well known to those who endeavor to obtain in glass vessels the very perfect vacuum first arrived at by Crookes, that the operation of exhausting by the mercury pump is much facilitated by heating the tubes of the pump and the glass vessel to a high temperature. The difficulty of removing the film of air and moisture adhering to glass tubes is also well known to makers of barometers and thermometers. When in exhausting by the Sprengel pump the vacuum is gauged by a millimeter or half a millimeter of mercury, the drops of mercury falling in the tube of the pump produce a loud, sharp, hammering sound, and sometimes break the tube. If the tube be now heated, however, by a Bunsen flame, this hammering ceases, and on close inspection of the fall tubes, air is seen to be carried down in them. This air is liberated from the glass walls of the tube by the heating. The deposition of thin films of moisture on glass insulating-rods is also well known. Professor Quincke finds their thickness to be comparable with  $5 \div 10$  cm. Mr. J. T. Bottomley, an English investigator, has recently made some experiments on this subject, his object being to measure the quantity of gas condensed on the surface of glass. The glass employed consisted of fine glass thread—some of it made from flint-glass rods, the rest of flint-glass tubes. According to his results, communicated to the British Royal Society, Mr. Bottomley found that 8.24 per cent. of the gas deposited on the glass fiber was carbonic acid gas, and 24.8 per cent. of oxygen. The residue, 75.2 per cent., was mainly, if not wholly, nitrogen. The total quantity of gas collected was calculated to be at  $15^{\circ}$  C., and 760 mm. pressure, .45 c. cm., and the glass surface of condensation to be 1448 sq. cm., or equal to that of a square 38 cm. in the side.—*Ex.*

### RESISTANCE OF WIRES ON COILING.

An interesting series of experiments has recently been made by Mr. J. Hopps, of the Indian Engineering College, Cooper's Hill, England, and his results will be published shortly in the "Proceedings" of the British Physical Society. We may state, however, that Mr. Hopps experimented with wires of various metals, and employed an ingenious testing machine, recently exhibited to the Physical Society. Observers have found that coiling iron wire decreased its resistance, and uncoiling it increased its resistance. Mr. Hopps, however, finds that with soft iron wire, during the first few operations of coiling and uncoiling, the coiling is accompanied by a degree of resistance, and uncoiling by an increase. The same holds for wires of copper, German silver, lead, aluminium and magnesium. With zinc an increase of resistance attends coiling and uncoiling, but the increase for coiling is only from  $\frac{1}{3}$  to  $\frac{1}{50}$  of what it is on uncoiling. It will be remembered that, during the Paris Electrical Exhibition of 1881, M. Violle suggested as a standard the light radiated by a square centimeter of platinum at the fusing point, or, in other words, at its point of solidification. The congress which then sat recommended the Carcel lamp, of the Dumas and Regnault type, as a secondary standard, and the International Conference has now definitely adopted the Violle light as the primary standard.—*Ex.*

### EFFECT OF LOW PRICES.

The three-cornered fight among wages, prices and interest (profits), has an excellent illustration in the iron industry. Prices return to the manufacturer and his workmen the equivalent of the product, and, after paying out of this the other items of the cost of production, interest and wages (and a small amount for management), must divide the rest. Late years have demonstrated the diminution of interest through price reduction, and that wages are at times subject to loss through the same decrease of returns. Capital would show the loss upon labour, and labour upon capital, and sometimes they are compelled to divide the loss; but, in any event nearly all the strikes have this origin. In 1881, when \$5.50 was fixed at the rate for puddling, bar iron sold for \$56 and pig iron at \$25 per ton; now the same bar iron sells at \$40.32, a decline of 28 per cent., and the same pig iron at \$18, a decline of 28 per cent. The falling price has cut down the value of the product, and hence the amount to be divided as interest and wages. Manufacturers say that wages must go down and, the workmen not agreeing, 55,000 of them were lately out of work and iron furnaces worth millions of dollars were doing nothing.

### QUICK CAPITAL.

One of the savings that modern business has developed is the quick turning over of capital. An "active" capital of \$500 that is turned over twice a year, is just as serviceable as a capital of \$1,000 in the same business turned over but once a year. The saving is in the amount of interest, which, in the former case, is just half what it is in the latter. The fast mail train recently put on the Pennsylvania railroad, so shortens the time between New York and St. Louis that the bankers and merchants of the latter city will save about \$60,000 a year in interest on remittances. Under the new arrangement the remittances will pass through the Clearing House at New York the day of their arrival instead of on the following day, as before, and one day's interest upon about a million of dollars is saved to St. Louis business men.

### SOUTHERN PINE.

The supply of southern pine seems exhaustless. A large fleet of schooners and other craft is devoted exclusively to its transportation from Virginia, North and South Carolinas, Georgia and Florida. The latter state is renowned for the long boards that are cut from its trees. Georgia owns the standard of quality. Trees from which the pitch has been partly removed in the manufacture of turpentine, turn out lighter wood, but such cuttings have not the wearing merit of sawings from virgin trees. Since the war, owing to better railroad facilities, large tracts of new forests have been opened to commerce. Europe, especially England, is a large buyer of this wood. Its excellence in railroad work on account of toughness and comparative lightness, is becoming recognized abroad as well as in this country. When yellow pine vessels become dismantled or capsized at sea they form most dangerous wrecks, and at night are an especial terror to navigators. Their buoyant cargoes prevent them from sinking. Several abandoned schooners have been known to drift about the ocean from six to eighteen months. In ship work the durability of this pine has been long acknowledged, but it is only within a few years that its usefulness for house purposes have been appreciated. In former times it was tedious stuff to work by hand, but its toughness is now overcome by improved tools and steam dressing, and the increased call for hard pine wainscotings and ceilings that has attended the active building operations of late, has been readily supplied. No wooden flooring that is used bare is superior to narrow strips of seasoned Georgia yellow pine. A well-laid surface of the wood improves with age and friction, its resinous quality hardens and forms for it a sort of natural varnish. Art, too, has recently touched this sturdy old timber. Thin door panels are sawed out of planks containing thick deposits of rosin. When these panels are placed in doors that the sun can strike, the effect produced is a rich, red wine color, showing inside of the room. There is a process of artificially seasoning pine. There is also one of steaming it, so that the rosin will show uniformly in the board, but the naturally veined surfaces are handsome enough when properly smoothened.—*New York Tribune.*

### THE INERTIA OF CAPITAL.

In some books on political economy the removal of capital from one employment to another is spoken of lightly, as if it were an easy process. No delusion can be greater. Such changes can, of course be made in some kinds of business without very serious loss. A banker, whose fixed plant consists of a few chairs and tables, may, if he has been prudent, wind up his affairs and invest his capital elsewhere, but a manufacturer or farmer, with money sunk in all sorts of ways, cannot sell his plant without heavy loss, except in very particular times and under extraordinary circumstances. The times when he could so sell are prosperous times, when he would not desire to abandon his occupation and find another. The times when he wishes to retire would be the very times when others besides himself are suffering from reduced profits, and when few would be disposed to enter on such a business. So, if he sells, he must sell at a great sacrifice in order to tempt a purchaser. Rather than do this he will continue his business, at the risk of no profit, or at a loss.—*The Contemporary Review.*