

THE EDINBURGH INTERNATIONAL EXHIBITION.

In the summer of this year, under the patronage of the Queen, an important exhibition of industry, science, and art will be held at Edinburgh, says the *London News*, from which we take our cut, the first "international exhibition" in the ancient capital of the Scottish nation, but of which a prominent feature will be the display of the material resources, manufactures, and art treasures of Scotland. The list of patrons includes many influential persons of the Scottish nobility and gentry, with the Marquis of Lothian as president, and the Earl of Aberdeen and the Provoosts of Edinburgh and Glasgow as vice-presidents; Bailie Clark is chairman of the committee; Messrs. R. Hutcheson, of Carlowrie, James Gowans, Dean of Guild, and Councilor Andrew Ritchie are the vice-chairmen. The exhibition will be divided into the following classes: Minerals, mining, quarrying, and metallurgy; pottery, glass, and kindred industries; chemistry, pharmacy, and food, including drinks; animal and vegetable substances, and their manufacture; paper, stationery, printing, and bookbinding; steam engines and other "prime movers"; metal manufactures; railway, tramway, and carriage appliances; engineering, building, and ship building; fur-

duced on one side of the mould, and is drawn through the mass of dry powder by means of a pump connected with the opposite side; this water contains a certain quantity of finely powdered cement, which is thus caused to penetrate through the mass, expelling at the same time the air and cementing it firmly together. The artificial stone is subjected to further pressure. In this manner slabs of the required size can be formed economically. Carbonate of lime may be substituted for cement, in which case the stones are of a lighter color.

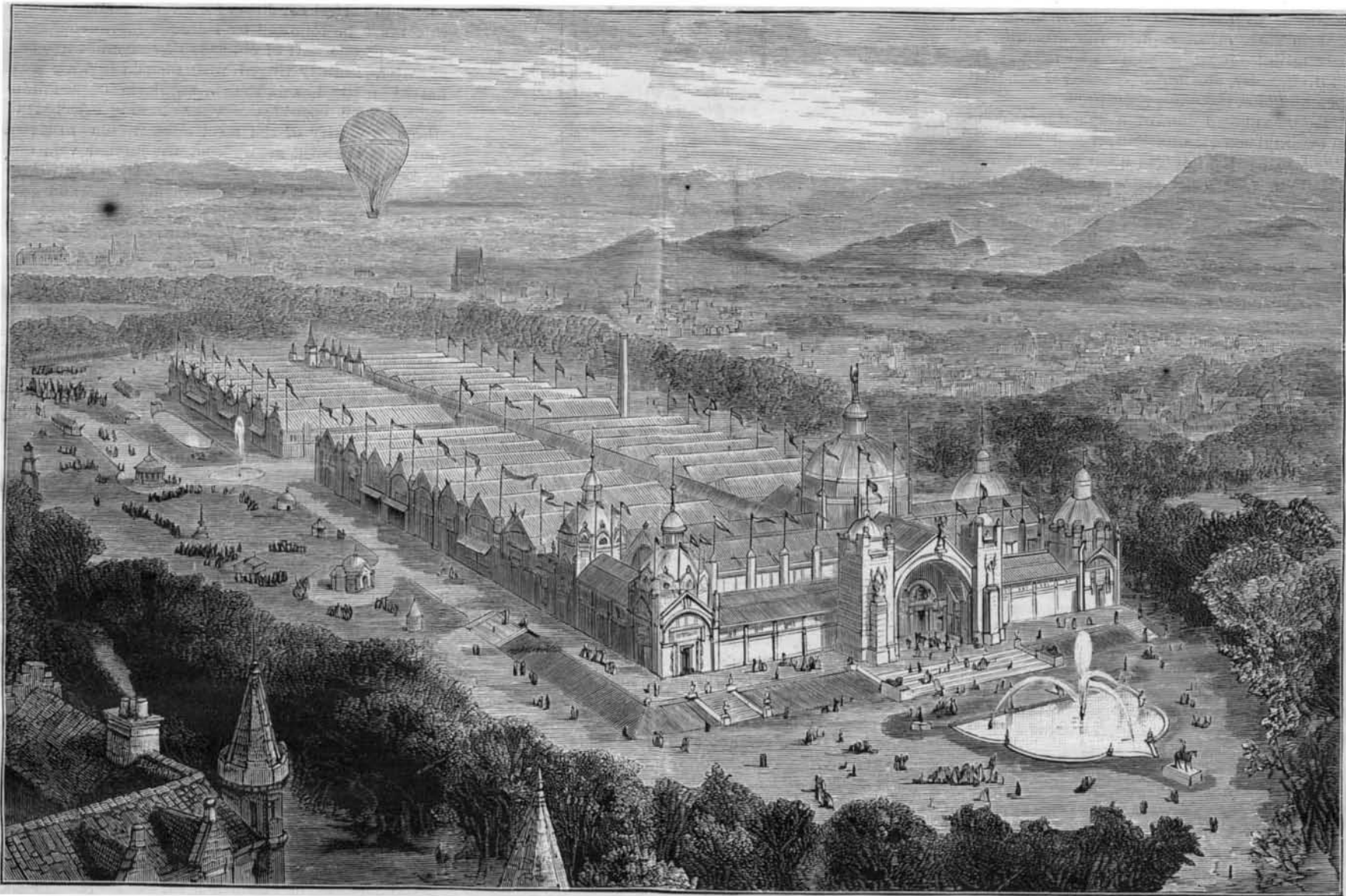
Fires from Steam Pipes.

Some of the facts brought out in the course of the discussion upon the setting of wood on fire by steam pipes, which occupies considerable space in several technical journals just now, point strongly to the desirability of instituting somewhere a connected series of experiments on the subject, the results of which should be made public for the general benefit. It is remarkable that several writers have recently mentioned, as the result of their experience, that wood-work near a leaky joint in a steam pipe, or exposed to escaping vapor, has been charred, and even set on fire, while the much higher temperature of a perfect

charred at a comparatively low temperature. We can ourselves remember a case where the cover of a house hot water tank, the thermometer in which would probably never rise to 200°, was found, after some years of use, to be deeply charred; and it may be fairly questioned, not only whether the heat of steam without water is capable of kindling wood, but whether moisture, with a comparatively feeble degree of warmth, may not be more dangerous than has been hitherto suspected.—*American Architect*.

An English Patent Filter.

After having described his invention (a charcoal filter), the inventor concludes with the following statement: "I first became aware of the purifying qualities of charcoal some twenty years ago, in the course of my readings and practice as an operative chemist, but it never occurred to me to apply it to the purification of water until the early part of last summer, when I at once gave my whole soul to the subject, and have continued incessantly to pursue it with all my energy during eight months, strengthened by the hearty and efficient co-operation of my dear wife, the support of our brother Sampson, the enthusiastic admiration of our dear friend, Mr. Robert Noyes, and our brother-in-



THE BUILDING FOR THE INTERNATIONAL INDUSTRIAL EXHIBITION AT EDINBURGH.

niture and decoration; scientific apparatus; educational apparatus; fishery and fish curing; the fine arts; and reproductions of the streets and architecture of "Old Edinburgh," with artistic industries represented in the city guilds and crafts, and the historical costumes of the fourteenth, fifteenth, and sixteenth centuries. The site, placed at the disposal of the committee by the Town Council of Edinburgh, is in one of the finest and most accessible parks in that beautiful neighborhood. The exhibition building, of which we give an illustration, is designed by Messrs. John Burnes & Son, architects, of St. Vincent Street, Glasgow, and is being erected under their superintendence and that of Mr. Charles J. Lindsay. We shall probably give a further account of the progress of this exhibition.

Artificial Lithographic Stones.

The *Patent Blatt* describes a process, introduced by M. Rosenthal, of Frankfort, for making artificial lithographic stones. The ingredients consist simply of cement. In the first place, a sufficient quantity of finely ground cement is mixed with water, and allowed to harden in slabs, either in the open air or in an oven. When the cement has set, these slabs are wetted and heated until they crack in all directions; it is then reduced to a fine powder, and is well mixed with an equal quantity of fresh cement. This mixture, in a dry state, is put into strong cast-iron moulds and subjected to a pressure of from thirty to thirty-five atmospheres. A sufficient quantity of water is then intro-

duced on one side of the mould, and is drawn through the mass of dry powder by means of a pump connected with the opposite side; this water contains a certain quantity of finely powdered cement, which is thus caused to penetrate through the mass, expelling at the same time the air and cementing it firmly together. The artificial stone is subjected to further pressure. In this manner slabs of the required size can be formed economically. Carbonate of lime may be substituted for cement, in which case the stones are of a lighter color.

Running over in our mind, by the light of these observations, the examples which we recollect of fire set by steam pipes, it strikes us as it never did before, that watery vapor may have been present in all the instances, and may have played a part in exciting combustion which has been hitherto unnoticed and unexplained. If it should be shown that the presence of moisture is necessary to the kindling or charring of wood subjected to a temperature of 212°, not only will the discordant assertions of those who do, and those who do not, believe that steam pipes can set wood on fire be reconciled, but a very important advance will be made in the science of safe construction and protection against fire—and there are many indications that this is really the case.

While there are thousands of examples of woodwork remaining, for years with perfect safety in contact with high pressure steam boilers or pipes, perhaps half the examples of combustion excited by the heat of steam show obviously that the moisture as well as the heat of the vapor had something to do with the result; and in the other examples, so far as we know, there is nothing to show that the incendiary pipes may not have leaked, or that the woodwork consumed may not have been moist with water derived from some other source. With heat and moisture together, it is now pretty evident that wood may be

law, Mr. William Neeld, the cheerful assistance of our several women, particularly Martha Heath and Betsy Jebbs, and the warm smile of an enchanted public; particularly the dear little ones, who clasp the cold, sparkling crystal with both their tiny hands and lift it to their sweet, quivering lips. To some this may seem irrelevant, but I feel it a tribute to justice which gives me inexpressible pleasure to render, for without such aids it would have been a physical impossibility for me to have brought my invention to a successful issue. This forms a striking contrast to the dry and prosaic style usually found in patent specifications. The specification is dated A.D. 1860, and numbered 1861.

A CORRESPONDENT in one of our contemporaries says that a common feature of traveling shows in Japan is a realistic view of Jigokee, or the Buddhist hell. The figures represented move by machinery, and include a selection of as terrifying devils as ever were depicted in a temple kakemono. One well developed devil is weighing new arrivals at the gates in a balance, and directs them to the right or left—to Heaven or Hell—according as they tip the scale or are found wanting. The tortures inflicted on the wicked receive ample attention. The braying in a mortar, pounding with an iron mace (spiked), sawing in two, and dragging out of the entrails are all on view. The most business-like earnestness is displayed by the various figures, one green devil being specially noticeable.

Alcoholism Incompatible with an Accurate Perception of Facts.

BY T. L. WRIGHT, M.D., BELLEFONTAINE, O.

The accuracy of the mental apprehension of facts depends very much upon the more or less complete consciousness of the mind when the facts are under observation.

In complete anæsthesia there is entire unconsciousness, because, there being no sensibility, there can be no perceptions offered or received.

In every subordinate degree of anæsthesia there must be a corresponding degree of imperfection in the perceptive function.

When the nervous system is in a condition of partial anæsthesia, such as always supervenes during the alcoholic impression, the knowledge of facts is infallibly darkened, and in several ways:

First, the insensibility of the nervous system causes the facts to be presented in a clouded manner. Events are enveloped in a mental haze which renders all conceptions of them undefined and often very incorrect. When the sense of vision is obscured by conditions exterior to the body, as, for instance, by a foggy atmosphere, the appearances are materially changed with respect to the actual situation of surrounding objects. Not only are outlines indistinct and deceptive, but objects appear to be placed in relative positions with regard to each other, and to the observer, such as greatly misinform the judgment as to the real facts. Not infrequently, also, objects appear wonderfully misshapen and of monstrous proportions.

If, then, the incapacity of a single sense dependent upon external causes, well known and appreciated at the time, so greatly imposes upon the mind, it cannot be otherwise than that the incapacity of the whole nervous system through alcoholic anæsthesia should prove radically misleading in a vast number of particulars.

Again, the facts presented to the unstable or wavering attention, in a condition of alcoholism, are liable, through defective sensibility, to appear in parts only—that is, fragmentary, and, of necessity, lacking in that completeness and unity of character that is essential to a truthful appreciation of them.

But the mind, under the sway of alcoholic anæsthesia, is unconscious of its infirmities. The toxic power of alcohol, operating wholly from within, gives no appreciable sign of its impostures. There is no corrective to misinformation, as there may be in the case of enveloping mists, deceiving the eye—that is, through the co-operative and conservative action of the several senses. On the contrary, the avenues to knowledge, in alcoholism, are all obstructed, and the senses operate in unison to betray.

The consequence is that the convictions of the mind under anæsthetic influences are like mental convictions in brain disease. They are not fully amenable to the modifying influences of ordinary comparison and evidence. Like the delusions of the insane, they become imperative and unalterable.

And thus it happens that the sober and conscientious witness will testify to the truth of events which were largely illusions of the perceptions in intoxication; and which, moreover, give rise to delusions of the understanding when sober. In no respect, however, is the power of alcohol, in weakening judicial testimony, more aggressively prominent than in its invariable interference with the usual methods assumed by the mind to measure the passage of time.

In criminal jurisprudence it is well known that the effects of alcohol very often enter as prime factors, not only as to principals but also as to witnesses. But in all criminal investigations, the "time when" of an event becomes as important a consideration as the "place where;" so that when crime is under investigation, the time of an occurrence is generally one of the decisive points in question.

There must be a normal and customary succession of perceptions—applied to the conscious mind, in order to appropriately arrive at a true conception of the actual passage of time. The mind, at stated intervals, must come, through the perceptive faculties, into immediate relationship with the world exterior to it, or the idea of time will be surprisingly erroneous. No matter if ideas are fixed or slow, no matter if they are swift or maniacal, there is no idea of the flight of time without this periodical return of the conscious mind to the material world—to the "things of time and sense."

But in alcoholism, anæsthesia prevents the regular and normal operations of the perceptive faculties. Nothing more astonishes an intoxicated man than to give him the true time.

How, then, can a witness, be he ever so honest, testify as to the time of an event observed by him while in a state of intoxication? He may say he informed himself respecting the time "soon" after the occurrence in question; but how can he know how long a period that "soon" occupied?

Alcohol is antagonistic to the right perception of facts, and, of course, also to accurate testimony respecting facts observed under alcoholic impressions. It mystifies facts, it distorts truths, and it annihilates time.

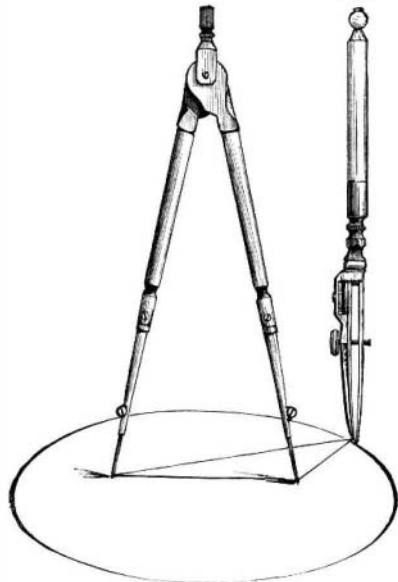
In all judicial proceedings of great moment, when stupendous interests in property, or liberty, or life are at stake, the testimony of witnesses respecting facts observed while in a state of intoxication should be viewed with the utmost suspicion.—*Q. Jour. Inebriety.*

A NOVEL ELLIPSOGRAPH.

H. T. Hozard, of Los Angeles, Cal., has devised an instrument which may be attached to the blade of an ordinary drawing pen, and held in position by the adjusting screw of the pen.

On the attachment to the blade of the pen is mounted a revolving drum, on which a double thread is wound. The thread passes through a hole near the point of the pen, and forms a loop; by placing this loop around the legs of a pair of dividers, keeping the cord taut, a perfect ellipse will be drawn. The size or shape of the ellipse is regulated by rotating the drum, to enlarge or diminish the loop, and by increasing or diminishing the distance between the points of the dividers.

A similar attachment has been designed for an



HOZARD'S ELLIPSOGRAPH.

ordinary lead pencil, to meet the want of such an implement in the workshop.

These ellipsographs are manufactured by F. W. Devoe & Co., corner of Fulton and William Streets, New York.

Gum Ferment.

Gum arabic is found, by J. Wiesner, to contain a diastasic ferment, which is also met with in nearly all the different varieties of gum, in mucilage, in linseed, and many other similar substances. It exists in those tissues of the plant which are characterized by the transformation of cellulose into gum. It appears that this ferment is incapable of decomposing the glucosides. It does not convert proteids into peptones, nor has it an inverting action on sugar. It converts starch into dextrine, and arabine into bassorine.

The gum ferment may be detected by boiling the substance which contains it with orcinol and strong hydrochloric acid, when a red coloration is soon produced; the liquid then turns violet, and deposits a blue precipitate, which is soluble in alcohol. The gum ferment is decomposed by boiling in water for an hour and a half. Finally, we are told that the presence of this peculiar ferment interferes with the conversion of starch into sugar by bacteria or by diastase.

It is supposed that the conversion of cellulose into gum or mucilage in living plants is due entirely to the presence of this gum ferment.

The Impermeability of Glass by Gases.

The question has sometimes been asked whether glass is permeable by gases, and, as reported in the *Nuovo Cimento*, Signor A. Bartoli has conducted some experiments with a view to deciding it. The method adopted for this purpose was exceedingly delicate. Two electrodes of gold, B and C, were glued upon the two faces of a glass sheet, separating into two compartments an electrolytic cell hermetically closed. Each of these compartments contained a solution of sulphate of soda and a second electrode of gold. The two electrodes, A and B, of one compartment were in permanent connection with a galvanometer remaining constantly at zero. Under these conditions, the two other electrodes, C and D, were connected with a rather powerful battery, when the galvanometer failed to show the slightest effect. It is concluded from this that glass, at least such as was used in this experiment, is perfectly impermeable by oxygen or hydrogen; for an otherwise imperceptible trace of either gas would have sufficed to produce an appreciable polarization of the sheet. It does not appear, from the report, which is briefly translated for the *Journal de Physique* by M. Bouty, whether these experiments were of a protracted character, or whether different descriptions of glass were used in the trial.

Embalming.

A. Sauter (*Der Fortschritt*, No. 3, February 5, 1885; Ferd. Ad. Junker, M.D., London, *Med. Rec.*) describes several cheap and easy methods of preserving and embalming bodies. If only a temporary retardation of putrefaction and decomposition be required, the filling up of the coffin with sublimated wood wool will answer better than any other means, being at the same time easily procured and prepared. Common wood wool, which may be purchased of any surgical dressing manufacturer, is treated with a solution of one part of bichloride of mercury, 100 of alcohol of 5 to 10 per cent, and dried for use. Instead of wood wool, common sawdust prepared in the same manner will likewise answer. The corpses ought to be previously washed with ten parts of water.

The best and easiest manner of embalming consists in gradually injecting, under gentle pressure, the preservative fluid into the carotid artery by means of an Esmarch's irrigating can, or by a larger ordinary injecting syringe. The quantity required will vary between six to eight pints (three or four liters), consisting of one part of carbolic acid, ten of glycerine, fifty of alcohol, and forty of water. This fluid will preserve the body, and retain the epidermis for several days. If, however, it be desired to keep the corpse in perfect condition for several months or longer this must be followed by a second more copious injection of one part of chloride of zinc and three parts of water, slightly tinged with fuchsin or with a saturated neutral solution of sulphate of aluminum colored with cochineal. After having injected the whole quantity of the fluid (about ten to sixteen pints), the carotid artery and the jugular vein must be tied. The surface of the body may be lubricated with vaseline or covered with varnish of sandarac, to which 1 per cent of carbolic acid is added. The cavities of the body are filled with sublimated wood wool, or with cotton wool soaked in glycerine containing 5 per cent of carbolic acid.

These methods of preserving corpses will neither require unusual skill nor be very expensive.

A Frenchman suggests that bodies be copper-plated as a means of preservation. He has tried the experiment successfully on small animals. The copper shell can be plated with nickel, silver, or gold. Whatever use may be made of this as a method of preservation, it is useful as a means of obtaining facsimile casts for demonstration. Broca, some years ago, described a process for metalizing a brain. The organ is first hardened, then immersed in a solution of nitrate of silver, and then exposed to the action of sulphureted hydrogen; a metallic sulphide is thus formed, which acts the same as the blacklead coating employed in electrotyping. The organ thus prepared is placed in the bath, the process being the same as in electro-metallurgy. A very thin deposit is all that is required. The brain is removed through a small hole, the interior washed out with strong lye, and then, after drying, the shell is filled with plaster of Paris.

The Philosophy of Vaccination.

Professor Tyndall explains the philosophy of vaccination as follows: "When a tree or a bundle of wheat or barley straw is burned, a certain amount of mineral matter remains in the ashes—extremely small in comparison with the bulk of the tree or of the straw, but absolutely essential to its growth. In a soil lacking, or exhausted of, the necessary constituents, the tree cannot live, the crop cannot grow. Now, contagia are living things, which demand certain elements of life, just as inexorably as trees or wheat or barley; and it is not difficult to see that a crop of a given parasite may so far use up a constituent existing in small quantities in the body, but essential in the growth of the parasite, as to render the body unfit for the production of a second crop. The soil is exhausted; and until the lost constituent is restored, the body is protected from any further attack from the same disorder. Such an explanation of non-recurrent diseases naturally presents itself to a thorough believer in the germ theory; and such was the solution which, in reply to a question, I ventured to offer nearly fifteen years ago to an eminent physician. To exhaust a soil, however, a parasite less vigorous and destructive than the really virulent one may suffice; and if, after having, by means of a feebler organism, exhausted the soil without fatal result, the most highly virulent parasite be introduced into the system, it will prove powerless. This, in the language of the germ theory, is the whole secret of vaccination."

New Treasurer for the Blake Manufacturing Co.

We learn that Mr. E. C. Turner will probably succeed his father, lately deceased, as treasurer of the George F. Blake Manufacturing Company, Boston, Mass. Mr. Turner is a gentleman of much business experience, and combines therewith the rare qualities of active enterprise and good judgment. He is admirably qualified for the duties of the position.