A New Commercial Treaty with Mexico.

Any legislation which has a tendency to make it easier for manufacturers to export the productions of our workshops and factories cannot fail to meet with general appreciation, while it will be particularly welcome to the mechanics and artisans of every trade. Of such a nature is the new treaty with Mexico, ratified by the United States Senate March 11. Nearly all our exports heretofore have been of agricultural productions, but a proper growth and healthy expansion of our manufacturing industries cannot be steadily maintained without materially enlarged foreign markets. We need more customers ready to take our surplus of manufactures, above what is required to fill the home demand, and it is eminently proper that we should take a step in advance in this direction by making a sort of reciprocity treaty with our neighbors in the Southwest, of the Mexican Republic. They are in want of many things now, and with the opening of new railroads through the country will want far more, which it would be, indeed, a pity to send them to Europe to buy while our factories are far from being overworked.

Under the treaty, which has just been ratified by the U. S. Senate, the chief agricultural products of Mexico, including leaf tobacco, are to be admitted to the United States free of duty. The list of articles on the free list embraces few manufactures, and contains many entries now admitted free. Among the manufactured articles is sugar of not above No. 16 Dutch standard in color. The schedule of articles to be admitted free into Mexico from the United States contains over seventy entries, and comprises five great classes of manufactures—railroad machinery, steam engines, agricultural implements, mining machinery, and building materials. To these are added coal of all kinds, petroleum, naphtha, precious metals, sewing machines, vehicles of all kinds, clocks, stoves, and many minor manufactures and materials. The treaty will remain in force for six years.

The Power of Boilers.

At a recent meeting in Manchester of inspecting engineers and other gentlemen interested in the inspection of engines and boilers, the question of the so-called horse power of boilers was raised by Mr. Boswell, and the debate which followed was well sustained, the general opinion being that the term "horse power" as applied to a boiler was wholly wrong, and should be abandoned. It was suggested that boilers should be rated by their evaporative capacity; but to this it was objected that the factors of this capacity were—quality of coal and water, the method of seating adopted, the area and altitude of the chimney, and, not least, the brains or skill of the fireman. Mr. Richard Thompson, the senior inspector of the Manchester Steam Users' Association, contributed very greatly to the interest of the debate by his contribution of facts acquired in actual experience, as did also the majority of those present. It appeared that a full-sized Lancashire boiler, 7 feet by 28 feet or 30 feet, might, so far as horse power was concerned, develop anything up to 380 or 400 horse power, according to the conditions, which would of course include a very economical engine. A fact of great value, not sufficiently known, was brought up, namely, that when the evaporative efficiency of a Lancashire boiler was being tested at atmospheric pressure, the whole of the steam generated being discharged through a short 6 inch pipe with one right angled bend in its length of a few feet only, the pressure in the boiler rose to 3 pounds per square inch by the gauge, showing most conclusively that at such a low pressure it requires a safety valve to a boiler with at least an outlet area of 25 square inches. Whatever may be the pressure in a boiler, it will practically evaporate the same weight of water, but an orifice will practically discharge a constant volume at all pressures, and the volume varying almost inversely with the pressure, a safety valve will discharge more steam at a high than at a low pressure, and therefore a high pressure boiler does not require so great an area of safety valve as does one at a low pressure.

An Anecdote of Peter Cooper.

The head of the Women's Art School of Cooper Institute writes of Peter Cooper, in the *Century:* "One day he stood watching the portrait class, who, to the number of thirty pupils or more, were drawing likenesses of the same model from different positions. One scholar made the face in profile; another had it turned a little into the shadow; a third saw more of the full face; while others worked still further into or away from the light. He had stood observing the scene for a few minutes, when he said, 'Such a sight as this should be a lesson in charity, when we perceive how the same person may be so different, according to the way he is looked at by various people.'"

PANCLASTITE.

The new explosives known as panclastite, which have attracted so much attention from engineers and chemists, form a group which has no connection with any other known explosives. They are possessed of peculiar properties and power, and merit a description. The combustive element of this new section of explosive bodies, which is the discovery of Mr. Eugene Turpin, is peroxide of nitrogen. The combustible body may be formed of different substances, such as sulphide of carbon, petroleum, toluene and xylene, benzoles, and vegetable and animal oils. Each of these substances gives a different explosive endowed with special properties. Another group is formed of a mixture of peroxide of nitrogen with nitrobenzine. This latter group gives products of great stability. In fact, the combustible being already nitrated to saturation by nitric acid, the peroxide of nitrogen has no action upon it, and intervenes, merely as a combustive, by its simple admixture, to render it explosive. These compounds are specially adapted for military purposes.

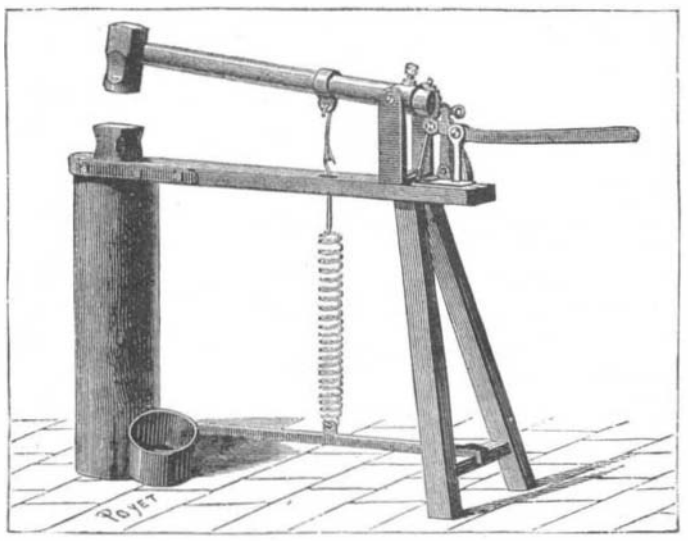

Fig. 1.—TURPIN'S PERCUSSION APPARATUS FOR EXPERIMENTING UPON EXPLOSIVES.

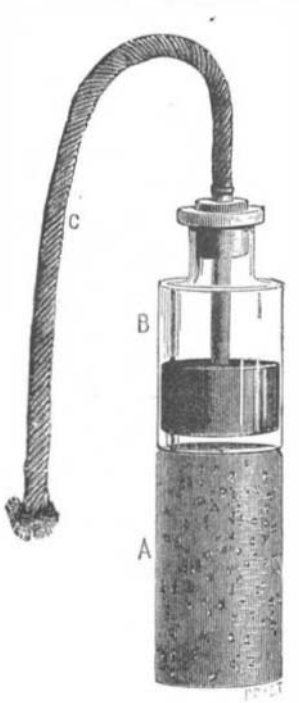

Fig. 2.—ARRANGEMENT FOR TESTING POWER OF EXPLOSIVES.

In principle, panclastite for industrial purposes consists of two liquids, one soluble in the other, which are inert taken separately, but which it is only necessary to mix together to at once obtain, without any other operation, an explosive that is more powerful and more instantaneous than nitroglycerine.

Certain mixtures thus obtained resist shocks better in the liquid state than any other known explosives, even ordinary mining powder. Ordinary powder explodes under the shock of an iron weight of six kilogrammes falling from a height of half a meter. Gun cotton and other products of the same section explode under the fall of the same weight from a height of a quarter of a meter. Seventy-five per cent dynamite explodes under the same weight falling 0·15 meter, and dynamite gum explodes under a fall of from 0·20 to 0·25 meter. Pur nitroglycerine explodes under a fall of 0·10 to 0·15 meter. Panclastite in a liquid state does not explode under the shock of the same weight falling *four meters.* All these experiments were made under exactly the same conditions by means of apparatus constructed by Mr. Turpin, and one of which is shown in Fig. 1.

Certain compounds of panclastite are non-inflammable, while others are more or less inflammable, but never detonate through fire alone, in an open vessel. All the inflammable compounds burn quietly in the open air. It requires a preliminary explosion to bring about one of panclastite, such, for instance, as that of a primer charged with fulminate of mercury. Certain of the compounds burn so quickly and with so brilliant a flame that Mr. Turpin has been led to devise a portable apparatus for optical telegraphy at night, in which this material is used as an illuminating agent. Panclastite, considered as an explosive, enjoys the peculiar and valuable property that its sensitiveness and power may be varied at will. All the experiments with it have been made with the mixture that is least sensitive in a liquid state.

But its sensitiveness may be made such that a hermetically closed vessel filled with the mixture will explode under its own weight in falling from a height of from one to two meters upon hard ground. On the contrary, the sensitiveness may be made so slight as to make it impossible to explode it under the influence of a primer charged with 3 grammes of fulminate of mercury. Finally, as with nitroglycerine, panclastite may be united with an active porous substance, such as powder, vandanite, etc. In such a case, it again loses its sensitiveness to shock.

When dynamite and panclastite are caused to explode in the open air upon leaden cylinders, it is found that the effects produced by panclastite are infinitely superior to those obtained with a larger quantity of dynamite.

Fig. 2 shows the arrangement before the explosion. A is the leaden cylinder, B is a bottle placed upon it and containing the explosive, and C is the priming and fuse. Here the bottle is represented as containing 10 grammes of panclastite.

Fig. 3 shows the leaden cylinders before and after the explosion. No. 1 represents the cylinder before the explosion, No. 2 the same cylinder crushed by the explosion of 20 grammes of dynamite gum, and No. 3 a cylinder crushed by the explosion of 10 grammes of panclastite. As may be seen, the effect produced by the new explosive is greatly superior to that given by dynamite, notwithstanding that the former be used in much less quantity.

Among other open air experiments that have been tried with it we may cite the following: An iron rail was placed upon an oak tie, and, in the channel between the flange and head, there was laid a cartridge containing 60 grammes of panclastite primed in the ordinary way. When the fuse was lighted a violent explosion ensued and the rail was literally crushed into fine bits, the majority of which were driven deeply into the tie, the latter itself having been broken.

Some of the fragments of the rail weighed but a few grammes. For these details and the engravings we are indebted to *La Nature.*

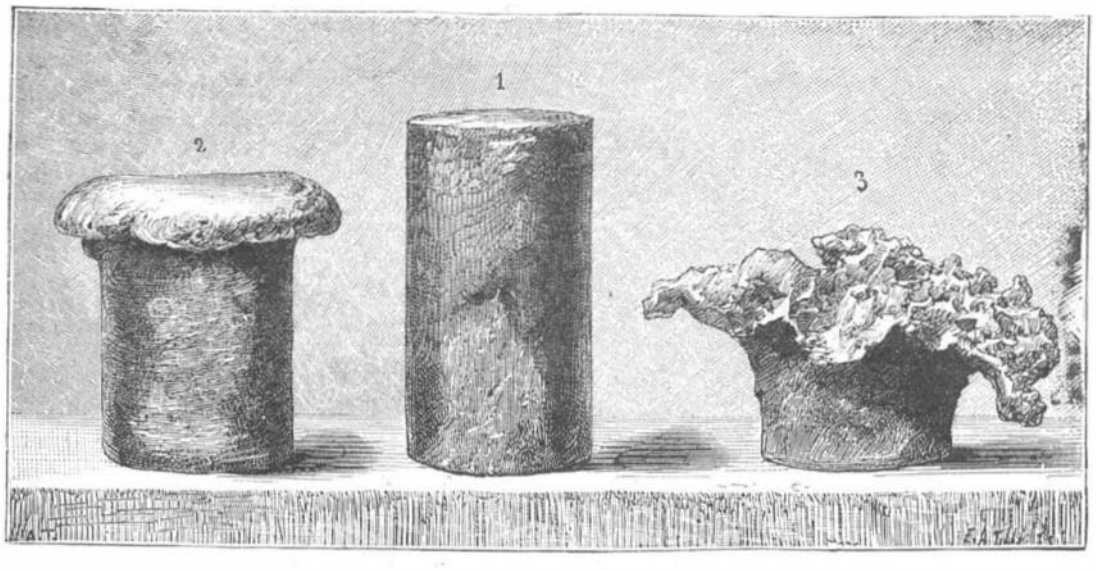

Fig. 3.—COMPARATIVE RESULTS GIVEN BY THE EXPLOSION OF DYNAMITE AND PANCLASTITE.

Air.

Mean pressure of the atmosphere, at the level of the sea, is equal to 14·7 pounds per square inch, or 2,116·4 pounds per square foot. One atmosphere of pressure is measured by a column of air at 32° Fah., 27,801 feet, or about 5¼ miles, high, of uniform density equal to that of air at the level of the sea.

The density, or weight, of one cubic foot of pure air, under a pressure of one atmosphere, or 14·7 pounds per square inch, is, at 32° Fah., equal to 0·080728 pound. At 62° Fah., the weight is 0·076097 pound.

The volume of 1 pound of air, at 32° Fah., and under one atmosphere of pressure, is 12·387 cubic feet. The volume at 62° Fah. is 13·141 cubic feet.

The specific heat of air at constant pressure is 0·2377, and at constant volume 0·1688, that of water being taken as 1

Forming and Repairing Lawns.

The making of new lawns, and the best means for keeping old ones in good condition, and the keeping of our grass plats, great or small, free from weeds, are themes which interest and affect the majority of persons residing outside of our cities, and this is our excuse for so frequently referring to the subject.

The last number of the *Garden* (London) publishes the following article on lawns and their treatment, which contains much useful and timely information.

It has been said, and with much truth, that there is nothing which adds so great a charm to English homesteads as the lawns or grass plats that are generally to be found surrounding them; and, as this is the season to form, relay, or repair them, a few remarks as to the proper mode of procedure may possibly be useful. In forming new lawns, it is hardly necessary to say that their extent must be dependent on the ground at command; every endeavor should, however, be used to make them as roomy as possible, and toward this end much may be done by placing the shrubs and trees, or at least the greater part of them, as far away from the house as the boundary will permit; any that stand out ought to be of the best kind. A lawn need not necessarily be flat or level; it may, on the contrary, be undulating, according to the natural formation of the ground. In preparing the latter for the turf, the most important thing is to see that any portion which has been moved is well rammed, for if not it will be continually subsiding, and nothing looks worse than little hollows caused by the settling of earth.

Another important matter to bear in mind is that the soil of lawns should not be rich, for if so the grass not only grows fast, but coarse, and it is impossible under such circumstances to get a good thick bottom or to keep it in anything like the perfect order attainable when the roots are less fed. This being so, it is a good plan to use sand, or to cart poor earth for the leveling and finishing off of the top, but when so applied it should be put on regularly or the grass will be patchy, which will spoil the effect of the whole. The leveling being completed and the surface raked smooth and fine, the next thing is either to sow seed or use turf, the latter being by far the best way, for though it involves more labor, time, and expense, the work is at once complete, while if seed be sown it takes a year to get a good bottom. The most suitable turf is that from pastures or waste places by the road-side which have been closely fed off and the grass is short and fine, with a sprinkling of white clover in it. If the turf of this kind can be got, a fine lawn may soon be made.

The most handy turfs to work with are those a yard long and a foot wide, and the thinner they are, so long as they will hang together, the easier will they roll and lay down again. No open joints should be left for the air to get in; to prevent this it is a good plan to pass the roller over the turfs quickly after they are down, so as to press them to the earth, in which the grass will soon take root. If any inequalities of surface should by chance exist after the roller has been used, they may easily be beaten down by means of a rammer when the ground is soft. Where fine turf cannot be had and seed has to be sown, it should be got specially for the purpose from some seedsman, as that otherwise obtained is full of weeds, and never makes a good lawn. The time to sow is about the middle of March, when the seed should be scattered evenly over the surface of the finely raked ground and slightly covered, after which, if birds are kept from scratching it out and devouring it, it soon germinates and grows at a quick rate if the weather proves favorable.

Lawns that are in a thin, patchy condition may be improved in two ways: the one by cutting out the bare or worn parts and relaying with fresh flag, and the other by a top-dressing of rich, finely sifted soil, to which should be added some soot and fresh slaked lime, which will not only stimulate the grass and give it a rich, deep green color, but will also kill all moss, which on some lawns is very troublesome, and if not checked or destroyed soon gets entire possession. Daisies and plantains, too, are often a nuisance, and to eradicate these weeds there is no plan better than cutting or digging them out, which, unless they are thick, is no great task if set about in real earnest with a sharp and suitable tool. D. S.

The Luxury of Rapid Transit in New York.

"The city of New York is provided with thirty-three miles of double railway tracks, built on iron posts—iron bridges, in fact—which occupy some of the finest streets and avenues. On these tracks the steam passenger trains roar and whiz along at intervals of a minute in each direction; the smoke and cinders are poured into the windows of the adjacent dwellings, in many cases only two feet from the railway; awnings are set on fire by sparks; passengers and workmen are frequently knocked off from the station platforms, and fall twenty feet to the pavement, to be picked up dead; tools, hot water, fire, and lumps of coal drop upon the heads of luckless pedestrians or car men in the street below; and, finally, light iron shavings, cut from the wheels of the cars by the brakes, float down through the air and lodge in the eyes of passers by. These are a few of the nuisances which New Yorkers endure for the sake of enjoying the luxury of rapid transit.

"One of the car drivers on the Sixth Avenue horsecar line, the track of which runs directly under the steam railway, recovered in court not long ago $3,000 damages for injury to eyes from a burning coal that fell upon him. The iron shaving trouble is quite serious. When the brakes are put on the pressure on the shoes, as they call the iron that is thrown against and checks the wheels, is very great, because they have to make such short and quick stops. This friction tears off minute particles of iron, so small that the eye cannot perceive them, yet they are jagged and produce irritation.

"Some of the city oculists have special microscopes made to detect them, so frequent are the complaints, and these instruments require very powerful lenses and strong lights to detect them. Car drivers on the Third and Sixth Avenue roads are large sufferers from this trouble, so the professors at the Eye and Ear Hospital report."

The Cincinnati Convention.

Our last week's report gave most of the proceedings of the second day. Among the incidents was the following admirable letter from Senator Hawley of Connecticut, which was read before the Convention and received with great enthusiasm:

WASHINGTON, March 19, 1884.

DEAR SIR: Those patent bills pending before the Senate are not to become law by my vote, or if I can prevent it in any honorable way. My hope now is that the Senate bill, with the House bill, may be sent back to the Senate Committee on Patents, there to hear arguments which persons interested in patents are desirous of making. I have been wondering for two years that the patent industries of the United States were not more awake to the dangers which threaten this whole system. They are now bestirring themselves. I hope it is not too late.

Yours truly,
Jos. R. HAWLEY.

At the evening session the Convention adopted the following

PROTEST TO CONGRESS.

CINCINNATI, O., March 26, 1884.

Hon. George F. Edmunds, President *pro tem.*, U.S. Senate:

The American inventors, in convention assembled, desire, through you, to respectfully enter their solemn protest before the Senate against the passage of any measure tending to impair their rights as inventors or to deprive them of any of the legitimate fruits of their hard earned labor.

By order of the Convention.
J. S. ZERBE, Chairman.
CHAS. M. TRAVIS, Sec'y.

The Convention also adopted the following

APPEAL TO INVENTORS AND PATENTEES.

"*Resolved*, That a committee of three be appointed (the same to include the President of this Convention), whose duty it shall be to send a circular letter to inventors and patentees, urgently requesting them to write a private letter to their Senators and Representatives in Congress to vote and use their influence in all honorable ways to defeat all bills now pending before Congress, or which may be hereafter introduced, detrimental or in any way impairing their rights under patents."

The Constitution and By-Laws for the permanent organization were next read and adopted as a whole. The annual assessment on delegates was fixed at $2.

Some foolish fellow got in a set of resolutions that nobody but a lawyer shall represent an inventor before the Patent Office. They were laid on the table. This is on a par with the bill before Congress to compel patentees to pay $50 counsel fees to the defendant lawyer.

On the third and last day, March 27, the election of officers resulted as follows:

President, James S. Zerbe, Ohio; A. J. Nellis, Pennsylvania, First Vice-President.

C. M. Travis, Crawfordsville, Ind., Secretary.

John Fehrenbatch, Cincinnati, Assistant Secretary.

C. P. Lesher, Lansing, Mich., Treasurer.

J. J. Geghan, Cincinnati, Librarian.

The following Vice-Presidents were elected: M. Garland, of Bay City, Michigan; Josiah Kirby, Cincinnati, O.; J. S. Johnson, Mexico, Missouri; James T. Dongine, Chicago, Illinois; L. C. Huber, Huber, Kentucky; J. J. Johnson, Pittsburg, Pennsylvania; K. D. Davis, Cole City, Georgia; John Burleigh, Lawrence, Mass.; J. E. Baker, Madison, Wisconsin; C. P. Jacobs, Indianapolis, Indiana; Hon. Fred. Atwood, Winterport, Maine; Edward Barrath, Brooklyn, New York; Al. A. Yeager, Knoxville, Tennessee; W. C. Dodge, Washington, District of Columbia; William A. Harris, Providence, Rhode Island; Frederic Fries, Shenandoah, Iowa; Irving M. Scott, San Francisco, California; Mr. Knapp, Portland, Oregon; C. A. Campbell, Mississippi; E. V. Caldwell, Hoopersville, Alabama; C. F. Hyde, Ottawa, Kansas; George R. Platt, Louisiana; Hon. Clinton B. Davis, Higganum, Connecticut; C. A. Barvoios, Bennington, Vermont; A. J. Marberry, Cabot, Arkansas.

The Committee on Publication was appointed as follows: Dr. N. N. Horton, of Missouri, Chairman; Hon. Josiah Kirby; J. J. Johnson, Pennsylvania; J. S. Zerbe, A. J. Nellis, C. M. Travis, John Fehrenbatch, C. P. Lesher, J. J. Geghan.

Buffalo was selected as the next place for the annual convention, which takes place the second Tuesday in January, 1885.

SOME one says a good dressing for leather is made of one quart of vinegar, two ounces of spermaceti oil, and six ounces each of molasses and ivory black.

Colorado Resolutions.

We hope that inventors and manufacturers in all parts of the country will follow the spirited example of their brethren in Colorado, and lose no time in sending to Senators and Representatives an expression of their views. The following is from the Denver *Daily News* of March 22:

The inventors' convention called to meet in this city convened at the office of J. A. McAnulty yesterday afternoon.

General F. M. Case was elected president, and J. A. McAnulty secretary. A committee on resolutions was appointed by the chair, consisting of H. C. Lowry, H. W. Yonley, and J. A. McAnulty. Remarks were indulged in by a number of inventors present. The following resolutions were reported by the committee, which were unanimously adopted:

Resolved, That we, the inventors of Colorado in mass meeting assembled, view with alarm the hostile legislation threatened the patent laws of our country, as evidenced by bills already passed in the House, in which is shown an entire disregard, if not gross ignorance, of the protection that is required by inventors, who necessarily devote much time and thought and make large expenditures in the advancement of the practical interests of all men.

Resolved, That we are of the opinion that in no ordinary case can a reasonable profit or remuneration for the care, labor, and expense attendant upon the manufacture, introduction, and sale of any patented article be realized in any curtailment in the present life of a patent, being seventeen years.

Resolved, As citizens of a country which produces more inventions to the amount of population than any country in the known world, as constituents of a government whose only department that is self-sustaining is supported by the fees derived from patentees, the citizens of the United States should be the last to be deprived of the legitimate fruits of their brain labor by the acts of their own representatives to be stultified among the nations of the world as being the first and only government to remove all inducement to invention.

Resolved, That we appeal directly to our Senators and Congressmen, Hons. N. P. Hill and T. M. Bowen, J. B. Belford, and to the Hon. H. M. Teller, asking for diligent attention, persistent and outspoken opposition to any such legislation, or any interference whatever with our present patent laws.

Resolved, That a copy of these resolutions be forwarded to each of our representatives at Washington, to Secretary Teller, to the convention of inventors to be held at Cincinnati, March 25, and a copy furnished to each of the Denver daily papers.

Resolved, That this organization be considered permanent, at least during the present session of Congress, subject to call by the president, secretary, or three members. Adjourned.

The following are names of members signing the memorial: General F. M. Case, J. A. McAnulty, H. C. Lowry, H. W. Yonley, A. M. Wood, H. D. Preiser, Aaron Allen, W. Holland, Hadwin Swaim, G. M. Kitterman, J. P. Tryner, J. N. Best, George W. Gay, P. B. Hirsch, John W. Collins, Charles H. Murray, J. C. Phillips, James Scott, W. H. Lyman, E. R. Hubbard, M. Harrison, W. H. Rundall, Thomas D. Hughes, A. B. Evans, J. Lytle, John Berkey, Otto G. Patterson, J. H. Montgomery, Dennis Hughes, George Graves, S. E. Carson, J. Wilkelm, H. L. Rice, D. D. Shaw, W. A. Maloney, William Pim, John T. Fertig, James Goodlander.

Ideas of Locality.

An Ohio correspondent suggests that there is some relation between lost people describing a circle in their wanderings, from one limb being longer than another, and what is ordinarily spoken of as getting "turned around," when people traveling are confused as to the points of the compass, and attributes both phenomena to some peculiarity of the brain. Neither is owing to any "peculiarity" of the brain, but both are rather the necessary results of the normal operation of a sound mind. On the prairie as on the ocean, in the dark, or in strange places anywhere, one depends upon definite known bearings for fixing the points of the compass. When these pass out of sight on land it is generally by successive steps through surroundings less and less accurately observed, so that, particularly in journeying through the night, or for a period when the shifting of position as to external objects cannot be noted, the memory bears a constant impress of the direction last observed, and seeks to fit new surroundings thereto. The compass, or the sun and the stars, are the usual means for correcting the wrong impressions; but it is only by a subsequent mental process, which, with intermittent attention, is often a good deal protracted, that we are able, in some cases, to obtain correct ideas of locations into which we have been but newly introduced.

Alcohol and Digestion.

"We see many preparations of which the chief virtue is supposed to be that they contain *all* the digestive principles. These can be active only so far as they contain pepsin, and have no advantage over the simple drug.

It has also been shown that certain substances combined with pepsin in solution, render it inert. Alcohol is one, and even in moderation diminishes its action, while, in any quantity, the activity of pepsin is totally prevented. This is a point often lost sight of, and serves as a hint concerning the use of liquors at meals, by dyspeptics."—*Med. and Surg. Rep.*