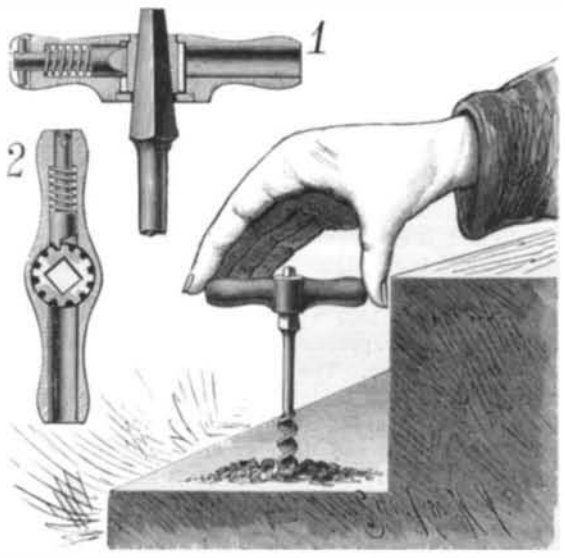
RATCHET TOOL HANDLE.

Fig. 1 is a sectional side elevation, and Fig. 2 a sectional plan view of a ratchet tool handle recently patented by Mr. Christian Hermann, of Bristol, R. I. The handle is a straight bar of suitable length formed with a recess in which is seated a ratchet sleeve having an angular aperture for passing upon the tool shank. The handle is b ored lengthwise through both ends, and in one hole is a sliding pawl that engages the ratchet sleeve. A spiral spring acts to move the pawl, the movement being limited by a cross pin through the outer end of the dog, that enters a groove in the handle to prevent the pawl from turning accidentally. The ratchet is held in the recess by a ring plate fitted to the under side of the handle in a manner to allow removal. The hole in



HERMANN'S RATCHET TOOL HANDLE.

the opposite end of the handle permits the insertion of the dog, and can be used to receive a bar and to give greater leverage.

This handle can be readily applied to bits, screw drivers, and other tools, and by drawing back the pawl and giving it a half turn the ratchet mechanism is changed from right to left, so that the handle can be used to withdraw a boring tool or back out a screw.

Brier Root Pipes.

In a report on the trade and commerce of Leghorn, the following note on the so-called brier root pipes, which have become so large an industry of late years, will be read with interest: "An interesting industry has been started here within the last three years by a Frenchman from Carcasonne, for the export of material for the manufacture of wooden pipes. Similar works are also to be found at Sienna and Grosseto. Selected roots of the heath (*Erica arborea*)—preference being given to the male variety—are collected on the hills of the Maremma, where the plant grows luxuriantly and attains a great size. When brought to the factory the roots are cleared of earth, and any decayed parts are cut away. They are then shaped into blocks of various dimensions with a circular saw set in motion by a small steam engine. Great dexterity is necessary at this stage in cutting the wood to the best advantage, and it is only after a long apprenticeship that a workman is thoroughly efficient. The blocks are then placed in a vat, and subjected to a gentle simmering for a space of twelve hours. During this process they acquire the rich yellowish-brown hue for which the best pipes are noted, and are then in a condition to receive the final turning and boring, but this is not done here. The rough blocks are packed in sacks containing 40 to 100 dozen each, and sent abroad, principally to France (St. Cloud), where they are finished into the famous G. B. D., or 'Pipes de Bruyere,' known to smokers in England under the name of 'brier wood pipes.' The production of this article is considerable, four hands turning out about 60 sacks per month. Consignments are also made to England and Germany, but at present the demand is said to be rather slack."—*The Gardeners' Chronicle.*

Ingenious Idea.

It is told of a man in Connecticut who wanted to put a water pipe through a drain several feet below the surface of the ground, without digging up the drain. To accomplish it he tied a string to a cat's leg, thrust her into one end of the drain, and giving a terrific "scat," the feline quickly appeared at the other end; the pipe was drawn through the drain by means of the line, thus saving considerable expense.

New Italian War Ship.

The latest addition to the Italian ironclad navy, the Ruggiero di Lauria, was launched at Castellamare on the 9th ult. This vessel forms one of the Andrea Doria class, and is a modified type of the Italia. She is constructed entirely of steel, and her principal dimensions are; Length between perpendiculars, 328 ft. 1 in.; extreme breadth of beam, 65 ft. 7 in.; mean draught of water, 25 ft. 6 in.; displacement, 10,080 tons. Her twin screw engines, of 1000 indicated horse-power, have been supplied by Messrs. John Elder and Co., of Glasgow, and are estimated to propel her at a speed of sixteen knots per hour. The chief armament of the Ruggiero di Lauria will consist of four 17 in. Armstrong breech-loading guns of the latest design, mounted *en barbette*, and she will likewise be provided with the most modern type of torpedo apparatus and machine guns. The most vulnerable parts of the hull will be protected by 17¾ in. armor, the system of which, viz., steel or compound, does not appear to have been decided upon as yet. The only explanation which can be found for this is that various conflicting interests are at work at the naval headquarters for the purpose of mere political opposition, and we therefore find Italy expending enormous sums on competitive armor-plate trials, reoccurring with every change of ministry, while the question of the comparative value of the different systems of armor has long been settled by every other naval power.

The Breaking up of Monitors.

According to one of our contemporaries, the breaking up of an old wooden hull is not an easy matter, but it is nothing compared with the task of dismantling a disused ironclad, as some contractors at Philadelphia, who have been trying to break up an old monitor, have found to their cost. A fire has been burning briskly for several weeks on board the old United States monitor Dictator, at Tasker Street wharf, Philadelphia, the contractors having been endeavoring, with but little success, to get rid of the woodwork which lies firmly embedded between the armor and the hull. Nine months have been spent in the work of tearing the old hulk apart, with prospect of many more passing before the vessel will be reduced to old iron and ready for the furnace. Several thousand tons of material have been taken out of the Dictator, and yet there are many more concealed in her massive frame. As soon as the remaining portion is cut down to the water's edge, the hull will be towed to a shoal spot on the Jersey side of the Delaware River and—blown up!

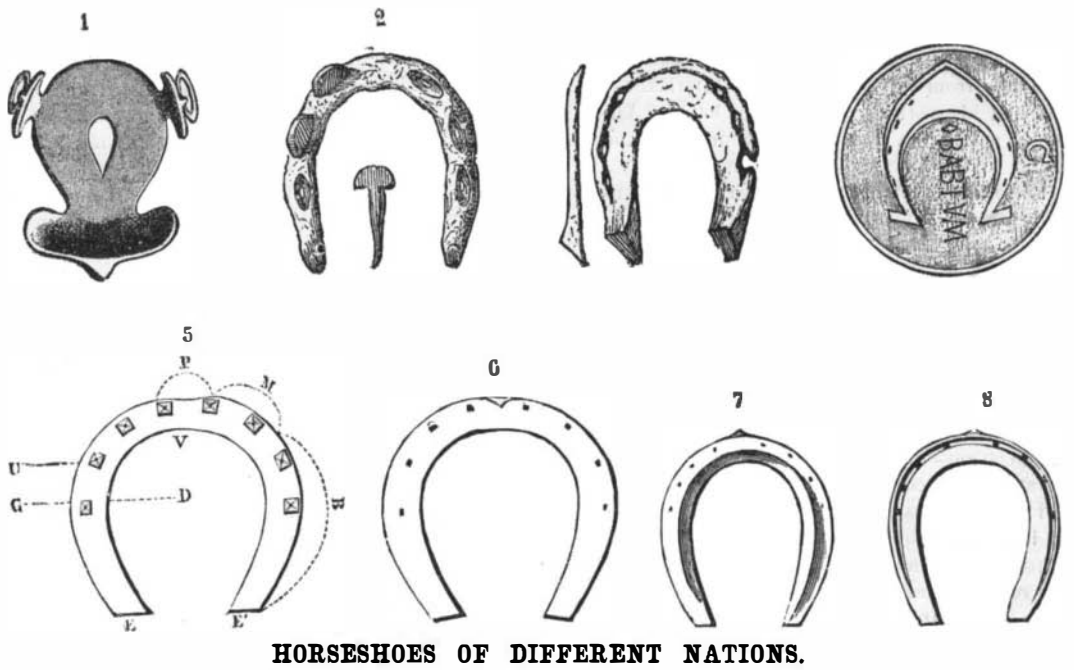
HORSESHOES.

We illustrate in the accompanying engraving some curious specimens of horseshoes that were recently shown at the Exhibition of Hippic Material in Paris.

Fig. 1 is the *solea*, an oval plate, entire or perforated in the center, and provided with a heel piece and lateral ears. This is found in France, England, Germany, and all places where the Romans once established their power.

No. 2 is the Celtic shoe with nails in the form of violin keys. This was found in the environs of Alise.

The horseshoes of the seventh century (Fig. 3) are distinguished by the thickened extremity of their branches. Those of the middle ages (Fig. 4) were proportioned to the large stature of the war horse and the weight of the knight's armor. They sometimes weighed over two pounds, and were wide, pointed at the toe, and provided at the heel with a long projection.



HORSESHOES OF DIFFERENT NATIONS.

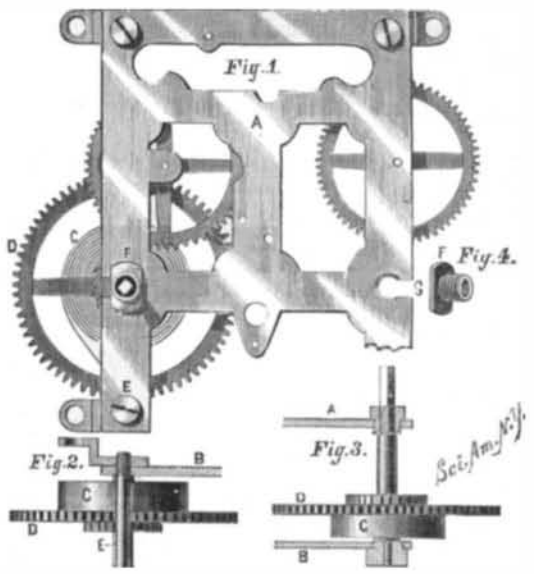
In the French shoe (Figs. 5 and 6) we distinguish the toe, P, the *mammelles*, M, the branches, B, and heel, E.

The English shoe (Figs. 7 and 8) differs from the French as regards the arrangement of the iron and the method of applying it to the hoof.—*Science et Nature.*

ACCORDING to the *Journal d'Hygiene*, citric acid is a most powerful disinfectant, preserving meat from putrefaction, and proving rapidly fatal to septic microbia. The soluble citrates have no similar action.

AN IMPROVED CLOCK FRAME.

The invention herewith illustrated provides for the ready removal of the main spring or springs and main wheels of a clock without disturbing the rest of the movement, or taking it apart in case of breakage or for necessary repair, and so they may be quickly and easily replaced. The front plate of the frame, A, Fig. 1, is made with a peculiar slotted construction for a screw boss or front bearing for the arbor of the main wheel, as shown at G, the form of these detachable screw bosses being as represented by F, Fig. 4. One main spring, C, and wheel, D, are shown opposite, fixed in place in a similar bearing. E represents the pillar or bolt of the main frame, to which the main spring is attached, and



WYKHUYSEN'S IMPROVED CLOCK FRAME.

this pillar has at its rear end a screw thread adapted to screw into the back plate of the movement, B, as shown in Fig. 2, although the rear bosses may be permanent attachments, as in Fig. 3.

This invention has been patented by Mr. Hendrik Wykhuysen, of Holland, Mich., to whom communications should be addressed.

A Whale Caught by a Telegraph Cable.

Mr. Robinson Kendal, chairman of the West Coast of America Telegraph Company, has communicated the following extracts from letters received from that company's officials on the west coast of South America, to the papers. The captain of the company's repairing steamer writes: "Having picked up 21 knots of cable, and while continuing picking up, an immense whale came up to the bows entangled in the cable. It seemed to be about 70 feet in length. In its struggles to get free the cable cut right into its side, the whole of its entrails coming out, and great streams of blood. In its last dying struggle it parted the cable on the bow sheaves, and floated to windward of the steamer.

"The cable was twisted up in the form of a wire rope for about two fathoms, and in six different parts it had the appearance of having been bitten through sufficiently to stop all communication. There is no doubt the whale has been the cause of the interruption." Their manager also writes: "The cause of the breakage of the cable, as has been pointed out to you in Captain Morton's report, was a huge whale, which became entangled in the turns of the cable, and was held prisoner for seven days; the interruption was unfortunate, but it is, at least, satisfactory to know that the cable did not give way naturally, and that where picked up, the sheathing yarn and core were found to be in an almost perfect state of preservation, in fact, looked as good as on the day the cable was first laid."

Great Fire in Cleveland.

On the 7th of September the city of Cleveland, Ohio, was the scene of a gigantic fire, which swept away for the time being many of her manufacturing industries, caused the loss of life, and also destroyed property to the value of two millions of dollars. The burned area covers more than fifty acres, extending from Scranton Ave. and the Bee-line track on the east and west, and from the river to Gerard St. on the north and south.

Included in the property destroyed were several lumber yards, thirty-five million feet of lumber, coal yards, many railway cars. The fire was spread from point to point by the burning boards, which were floated into the air by the strong upward current. The heat was terrible. Several fire engines were consumed, owing to the rapidity with which the fire spread.

Antwerp International Exhibition, 1885.

The International Exhibition at Antwerp will be a national and governmental undertaking, under the immediate patronage of His Majesty the King of the Belgians. The president of the exhibition will be His Royal Highness the Count of Flanders, and the vice-president the Minister of Agriculture, Industry, and Commerce. The committee will consist 450 members, and the Belgian Parliament will be asked to vote a sum of money for the commission. The State will nominate the jury and regulate its functions. The exhibition will be opened on May 2, 1885, and will embrace five principal divisions or sections, namely: 1. Education, including the fine arts and art applied to industry. 2. Manufactures. 3. Commerce and navigation, fisheries and pisciculture. 4. Electricity. 5. Agriculture and horticulture. Each of which will again be subdivided into groups and classes. The triennial exhibition of painting, sculpture, and architecture, to which artists of all countries will be invited to contribute, will coincide in 1885 with the universal exhibition.

All necessary measures will, it is stated, be taken on the part of the Belgian Government to protect all patentable inventions, models, drawings, or trade marks which may figure at the exhibition.

The Manufacture of Glass Pots.

One of the first essentials to a successful manufacture of glass is the preparation of the melting pots. These pots are composed of clay, which is required to be as free as possible from lime and iron. A clay obtained from the carboniferous shales of Worcestershire, in the neighborhood of Stourbridge, is highly esteemed for this purpose; it consists of pretty nearly equal proportions of silica and alumina, and there are excellent clays both in Germany and the United States. The clay is carefully dried and sifted, after which it is mixed with hot water, and worked into a paste; it is then transferred to the kneading floor, and when sufficiently kneaded—which is done by men treading it with naked feet—it is laid in large masses in a damp store cellar to ripen, a process the theory of which is not well understood. When required for forming the pots, a sufficient quantity is taken and again kneaded with one-fourth of its quantity of the material of old pots, which are ground to fine powder and carefully sifted; this material gives firmness and consistency to the paste, and renders it less liable to be affected by the heat.

The pots are of two kinds, the opened and the covered. The first is used for melting common glass, such as window and bottle glass; the other for flint glass. In each case the pots are made by hand, and require great skill and care. The bottom is first moulded on a board. When the bottom is finished, the workmen begins to build up the side of the pot by first forming a ring of the same height all round, taking care to round off the upper edge to a semicircular curve of great regularity; upon this he begins bending over other lumps of the paste until another equal layer is formed, and these are continued until the pot is complete; but the workmen do not work continuously at each pot until it is finished; they leave off from time to time, spreading wet cloths over the edges when they discontinue working. This is necessary, to admit of a certain amount of drying, otherwise, says the *Glassware Reporter*, the large weight of clay used would prevent the form being kept, and the pot would fall to pieces or lose shape seriously; the building of the pot is consequently extended over several days.

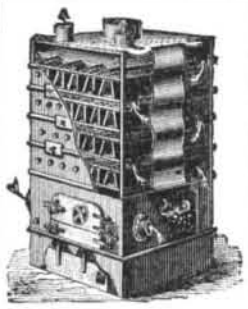
Those made in a favorite mode are from three to four inches thick, but the flint glass pots are only from two to three inches. After the potter has finished his work the pots are removed into the first drying floor, where they are only protected from draughts, so that the drying may be conducted with the greatest possible uniformity. When they have progressed sufficiently they are removed to the second drying floor, which is heated with a stove, and the drying is here completed. They are then placed in the store, where usually a good stock is kept on hand, as time improves them, and they are seldom kept less than six or nine months.

When required for use, they are placed for four or five days in the annealing furnace, which is on the reverberatory principle, and they are there kept at a red heat. This furnace is so situated that the pots, when ready, can be most quickly transferred to the main furnace—an operation of exceeding difficulty, and requiring great skill and dexterity, as they have to be removed while red hot, and it must be done so quickly that no sudden cooling shall injure the pot, a difficulty which can only be understood by remembering that the ordinary pots are nearly four feet in depth, are the same in width at the mouth, by about thirty inches at the bottom, and they weigh several hundredweight. The enormous amount of labor bestowed upon these pots makes them very expensive, their value being from $30 to $50 each.

Their removal from the annealing oven to the main furnace is effected by an immense pair of forceps several feet in length, which are placed horizontally upon an upright iron pillar about three feet in height, which rises from a small iron truck on four wheels, so that the whole apparatus can be easily moved from place to place. By means of this instrument the pot is lifted and dexterously withdrawn from the oven, and as quickly transferred to its position in the main furnace, in which usually ten or twelve are placed on a platform of firebrick or stone, each pot being opposite to a small arched opening through which it can be filled and emptied. The entrance to the main furnace, through which the pots have been introduced, is then closed with a movable door of firebrick, and covered over with fireclay, to prevent the escape of heat; the pots in the furnace are filled with the prepared materials for glass, now called grit, mixed with about a sixth or eighth part of cullet, or broken glass; the openings are closed temporarily for two or three hours, by which time the first charge of material has melted down, leaving room for a further supply, which is then thrown into the pot, and this is repeated two or three times until the pot is completely full. The openings are then closed, and the heat increased to the utmost for ten or twelve hours; and the result of it is to perfectly melt and vitrify the materials.

BOILER FOR HEATING BUILDINGS.

The engraving represents a boiler composed of sections mounted one upon the other, for use either in heating and circulating water, or for generating and circulating steam, to be used in heating buildings and for other purposes. The fire box section and the several horizontal sections are cast or made of metal. The joints of the sections have putty or cement applied to them to prevent leakage, and the sections are held firmly together by bolts passing through lugs upon opposite sides of the boiler. Cast with each section is a series of parallel horizontal water ducts; these are so arranged that the ducts of one section will be over the flue spaces of the section immediately above or below it, thus establishing tortuous channels for the passage of the products of combustion. The ducts in each section are in communication with each other at their ends, and the water spaces are alternately connected above and below, on opposite sides of the boiler, by tubular nozzles constructed so as to form sockets. These connections provide for the circulation of the water alternately in reverse directions through the sections. One or more of the sides of the boiler may be fitted with doors opposite the flue spaces to provide access for removing matter deposited on top of the ducts.



Further information concerning this invention may be obtained from Messrs. Redman & Byram, of Fishkill Landing, N. Y.

Swiss Wood Carving.

The London *Times*, in a letter from one of its correspondents referring to the removal of a number of Swiss carvers to the United States, says that they earn as much as eight dollars a day—more than they can earn at home in a week. This turned into francs sounds a good deal, and is, indeed, an undeniably high wage, eight dollars a day being nearly 10 pounds a week, only a little less, says the writer, than the salary of the President of the Confederation. For all that, the *Berner Post* and other papers of the district are strongly of opinion that the wood carvers would do much better to stay at home. They say: "Do not be so selfish as to follow the example of the horologists of the Jura, and establish in America a new trade which will compete with one of our most important local industries. In the United States you will be far away from your native mountains, from the scenes which suggest and the objects which inspire. The only works of art you will see are statues of Washington and Lafayette, and though you may earn more money you will not be half as happy as you are at Brienz and Meyringen and Interlaken. Stay at home, and instead of going to America let the Americans come to you and buy your chalets, your bears, and your chamois, in the land where they are made."

How far these persuasions will be effective remains to be seen, but it is greatly to be feared that the inducement of 40 francs a day may prove more potent. On the other hand, the attachment of the Swiss to their homes has passed into a proverb; and although some of the watchmakers of the Jura have gone to America, the deftest of them, those who livein the valley of Lake Joux, resolutely refuse to leave their native mountains and abandon their traditional habits for all the inducements that foreign capital can offer.

Swiss wood carving is a much younger industry than Swiss watch making. It was introduced into the Bernese Oberland some fifty years ago by Christian Fischer, a self-taught peasant artist of Brienz. But he was more peasant than artist, detested working indoors, and his ambition did not extend beyond carving rings for table napkins, cutting wooden egg cups, and adorning them with flowers. He was also a musician and village bone setter, and altogether, a man of versatile genius. But his great merit was being the creator of a new industry, for though Fischer did no great doings himself, he put into practice a valuable idea, and founded a school. Peter Baumann, of Grindelwald, and a man named Flenz, belonging to the same country, improving on Fischer's idea, began the making of those charming Swiss chalets, now so popular, and which it is now almost *de rigeur* for tourists in Switzerland to purchase. What was more natural than for these peasant artists to model, first of all their own picturesque houses with their overhanging roofs, their quaint galleries, their painted ornaments, and carved figures, brown with age, standing on a plinth of white stone, overshadowed with trees, within sound of a rushing torrent, and sheltered from avalanches and the north wind by the rocky rampart of some Alpine height?

Peter Baumann, who seems to have been more thrifty and steadfast than his predecessor, settled at Meyringen and taught his art to his three sons, one of whom, Andreas, became the *facile princeps* of wood carving. His work is deemed unapproachable, and his bouquets of roses still serve as models for aspiring sculptors. The success and celebrity acquired by the Baumanns caused the industry to spread, and wood carving soon became the winter occupation of every household in the vale of Hasli But there was no regular market for their productions, their only customers were casual visitors, their only agents hotel porters and small shop keepers, who took the lion's share of the profits. The trade wanted organizing, in fact, and, after several tentative efforts in this direction, the Brothers Wirth established their extensive workshops, where several hundred sculptors of the Oberland now find regular employment. In this industry, as in almost every other, the best results are obtained by a division of labor. Every carver has his or her specialty. Some prefer to shape groups of animals, others like better plants and flowers, others again take to building miniature chalets, and making curious caskets, and what they like the best is generally the best done. Elaborate artistic furniture is also made in great variety in the establishment of the Brothers Wirth. In 1862 the industry had become so important that the Cantonal Government deemed it expedient to found a school of design at Brienz, which is maintained by the State, the communes, and the fees of pupils, the last, however, being little more than nominal. In 1869 a master modeler, maintained in like manner, was appointed for the instruction of the carvers of Interlaken. The pay of a sculptor varies from two francs a day for beginners to five francs for the more expert, among whom is a large proportion of women, their natural tastefulness and deftness of touch making them formidable rivals to the men. Brienz is the headquarters and chief mart of the trade, which has entirely changed the character of the town, and gives it an appearance of prosperity that in former years was conspicuous by its absence. The number of male and female sculptors employed at Meyringen and Brienz amounts to 2,500, and their industry brings into the district some two million francs a year.

Successful enterprise is always a healthy and stimulating influence, and the success of wood carving at Brienz suggested the idea of making parqueterie and chalets at Interlaken. The former has already grown into a large business, the annual production of one establishment alone amounting to nearly 700,000 square feet of parqueterie, valued at half a million francs. Chalets are made for use, not for show, in parts, and, the parts being numbered and arranged to fit without trouble, a man may order a house by post, have it delivered by rail, and enter into possession, all within a few weeks. Attempts have also been successfully made to turn to account the indigenous stone of the country—variegated marbles, which are found in great variety, as also a soft stone, peculiar to the Oberland, which, while easily worked and susceptible of a high polish, acquires by exposure to the air an adamantine hardness, and has the further quality of being almost indestructible by fire.

Determination of the Earth's Magnetism at Paris.

Very careful determinations of H, the value of the horizontal component of the terrestrial magnetic field, have recently been made at Paris by M. Mascart, the well known electrician. The measurements were made in the observatory of the Parc St. Maur, and the method of Gauss was adopted as one of those giving the most correct results. This consists in oscillating a magnetized bar under the influence of the earth; then placing it a certain distance from another bar submitted to the action of the earth, and noting the deviation suffered by the latter. Let

M = magnetic moment of the bar.
K = its moment of inertia.
T = the duration of infinitely small oscillations.
R = the distance between the centers of the two bars.
α = the deviation of the auxiliary bar.
a = a constant determined by experiment.

If the deviating bar is perpendicular to the magnetic meridian, and directed toward the middle of the bar deviated, we have

$$H = \frac{\pi}{T}\sqrt{\frac{K}{R}\frac{2}{\tan.\alpha}}\sqrt{\frac{1}{R}\left(1+\frac{a}{R^2}\right)}$$

If the deviating bar remains perpendicular to the direction of the bar deviated, tan. α should be replaced by sin α. It results from the experiments that the mean value of the horizontal component at the observatory of the Parc St. Maur on July 1, 1884, is H = 0·19 414 ± 0 00012 C. G. S. unit. The error is probably below 0 0001.

An International Scientific Congress.

During the recent meeting of the American and British Associations a proposition was brought forward for the organization of an International Scientific Association, to meet at intervals in different countries of the civilized world. It came in the shape of a petition signed by eight past presidents of the A. A. A. S., and many members of both associations. The matter was referred to a committee from the British Association consisting of Sir William Thomson, Sir Lyon Playfair, and Vernon Harcourt; and from the American Association a similar committee was appointed, namely, Professors Newcomb, Hunt, Barker, Pickering, Powell, Remsen, and Minot. The joint committee will confer and report hereafter. The idea meets with very general approval