The London Fisheries Exhibition.

Congress having appropriated $50,000 for the collection, transportation, and display of objects representing the fishing interests of the United States at the International Fisheries Exhibition at London, next year, Commissioner Baird has issued a circular describing the character of the exhibits desired and the proper way of forwarding them.

Two classes of articles will be carried to London for exhibition, viz.: First, those which make up the "collective exhibit of the United States," and second, those which are entered for competition.

In the collective exhibit will be shown, in a systematic and synoptical manner, illustrations of our marine and fresh-water animals of economic value, together with the apparatus and methods of their capture and utilization, and the commercial, scientific, social, historical, and legislative aspect of the fisheries. It will include the most striking features of similar exhibits made by the Fish Commission in the Philadelphia Exhibition of 1876, and the International Fishery Exhibition at Berlin, in 1880, together with many additional ones never previously attempted. The major part of this display will be borrowed from the collections of the National Museum in Washington, but it will be necessary to secure a considerable number of new objects.

It is considered especially desirable that the department of competitive exhibits shall contain a very complete representation of the various food preparations of fish—canned, dried, pickled, smoked, etc.—there being a constantly increasing demand in England for goods of this description, shipments to that country amounting, in 1881, to more than $2,000,000, in addition to the very large exports to other parts of Europe and to the European colonies in the East. Manufacturers of boats and boat-fittings, angling apparatus and costumes, and other similar articles, are also urged to contribute. Medals in gold, silver, bronze, and diplomas of honor will be awarded by a jury of experts. Professor Baird is prepared to act, both in this country and in London, as the representative of individual exhibitors, and to attend to correspondence relating to applications for space, etc.

Goods to be exhibited, if delivered in Washington, Philadelphia, or New-York, will be carried to London and installed at the expense of the Government; special arrangements may be made for the return of articles at the close of the exhibition. Prospectuses, blank application forms, blank "lists of exhibits proposed to be shown," and any information desired will be furnished on application to the Commission at Washington Applications for space for competitive displays should be made before the 1st of September, 1882. The exhibition—which is under the patronage of the Queen of England and the Presidency of the Prince of Wales—will be opened on the 1st of May, 1883, in buildings now being erected in the Horticultural Gardens at South Kensington, and will continue for a period of six months.

NOVEL DOOR SECURER.

We give an engraving of a very compact and convenient device for securing doors. It is designed principally for the use of travelers, and is very readily carried, and quickly

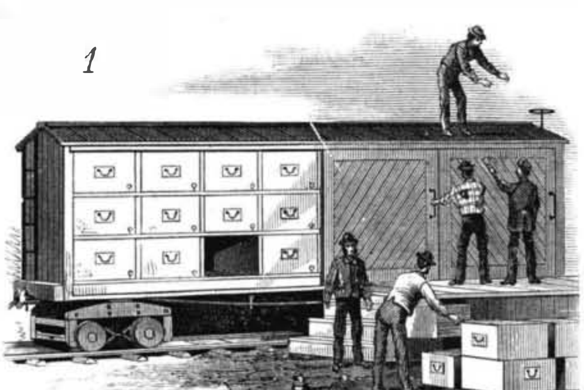
PORTABLE DOOR SECURER.

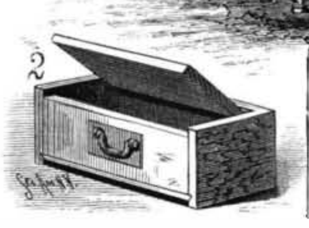
and easily applied to the door, and when so applied renders the door perfectly secure. The fastener is nicely finished and nickeled, and weighs complete only one and one-half ounces. It is provided with a morocco case, in which it is placed when not in use. A metal strip is provided at one end, with a flat hook, and a screw threaded rod is pivoted to its opposite end. A U-shaped piece, whose shanks are of unequal length, is apertured to receive the threaded rod, and the ends of the shanks of the U-shaped piece project toward the hooked end of the strip. This piece is secured in any desired position on the rod by a milled nut screwed on the outer end. The ends of the U-shaped piece have a flat, smooth surface to rest against the surface of the door and frame. The shorter shank is adapted to rest against a moulding or casing, and is provided with a swinging leg of such length that when it is swung outward its end will be flush with the end of the long shank. When in use, the hook of the metal strip is placed against the jam of the door, and the U-shaped piece is turned in such a manner as to permit the closing of the door, and by closing the door the hook is forced into the wood of the jam. The U-shaped piece is then turned so that the long shank will rest against the surface of the door. The device does not mar the door, and keeps it perfectly locked, and is applicable to doors of any thickness, having any style of casing.

This invention has been patented by Mr. Charles A. Crongeyer, of Detroit, Mich. Further information may be obtained by addressing Messrs. Crongeyer & Busch, Lock Box 643, Detroit, Mich.

IMPROVED FREIGHT CAR.

Hundreds of thousands of dollars are annually expended for packing cases in which to ship goods from one part of the country to another, and it may be said that the greater portion of this vast expenditure is actually wasted, as the cases, on reaching their destination, are found, in many instances, to be worse than useless, and are consequently destroyed. This, together with the fact of the injury to certain classes of goods, in the ordinary methods of handling and shipping, and the trouble and expense of packing and unpacking goods in the ordinary way, has led to the invention shown in our engraving.





McMANUS'S FREIGHT CAR.

The cut shows a freight-car divided horizontally by two platforms or partitions, forming three longitudinal compartments, which are subdivided by vertical partitions forming small chambers for receiving a series of packing cases of uniform size and shape. The sides of the car consist of sliding doors, which may be moved so as to expose either half of the car, or, in fact, any portion of it.

The packing boxes are of sufficient thickness to properly protect the merchandise packed in them, and are of such size as to be conveniently handled. They are provided with handles on opposite sides, and have hinged covers by which all the trouble of nailing and removing nailed covers is avoided.

The cases can be furnished to merchants, who can fill them with goods and deliver them at the freight stations. The receiver of the goods can unlock the cases and remove the goods, and the cases, at a slight expense and without injury, may be returned to the shipping point. All of the cars are to be provided with compartments of uniform size, and any case will fit any car.

As the compartments extend entirely through the car, the load may be readily taken from either side of the car; the arrangement also permits of double length boxes for special classes of merchandise. Of course a car may be fitted with the compartments and cases in one half, only leaving the other half as a plain box-car.

Fig. 1 shows the car as it appears while being loaded or unloaded, and Fig. 2 shows the packing case in detail.

This invention has been patented by Mr. Edwin McManus, of Randolph, N. Y.

Theory and Practice.

Theory and practice, says the *Chemiker Zeitung*, will involuntarily strike the ear of some of our readers like shrill discord.

"All theory, dear friend, is hoary," perhaps one will say, while the theorist, wrapping his toga proudly about him, will draw aside from the practician with a sympathetic smile and express *his* ideas. The contradiction herein expressed has become so customary that one rarely meets with any other conception than this which is decidedly false. For this reason we may be permitted to state in a few words what is the real relation between theory and practice.

We do not see in it any contradiction, any "master and servants," or "head and hand;" nay, we look on them as two perfectly equal factors, through the harmonious co-operation of which the acquisitions of science are first made to serve mankind. If we admire the learned who live only for science, pondering on the highest problems for their own sake alone, unconcerned as to whether their thoughts can find any practical use, we do not honor less the man who is quick to see which thoughts of that savant promises a rich return if carried into practice, and then with an iron energy carries it out, and impresses upon it its best form.

And where is there any discovery which owes its origin to the mind of a theorist, that has not found its first complete application in the efforts of a diligent practician?

We have seen a whole series of discoveries, which seemed originally to have merely a scientific value, but they soon celebrated unexpected practical triumphs; we have seen how flourishing industries have been built on small and unseemly experiments made only for scientific purposes in the laboratory of the investigator, not only without regard to their practical utility, but very frequently without any suspicion of it. About two decades ago Bunsen and Kirchhoff astonished the world by their discovery of spectrum analysis, but at that time no one imagined that it would so soon find an eminently practical and genial use in the manufacture of Bessemer steel.

The insignificant observation that the legs of a frog hanging on a copper wire would jerk whenever they touched the iron, was the foundation of the electric telegraph, and there is scarcely another domain in which practical men have attained such brilliant results as in electricity.

Marggraf's ever memorable isolation of the "sweet salt" in the beet was the corner stone of one of the most flourishing industries of Germany, which to-day supports very many chemists and technical men who are continually striving to advance the higher development of this branch of industry.

What a wide step from Zinin's conversion of nitro compounds into amides to the present state of the coal tar color industry!

We could give an enormous number of examples of how small theoretical beginnings have risen to important practical results. But these few may suffice to show how everything of importance which has been accomplished in our profession owes its results to the circumstance that theory and practice have mutually supplied each other's deficiencies.

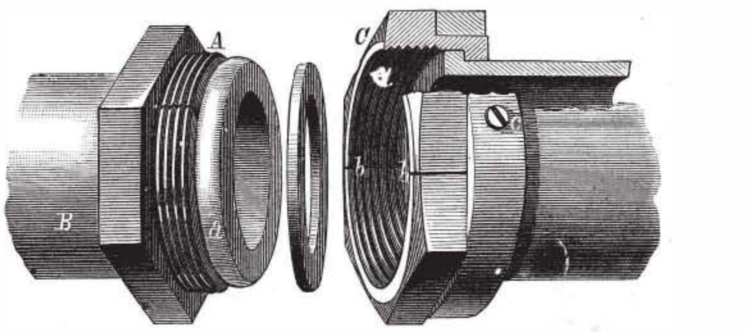
FREY'S PLUMBER'S COUPLING.

The great difficulty with plumbers' couplings used in connection with bowls and tubular connections of porcelain, glass, or other brittle material, is that they are difficult to apply, and can be applied and removed only with the risk of breaking the bowl or connection.

A ring or sleeve, A, having an external thread and divided into two or more longitudinal sections, is put on or around the branch, B, of the bowl. This ring is made somewhat larger in diameter than the collar of the bowl, and to receive a nut which holds the sleeve together and in place. The screw collar, C, of the coupling fits over the collar of the bowl, and screws on the split sleeve, A, bringing the flanged end of the pipe against the rubber packing ring by which the joint is made tight.

The split sleeve is prevented from turning when the joint is made by means of a tool fitted to the slits between the halves of the sleeve, or by means of a rubber band slipped over the collar, *a*, of the bowl.

In some cases it may be desirable to place the collar, C, on the branch, B. This collar is then split as shown at *b*, and the two halves are held together by a ring, *c*, which slips over the smaller diameter of the collar, and is secured in place by two screws. In cases where two flanged pipes, or connections of porcelain glass, or even iron or other material, require unity with a strong tight joint, and when it is impossible or inconvenient to apply the ordinary coupling, both the sleeve, A, and collar, C may be divided as described. In this case also the two parts may be readily separated by taking the ring *c*, from the divided collar, C.



NEW PLUMBER'S COUPLING.

It will be seen that this device admits of applying a positive and reliable coupling where cement joints have heretofore been used, and it will prevent the breakage of many expensive pieces of work in plumbing.

Further information in regard to this useful invention may be obtained by addressing the inventor, Mr. J. J. B. Frey, 1283 Broadway, New York city.

The Telephone at Alexandria.

It appears that just before the bombardment of Alexandria arrangements had been completed for the introduction of the telephone in that city. The work had been done by Mr. H. H. Eldred, formerly station agent at Passaic City, N. J., who was at Malta during the bombardment, and conducted the experiments by which the firing was heard through 1,000 miles of ocean cable. The experiments were suddenly terminated by the explosion of a shell from one of the 81 ton guns in the cellar of the Alexandria central office.

On Earthquakes.

BY C. W. C FUCHS.

It has been repeatedly noticed that of late years the interest in earthquakes is increasing. Every step of progress in this domain presupposes an exact knowledge of facts, and the more zealously observations are made, the richer and more reliable will be the supply of material that we have to work with. Scarcely a decade has elapsed since there were at most not over two or three persons engaged with this branch of geology, while now there are in all civilized countries professional co-workers that take part in these investigations, and that are in communication with all classes of people, so that they obtain information from all quarters, even the most retired. Within the last two years attempts have been made in many countries to replace these single and isolated efforts by methodical investigations that embrace the whole country, by giving a formal invitation to the whole population to take part in this investigation of earthquakes. The movement was started in Switzerland, and now we are in the fortunate position of being able to announce the first important results of such an organization. ("Les tremblements de terre étudies par la commission sismologique suisse de novbr., 1879, à fin decbr., 1880, par F. A. Forel.") Any one who has before him this abundance of connected statements regarding the trembling motions of that little country, and from it can easily read a number of the peculiarities of earthquakes, can form no adequate idea of the trouble and patience formerly required of isolated observers to obtain a few meager and often very inaccurate facts, and to make use of them in advancing our knowledge of this class of natural phenomena. We can not suppress a melancholy recollection of the insufficient means that we were compelled to make use of for so many years. Of course we cannot hesitate to acknowledge that there is scarcely any other country but Switzerland where such an organization could be as successful as in that country of freedom and independence, where persons are to be found in all strata of people, even in the most distant mountain districts, full of zeal to aid and sustain a purely scientific undertaking of this sort.

During the thirteen months embraced in this report of the committee there were twenty-six earthquakes. Many of these, usually the feebler ones, consisted of a single shock, while in the more violent and extended ones several shocks succeed each other. It was often possible to distinguish one principal shock and a number of secondary ones, as if the strata that were shaken by great force had afterward received other small cracks and breaks.

The surface affected by each earthquake varied in diameter from less than 4 miles to more than 350 miles; thirteen extended less than $3\frac{1}{2}$ miles, ten were between that and 100 miles, and three had an extent of 100 to 330 miles.

The small earthquakes were quite evenly distributed over the whole of Switzerland; of the three largest, that of December 4 and 5, 1879, extended over Savoy, the Jura mountains, and the Swiss hills as far as Constance. It consisted of three principal shocks, followed by seven smaller ones. The first occurred at 5:35 P.M., December 4, and the third at 2:31 P.M., December 5. The center, from which the movement proceeded, changed several times. The next large earthquake was December 29 to 31, 1879, and consisted of three principal shocks and twelve secondary ones. The third was from July 3 to 5, 1880, and was of a very complicate nature. There were two very violent shocks July 4, one at 9:20 A.M., the other at 8:30 P.M., that were felt throughout Switzerland. Passing over the details of these, we come next to the question of time. The limited time that has yet elapsed since observations were begun, and their limited extent, do not yet permit of our saying at what season of the year, or what hour of the day, they are most frequent, and whether they coincide with flood-tide, thunder storms, etc.

At present the most perfect method of studying earthquakes is the one in use in Italy; the credit of it is due to De Rossi, of the Papal Academy at Nuovi Lincei. Posts for observation are scattered about on the most suitable spots like meteorological stations, and provided with physical instruments of the most varied character, which not only show the occurrence of very slight shakes, but also the form of motion, its direction and speed, in fact a true picture of what is going on in the earth. Some of the results appear in the *Bolletino del vulcanismo Italiano*, and others in the Proceedings of the Pontifical Academy at Nuovi Lincei. (Similar observations are now being made in Japan.) We have every reason to expect valuable scientific results from this undertaking, but as yet they are only partially of use to us.

Under the term "earthquake" we understand the perceptible motions of the ground, and, as yet, it is these alone that are studied almost everywhere. But as the stations established by De Rossi report the feeblest "microseismic" vibrations, we cannot identify these oft observed phenomena with ordinary earth shaking without any further qualification. It is, indeed, possible that these investigations may lead to an entirely new field of science, electrical, magnetic, or what not, but belonging rather to physics than geology.

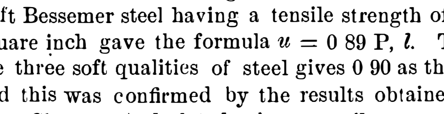
Excluding these slight tremors, and limiting ourselves to those which are perceptible shakes, we find that in 1881 there were 244 such shocks recorded in Italy, of which 86 were in winter, 61 in the fall, 56 in spring, and 41 in summer

The largest earthquake in 1881 was that of Chios. It began April 3, at 1:30 P.M., and the first shock was so violent as to destroy the greater part of the city of Castro in a few seconds. The soil appeared, as an eye witness expressed it, to actually dance from the powerful subterranean shocks. A second one soon followed and completed the destruction. It affected not merely the whole island, the southern part of which suffered most, but the opposite islands of Asia Minor were stricken too, so that the town and military harbor of Tschesme were half destroyed. There were 10,000 wounded and 4,181 killed, and it lasted six days, in which time there were thirty or forty shocks, each one of which was sufficient to destroy almost everything. On April 10 there were seven violent shocks, and then they became less frequent and weaker, but on May 20, June 10, and August 27, there were shocks powerful enough to level whatever buildings had been left standing. Even at the end of November they were still noticed.

The earthquake of Ischia also belongs to the class of large ones, 150 men having been destroyed, together with whole streets in Casamicciola. It was entirely local in character, being confined to the vicinity of Casamicciola and Lacco. It began at 1:05 P.M., March 4, 1881. There is scarcely any doubt that it was caused by the underwashing of the numerous hot springs in the vicinity of the extinct volcanoes, Monte Rotaro and Epomeo. Others of importance are the one that occurred August 10, at Osogna, when a thousand houses fell; and a smaller one between Taebris and Khoe, August 28.

Properties of Mild Steel.

At the recent session of the Iron and Steel Institute a paper was read by Mr. Edward Richards on the well worn subject of the properties of mild steel, and it detailed at considerable length a number of experiments carried out by the author. One object had in view was the determination of the work in foot pounds done in testing a specimen, and the formula deduced from results obtained in testing one specimen by the author was $u = 0{\cdot}90\ P, l$. Another sample of very soft ingot metal made for tin bar purposes, and having a tensile strength of 25 tons per square inch, gave results which would also agree with the formula $u = 0{\cdot}90\ P, l$. Soft Bessemer steel having a tensile strength of 31 tons per square inch gave the formula $u = 0{\cdot}89\ P, l$. The mean of the three soft qualities of steel gives 0·90 as the coefficient; and this was confirmed by the results obtained in testing some Siemens steel plate having a tensile strength of 32 tons per square inch. In the formula $u =$ the mechanical work, P is the tension in pounds, l the elongation reduced to forms of length. Another question to be settled by these experiments was the effect of sudden change in the form of a specimen. In one there were two cylindrical portions, each 4 inches long by $1\frac{1}{8}$ inches diameter near the ends, and a central portion between them 4 inches long by $1\frac{5}{8}$ inches diameter. A narrow groove, three thirty-seconds of an inch in width, was turned in the middle of this boss, so as to leave the diameter of the specimen at the bottom of the groove 1 inch in diameter. The sectional area of the speci-



men at the groove was upwards of 20 per cent less than at the ends, and the form of the specimen would at first sight appear to be highly favorable to fracture across the groove. The result of tensile test, however, proves the contrary; the metal is perfectly homogeneous, yet the specimen breaks, not at the groove, but at one of the ends, because the metal in the notch has not room to contract in area. It has been remarked by Dr. Siemens that "it is possible by careful manipulation to raise the breaking strain of a bar of a given sectional area to a remarkable extent by gradually accustoming it to the strain. By taking a bar of mild steel of 1 inch square sectional area, and loading it with a weight of, say, 15 tons, and leaving the weight on twenty-four hours, it would be found that the elastic limit and the breaking strength of the bar were materially increased." The author's experiments did not confirm this view, but the contrary. Other experiments described prove that the elastic limit of a steel bar varies according to the treatment of the bar previous to testing, and the tensile strength depends upon the cohesive force, and the amount of contraction of area at the maximum strain, the latter quantity being affected by the form of the specimen and by previous strain. In one sense these experiments go to support the opinion held by Dr. Siemens that any mechanical treatment to which mild steel is subjected has invariably the effect of increase of strength. Mr. Adamson and Mr. Wrightson made a few remarks on this paper, but there was no discussion. Mr. Bauermann, however, pointed out that we have probably two factors to deal with in breaking steel, namely, the force required to separate the crystals from each other, and to break any crystal through its own substance. It was not known whether the steel crystal had or had not a cleavage; nor could any one tell what force was required to part a crystal.

Wintergreen Oil in the Blue Mountains.

A letter from the village of Point Phillips gives us in the *Confectioners' Journal*, this account of a peculiar industry:

That long sandstone ridge, called the Blue Mountains, which runs past our village, is remarkably productive in huckleberries, foxes, birch, and wintergreen. In the heat of summer it yields its berries to thousands of pickers; in the cold of winter the hunters track the wily fox, and during all the year the luxurious growth of wintergreen and sweet birch gives employment to numbers of earnest men, who take up their dwelling in the woods and manufacture therefrom the oil of wintergreen. Public attention has lately been called to this humble industry by the activity of the internal revenue officers, who have descended, so to speak, upon these camps, and exacted a large and burdensome tax. Congressman Mutchler, in a recent speech, properly alluded to such a system of espionage as not only obnoxious to the people, but a disgrace to our civilization. Perhaps, then, a brief description of the process of manufacture of oil of wintergreen and the manner of life of those who make it may prove interesting to the reader.

Two men are necessary to carry on the business, one to work by day and the other by night. They build a hut wherein to dwell and sleep. One sleeps from 11 o'clock in the morning until 6 in the evening, and the other from 11 in the evening until 6 in the morning. During the forenoon they work together in collecting the wintergreen or birch. The sweet birch is generally used to produce the oil unless wintergreen is very plentiful. Bushes and branches are cut and chopped into small pieces, while from larger pieces the bark only can be used, and must be carefully shaved off. About half a cord of this material is collected and used every day, and from it a pint of oil or thereabouts is manufactured. The apparatus consists of a furnace, a boiler, a tin pipe, a trough, into which water is continually brought from a mountain brook, a barrel, and a glass jar. The furnace is made of loose stones, so arranged that the fuel is put in at one end, and the smoke goes out at the other through an old piece of stove pipe. Over the furnace is the boiler, which is merely a wooden box about three feet wide, four long, and three deep, with the bottom covered with sheet iron to prevent burning. The boiler has a wooden lid, so that it can be tightly closed, and from the top leads the tin pipe. This pipe runs into the water-trough and through it, so that the water always surrounds and cools it. The end of the pipe, after coming out of the trough, opens over a barrel, and in this barrel, exactly under the end of the pipe, is placed the glass jar. This constitutes all the plant.

The process of manufacture is now the following: The boiler is filled about a third deep with water, the birch bark and twigs are shoveled in until it is full, the lid is put on, and the fire started in the furnace. For hours the fire must be carefully watched and fresh fuel continually furnished. The material in the boiler becomes hot, the oil in the twigs comes out and mixes with the water. Finally the water boils, the oil passes into steam, and mingles with the steam of the water, and then goes out through the tin pipe. As the steam passes through said tin pipe it becomes cooled by the water in the trough, it condenses into liquid, and out of the end of the pipe runs a mixture of oil and water. The oil is the oil of wintergreen, and, being heavier than the water, it drops into the bottom of the glass jar, while the water flows over and is saved in the barrel, to be again reboiled the next day. The oil is reddish in color, sweetish in taste, and has that peculiar and agreeable odor so well known and liked. The manufacturers dispose of it to the apothecaries for about two dollars a pound, who, after diluting it with alcohol, sell it to confectioners and others at the usual apothecaries' profits.

Thus, through the cold rains of spring and the heated term of summer labor the wintergreeners. In the chilly air of night they poke their furnace fire, listening the while to the dismal hootings of the owl. In the ashes they bake the potatoes for their frugal meal. Upon hemlock branches they sleep in their hut. Remote from the world and deprived of its luxuries, they must labor with diligence and patience through all the hours of day and night in order to earn as much as two dollars per man. But now cometh toward the camp an assistant internal revenue collector, who tells them that their tin pipe, cooled by the running water, is a worm or still, and that the law of this great nation forbids the use of such a condenser, except on the payment of an annual tax. And said tax of $35 he collects from them —$35 for each and every tin pipe used for the purpose of condensing said steam. And having made his collection he returns happy, leaving, however, the poor wintergreeners sad and solemn upon the mountain side, denouncing the rapaciousness of the Government.

Robert Briggs.

Robert Briggs, well known as a mechanical engineer and writer upon engineering subjects, died at Dedham, Mass., July 24. Until disabled by paralysis several months ago, Mr. Briggs has resided in Philadelphia. For a number of years he was superintendent of the Pascal Iron Works; afterward he filled the same office at the Southwark Foundry. Latterly he has been connected with the government works for the improvement of the navigation of Delaware River and Bay. Mr. Briggs was an active and prominent member of the Franklin Institute, and for a time was one of its managers. For about a year he edited the Franklin Institute Journal, besides contributing to numerous scientific publications. He was a thorough mechanic, and in his specialties of systems of ventilation, the erection of gas works, and the manufacture of gas, was an expert. He was about fifty-five years of age.