the Office has been built up, and who exclusively sustain it, that the want of room and books is now signally felt. It is not an uncommon thing for persons to come from distant parts of the United States to consult books which can only be found here. A careful examination of the catalogues of other libraries shows that the Patent Office collection is now one of the best technical libraries in the world, if not the very best. The high price of gold and the limited means of the Office during the war prevented the purchase of many volumes which are much needed. Gold has very much depreciated and the means of the Office are now ample, and there are needed many volumes of necessary works to complete series heretofore kept up, which must soon be purchased or be hereafter bought at a much greater cost, if they can be procured on any terms, and there is really no room for any additional volumes, if such were now on hand. The works consulted in this library are very many of them of large size and require corresponding space for their examination. It often happens that every table in the room now occupied by the library is more than covered with volumes for examination and this too in places which should not be open to the public at large.

The want of room for the mere deposit of books is so great that many of them are, of necessity, stowed in the halls, in other rooms, and even piled on the floors. This is an every-day inconvenience; add to this the want of room for consulting the volumes as above mentioned, and there will be found a very valuable public institution which is deprived of much of its real means of usefulness for want of proper space for the use of its advantages.

Deeming it to be my duty to call the attention of Congress to the matter of the indispensable necessity that exists for much more room in order to properly carry on the now great and rapidly-increasing business of this Office, I have, as briefly as I could, made the foregoing representations, in the confident hope that your honorable body will, at no very distant day, take measures to afford the relief which is so much needed.

All of which is most respectfully submitted.

(Signed) T. C. THEAKER.
Commissioner of Patents.

Important Astronomical Discovery.

M. Schiaparelli, Director of the Brera Observatory at Milan, has announced the elliptic elements of the orbit of the meteoric shower of last November, in a comparative view with those of the orbits of two late comets—that of 1862 and the first of 1866—pointing out the important coincidence of all their details, to a fraction of a degree in most cases. Thus, the revolution of the comet of 1866 is calculated as 33.18 years, corresponding closely to that of the swarm of shooting stars. Comparing with the great comet of 1862, Schiaparelli gives for the orbits of the shower and the comet respectively the following elements, the co-incidence of which will be found very striking:—longitude of perihelion, 343° 28′ and 344° 41′: longitude of ascending node, 138° 16′ and 137° 27′: inclination of orbit, 64° 3′ and 66° 25′: perihelion distance, 0·9643 and 0·9626: perihelion passage, August 10·75 and 22·9.

Le Verrier ("true to his antecedents," says the Paris correspondent of the *Chemical News*) has done M. Schiaparelli's discovery the honor of adopting it as his own, and reproduced it with some elucidation in a lecture at the Academy of Sciences January 21st. He also addressed a public letter on the subject to Sir John Herschel, which with the reply was published in the *Moniteur*, and all without the least allusion to Schiaparelli, who had published his comparative calculation in the observatory bulletin for Dec. 31st, and a complete mathematical theory of the phenomena in *Les Mondes* of January 25th.

M. Le Verrier is quoted to the effect that the tricennial shower is a swarm of asteroids coming toward us from the depths of space, at regular intervals, and returning toward the superior planets. A body coming from a distance, with great velocity at the moment when it attains the minimum distance of the earth from the sun, could not be fixed in an orbit of one or two years by the feeble action of the inferior planets. This truth finds a physical proof in the fact that the shower of falling stars which repasses the earth every thirty three years is not deranged in the configuration of its orbit, but returns at regular intervals. M. LeVerrier also assumes that the mass of shooting stars could not have been introduced and thrown into its actual orbit but by some energetic disturbance; and remarking that its orbit crosses that of Uranus, concludes that all the phenomena may be explained by the collision of a globular cluster with Uranus at about the year 126 of our era. The latter suggestion meets with doubt, and it is remarked as to the period, that passages quoted by M. Schiaparelli in his article, from the ancient Indian poems, seem to show that the November meteoric shower had been observed long before A. D. 126.

New French Telegraphic Machines.

One of the latest inventions in use, that of M. Neel, consists of a dial on an axis, lettered with the proper alphabet in a circle, moved by clockwork, and stopped at will by means of the electric current. The dial being covered by a screen with a single perforation, each letter is brought to the aperture as it is wanted, and read off at the receiving station. This instrument is so simple and requires so little practice, that it has been adopted in France for railway and postal purposes. A simple form of battery said to be very effective and economical, is in use on French telegraphs. It consists of a rod of zinc forming one pole, in a porous vessel which is enclosed by a carbon cylinder covered with crushed carbon and peroxide of manganese, constituting the other pole. Only one liquid—a solution of chlorhydrate of ammonia in water—is used. The carbon and manganese last a long time and are cheaply renewed. A curious device designed to utilize the whole velocity of the electric current, has been invented by MM. J. Vavin and G. Fribourg. As we gather it from an obscure description in a Paris letter, the system is about the following. The main wire is ramified at each end into eleven short isolated small wires. The elemental parts, eleven in number, of all the letters, are cut out from plate metal and ingeniously arranged (each in connection with one of the small wires) in a group in which any letter may be seen by suppressing the parts foreign to it. The prepared or conductive paper for sending dispatches is stamped with rows of this composite figure, and the letters of the despatch are formed by tracing the proper elements in each successive figure with insulating ink. The machinery at each end of the line (we infer) brings each of the eleven wires into and out of circuit in rapid succession and invariable order, conveying from each part of the traced character on paper at the sending station to the correspondent type in the group at the receiving station, a magnetic action or interruption, as such part is traced or untraced with the insulating ink, and thus automatically printing one letter at each revolution of the series. Another French machine invented by M. Alphonse Joly, "special agent of the administration of telegraphs," prints the despatch at both ends of the line at once, thus verifying, includes among its characters the figures and points, and transmits 120 to 180 letters per minute.

Editorial Summary.

THE number of vessels reported lost during the year 1866, was 554, valued at $13,975,000.

THERE were 2,407,000 of the new five cents coined at the Philadelphia mint in December last.

THE New World still leads the Old in telegraphy. America now has 90,000 miles of telegraph lines; Europe 60,000; India 3,000.

FLATTERY is the oil of the machinery of society. All are susceptible to it; and he that thinks he is not, flatters himself in the outset.

A QUICK PROCESS for getting drying linseed oil is given by Dr. Dullo: boil the raw oil for two hours with binoxide of manganese and hydrochloric acid.

SPAIN AND BRAZIL have abundance of coal, but import the article at heavy cost from England, for want of enterprise to work their own mines. It is believed that a coal field fringes the coast of Brazil from the river Platte to Cape St. Roque.

PUDDLING is performed in a number of English iron works, by an automatic machine driven by steam, closely imitating the movements of the puddling tool as worked by hand, and giving, as claimed, an economy of nearly half in the consumption of coal.

METEORITES—assuming them to be planetary specimens—show by their analysis that peridot, which is found in some of our lowest rocks, is, as Daubree, the investigator of this subject, describes it, the universal scoria, and that oxygen is also a universal element.

LIGHT SUBMARINE CABLES.—An English inventor proposes to give to telegraphic cables a buoyancy which will prevent their parting from strain in paying out, and facilitate raising them, by means of a coating of ground cork mixed with india rubber.

PHOTOGRAPHIC.—The Paris Gas Company has decided to manufacture alkaline sulpho-cyanides and especially the sulpho-cyanide of sodium, on a large scale, at the request of the Photographic Society. The price will be three francs the kilogramme, and sixty tuns can be produced yearly.

A MALLEABLE CAST IRON of great strength, toughness and hardness, is reported to be produced by a secret process by McHaffie, Forsyth & Miller, of Glasgow. It has been used under important contracts for propeller screws, mast tops, hawse pipes, etc., etc. The teeth of pinions cast by this process have been hammered down to the solid boss without cracking.

A HINT FOR THE PATENT OFFICE.—A correspondent complains of the difficulty of finding different models or even classes of models in the Patent Office, and suggests the improvement of having the localities of the several classes marked by conspicuous signs, and the subject, date and grantee of each patent stated in a neat and plain inscription over the model.

PUTTING OUT A FIRE.—During the process of extinguishing the fire in the colliery of Clackmannan, near Stirling, England, in 1851, about 8,000,000 cubic feet of carbonic acid gas were required to fill the mine, and a continuous stream of impure carbonic acid was kept up night and day for about three weeks. The mine extended over a surface of twenty-six acres, and had been thirty years on fire.

THE SILK COLLODION newly invented, has long been obtained, or something like it, by the Chinese, from the contents of the silk worm which has been prevented from spinning. The matter is found in a thickened mass or gum, and is made into a transparent varnish. It is also spun (as the gum is said to have been spun lately by a Frenchman in a still earlier stage of its formation in the mulberry tree) and forms a very strong thread, used for fishing lines and snells.

IMPROVEMENT IN WATCHES.—An English manufacturer has invented an arrangement of watch movements by which the full-sized balance wheel of the English whole-plate watch is carried in the thin flat case so much preferred for convenience, but hitherto excluding the perfection of structure and durability. A Mr. Barlow has patented a simple contrivance by which the only figures of the dial that appear are those of the current hour and minute. A perforated screen is made to revolve instead of hands over the dial.

PATENTS AND PROSPERITY.—The *Scientific Review* (London), commenting on the remarkable exhibit of our Patent Office, makes a suggestion to the effect that the relative commercial prosperity of different countries seems to bear an intimate relation to the encouragement and activity of invention, as indicated by the spirit of their patent laws and the number of patents granted. Witness England, France and America, progressive in laws and arts, in contrast with Switzerland; China and Japan, wedded to the ways of a younger and cruder age, as if the man should look back to boyhood for his model, and glory still to think, to speak, to act as a child.

SOUND AND COLOR VIBRATIONS.—It is calculated that the deepest note which the human ear perceives as a continuous sound, is produced by 16 vibrations in a second: the acutest by 48,000. The extremes of color are red and violet; the former given by 458 billions of vibrations per second, and the latter by 727 billions. The relative velocities of light and sound, and the relative refinement of the media through which their effects are conveyed, are illustrated by this coin parison.

MOUNTAIN ATTRACTION.—The pendulum experiments connected with the great trigonometrical survey in India, have shown that, contrary to previous theory, gravitation is less powerful as we approach the Himalaya mountains; corroborating the Astronomer Royal's opinion that the strata below the mountains are less dense than those beneath the depressed portions of the surface. Nothing could be more probable, than that the upheaved portions of the crust should be the weakest.

THE PONTOON RAILROAD BRIDGE over the Rhine, or that part which rests on pontoons, is 768 feet long. The connecting ends of the shore approaches are adjusted to the rise and fall of the pontoons by a screw gear. The pontoons are coupled in sets of two or three, and each set can be readily removed for the passage of vessels and replaced. They are 65½ feet long, and sustain a roadway of about 40 feet in width, the central portion occupied by the rails, and the space on each side devoted to ordinary traffic. It has been in use about twenty months. The sinking of each pontoon under the locomotive is said to be only one-third of an inch.

ELECTRICITY AND ALTITUDE.—M. Matteucci has found that if the surface of the earth at different altitudes be connected by a conductor, a constant current of electricity will flow from the lower to the higher point; the intensity of the current increasing with the difference of the altitudes. Thus, between Florence and Turin, the deflection of the galvanometer from the current passing through it was from 15 to 20 degrees; between Pontedera and Volterra, from 20 to 25; and between Aoste and Courmayeur, from 40 to 50. Atmospheric changes, however, modify of course the effects, as do also diversities of latitude and geological formation. The aurora borealis and the variations of terrestrial magnetism are supposed to have an intimate relation with this distribution of electrical conditions.

A MONSTER SAW.—At No. 2 Jacob street, this city, we saw, a few days ago, a circular saw intended for the Paris Exhibition, which is said to be the largest ever manufactured. It is 88 inches, or eight feet four inches, in diameter, of one solid plate, from the works of Messrs. W. Jessop & Sons, England, and weighed, before finishing, 590 pounds. The saw is one of Emerson's patent, having movable teeth which are secured in the plate by V-shaped grooves with corresponding tenons and one rivet to each tooth. The thickness of the finished saw at the center is No. 2, Stubbs' wire gage, and at the edge, No. 5. The saw was made by the American Saw Company at their works at Trenton, N. J. It will be a prominent feature of American industry at the Paris Exposition.

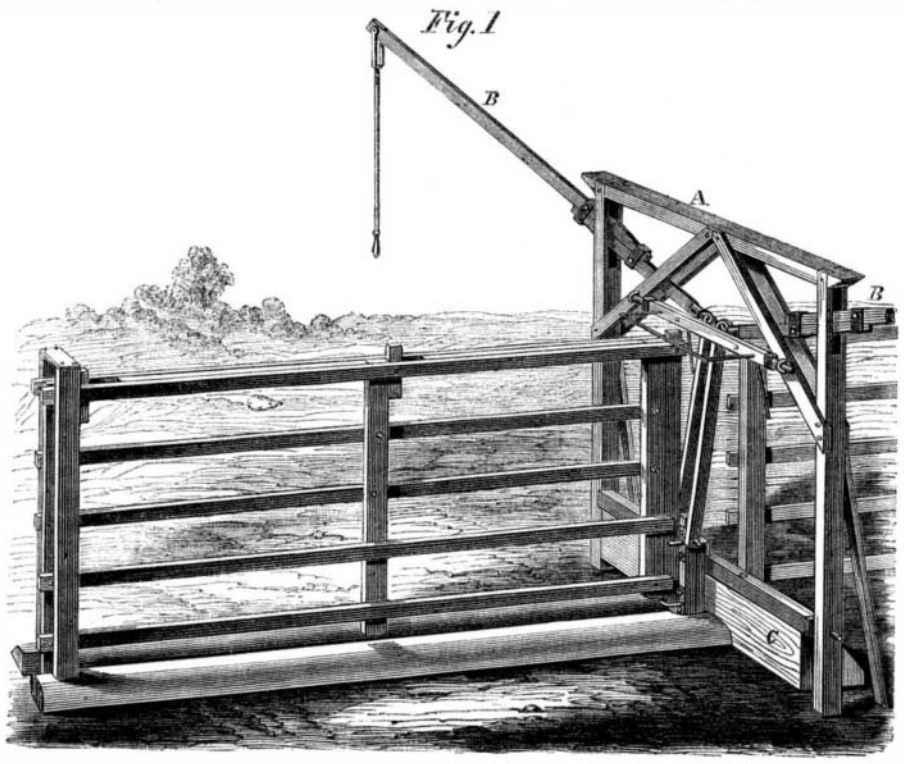
A VALUABLE FIRE ESCAPE has been introduced in England in a form convenient for travelers, and as safe and easy to use as a flight of stairs. Within a thin metallic case only 7½ inches in diameter, are coiled on a pulley thirty feet of light, strong and flexible steel-wire rope or tape, passing out between rollers adjusted by a hand screw to any desired pressure, and terminating in a hook for fastening to a window seat. A chair for the body, formed of leather straps, is attached to the case, and the hook being secured to the window seat, the person seated in the chair may regulate or arrest at pleasure his own descent, by means of the screw. By using fine steel wire, woven into a tape, sixty feet might be coiled in a smaller case than that above described, making a perfect fire escape portable in every one's carpet bag.

DOMESTIC ECONOMISTS may try the suggestion of covering the bottom of a fire grate with a plate of boiler iron or the like. Dr. Samuel Warren (author of "Ten Thousand a Year," and now recorder of Hull) asserts from experience that by this means one third of the coal may be saved with an increase of warmth. The iron plate evidently acts as a reservoir and radiator of the heat in the downward direction where it is most useful, and strengthens the combustion above it. The layer of ashes which usually receives the downward heat, absorbs it with avidity and scarcely radiates it perceptibly: as is proved by the fact that a grate is quickly burned out by an accumulation of ashes under and in contact with it, which without contact would be quite harmless. The capacity of ashes for "keeping" fire (*i.e.* heat) also proves that it should never be avoidably left in a position to absorb the heat, where active radiation is wanted. A fire clogged with ashes gives out, for this reason, palpably less warming effect than a clean fire, for the same amount of fuel. If the plated grate above suggested be not kept clear of ashes, the heat in the ashes will be largely withdrawn into the plate by contact, and thus utilized; but the plate or grate, whichever is uppermost, will be rapidly burnt out. The best economy of both heat and apparatus, is to keep the plated grate clear, and probably a further saving would be effected by allowing the hot ashes to be distributed upon a lower plate freely exposed to the atmosphere of the room and frequently cleared:

Improved Lever Farm Gate.

The gate seen in two positions in the engravings is one which when closed forms a portion of the fence as rigid and secure as the fixed fence itself. When opened it is entirely out of the way, so that the space occupied by the gate is left free. It is a pivot gate, the horizontal and upright bars being so pivoted at their intersection that by the action of a lever the gate may be folded together and dropped into a channel prepared for it.

A properly braced frame, A, supports two levers, B, one on each side of the gate, which engage at their inner ends with two upright bars pivoted at the lower ends with the gate post. Connected with these upright bars and turning on suitable pivots with them, is a horizontal box, C, weighted with stone to counterbalance the gate. Opposite the gate frame is an upright to hold the gate in position when closed. A horizontal bar on the main frame, acting as a latch, is operated by the levers to unfasten the gate, and when the gate is closed falls by its own weight into position and holds the gate securely. There are no posts or parts below the surface of the ground to be rotted off; no pit to give space for the action of weights, and to be filled up with ice in winter. All its parts are above ground, the gate when closed occupying a space no deeper than sufficient to hold the horizontal bars of the gate when they are folded together. The driver of a vehicle, or the equestrian, may, without alighting or relinquishing the reins or bridle, open and close the gate by the pendent rod at the end of the levers. If the channel should become filled with snow or ice, the gate can be easily removed by withdrawing a pin near the bottom and the channel be left clear to be cleaned. The attachments for working the gate appear to be of the simplest construction, not liable to become disarranged, and built for durability.



McKNIGHT'S LEVER FARM GATE.

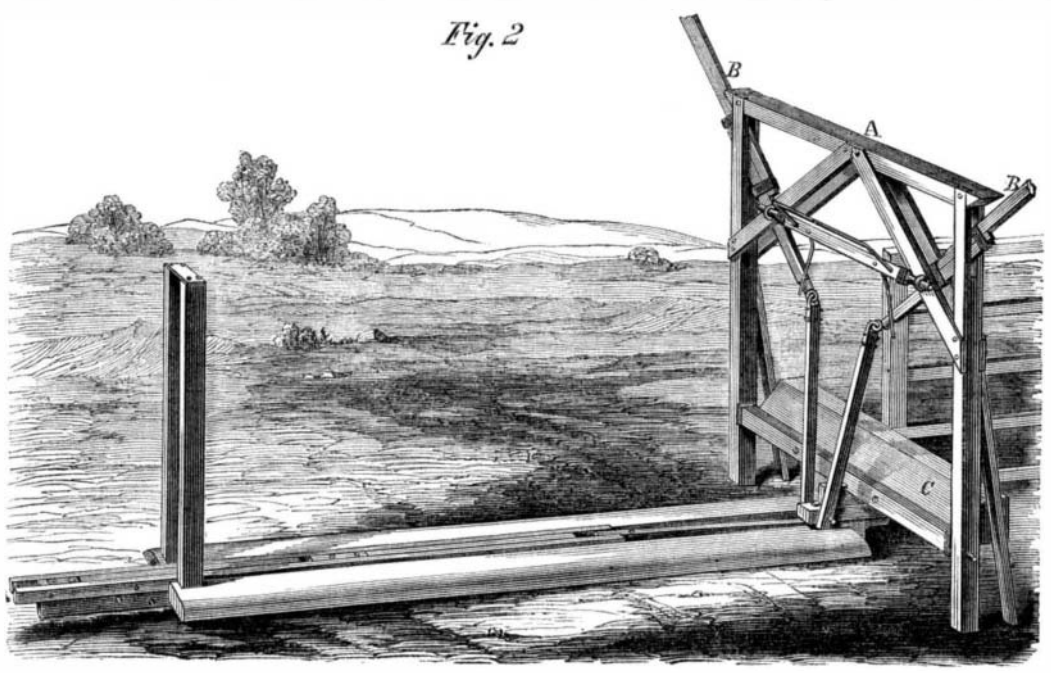
This gate was patented Jan. 29, 1867, through the Scientific American Patent Agency, by George McKnight, of Hebron, N. Y., whom address for further information.

MANUFACTURE OF FOREIGN BEER.

English men, women, and children, commencing with the new-born babe who imbibes it in its mother's milk, drink on an average a barrel of beer each per annum, during life. They did so a hundred and fifty years ago when there were but six millions of them, and they do it now when they are twenty millions. Consequently the brewers of England have the task of producing annually among them 20,000,000 barrels of beer for home consumption, beside the immense export. It is therefore no wonder, or rather only the same wonder over again, that each of the twelve great breweries in London, among which it is difficult to say which is the greatest, occupies many acres of ground, employs men by hundreds and horses by hundreds, and stores its current product by the hundred thousand barrels. But at Burton-on-Trent, a large section of which is devoted to brewing, and presents to a bird's eye view the appearance of one vast brewery, space and facilities for the manufacture are more abundant than in London. The premises of one brewing firm (Bass, Ratcliffe, Grattan & Co.), cover 48 acres, eight of which are sometimes covered with beer three casks deep, worth some two and a half millions of dollars, waiting to be distributed to their customers and agencies. Their sales amount in one season to six and a quarter millions of dollars ($6,125,015); their malt tax to Government, $885,731; their workmen, 1,555, and clerks, 163. They reap (indirectly) 30,000 acres of land yearly of its crop of barley, yielding 1,280,000 bushels of malt. They consume 130 tuns of coal per day, and 8,000,000 cubic feet of gas per annum. And their business is extending at the rate of 200,000 bushels of malt per annum.

The operations of another firm at this place (Samuel Allsopp & Sons) are scarcely less extensive. Both the names mentioned will be recognized as leading and celebrated brands the world over. The brewery of Allsopp & Sons is said to be probably the most perfect and complete establishment ever erected. Their premises cover fifty-two acres. Their counting house is a hundred and twenty feet square, subdivided by glass partitions, and handsomely furnished, with every department thoroughly systemized, including even a post office, and a department of chemists, whose duty it is to subject the beer to known tests at every stage of manufacture in order to secure its ultimate perfection. Duplicates of every utensil employed in the manufacture are kept on hand, so that no time may be lost by accidents. Every one of their 400,000 casks (which they make for themselves) has its number and its account kept, so that its present whereabouts and past history can be told in a moment.

In the establishment of Barclay, Perkins & Co., in London, —another household word all over the world—the larger storing vats contain 5,000 barrels each. Their stables contain 120 horses weighing from 1,700 to 1,900 pounds each. The malt houses are situated in the country; yet the city establishment covers twelve crowded acres. They bring up their sons to the business—five of them at present—by an apprenticeship of four years, during which they live on the premises in a building erected specially for them, rise at four o'clock in the morning or earlier as circumstances require, and upon occasion take the places of any of the clerks who may be sick or on leave, so as to become familiarized with every detail. Everything, and especially every moment of time, is economized and appropriated with rigorous system.



A peculiarity of the London beer business is that the brewers to a large extent own or control the alehouses, and the retailers are their tenants, dealing only in the article manufactured by them or in non-competing articles. A large sign displays the brand—"Barclay, Perkins & Co.'s *Entire*," for example. The price per barrel is about $7 33 for ordinary porter, and for ale $7 78. The retail price is 1½d. (say 2¾ cents) per glass, a full half pint, or 4d. (7 4/10 cents) per quart.

The taxes are laid on the malt, except a trifling license duty of three pence a barrel on beer, substituted in 1862 for the duty on hops. The excise duty on malt is 2s. 8½d. per bushel yielding half an English barrel (about 22 American gallons) of beer, making the whole duty equivalent to 94 cents on an American barrel; which rate it has not exceeded for the last 44 years, except in 1854 and 1855. Nearly one-tenth the expenditure of the British Government is paid by beer; but a much larger proportion is borne by (British) spirits. Together, the liquors pay nearly one-fourth the whole cost of the general government.

It is a noticeable fact in the experience of British taxation, that while no increase that has ever been made in the rate of taxation on spirits has, in the long run if at all, reduced the consumption, the taxation of malt liquors has been sufficient at some points to diminish the demand very seriously. This result illustrates very strongly a fact by which it is undoubtedly explained: *i. e.*, that no such unconquerable passion is excited for beer as for ardent spirits, and hence the former will be dispensed with when it becomes too expensive, while no sacrifice is too great for the devotee of ardent spirits to make to his idol. Congress should bear these plain facts in mind, and keep a tax on ardent spirits simply as high as it can be made practicable to collect.

It is said that almost every householder in good circumstances keeps a barrel of malt liquor on draft in his cellar. The average Englishman, drinking as we said his average barrel of beer per annum from birth to death, drinks less than three quarts (·645 gallon) of spirits per annum. In Ireland and Scotland, the principle though not the exact proportion is reversed: owing, some suppose, to a heavy excise imposed upon Scotland by the English in 1707, which suppressed the consumption of beer and brought whiskey into its room. In Ireland, the manufacture of porter was introduced only at the dawn of the present century. Consequently the brewing interest is insignificant in those parts of the United Kingdom, comparatively, and yet it is not so to our conception of things. For instance, the celebrated porter brewery of Guinness, Son & Co., Dublin, which has given a leading brand to the cosmopolitan market, is reckoned by the proprietors to rank about the fourth in extent of production in Great Britain. The wealth as well as the liberality of the concern may be inferred from the fact that its senior gave at one time $726,000 for the renovation and enlargement of the Protestant Episcopal Cathedral in Dublin. The still larger gift of his son, Rev. Henry Grattan Guinness, who gave himself as a gratuitous evangelist throughout the English-speaking world, is fresh in the memory of every one in this country.

In Scotland, the brewers are famed for a superior quality of ale, of great gravity and strength. "Scotch Ale" is a department of the trade in both hemispheres. The Scotch brewers are also successfully meeting the increasing demand for a lighter ale, competing in their own market and to some extent even in the English, with the famous breweries of Burton-on-Trent. Yet the whole production of malt liquor in Scotland and Ireland together is but one tenth of that of the United Kingdom. That of London is about one sixth of the whole.

In regard to peculiarities of manufacture, a few items may be added. The prejudice against American hops is rapidly disappearing: a portion of them are now used in nearly all the large breweries. The superiority of British beer is due in great part to the extreme care taken by the brewers in the selection of their barley and the manufacture of malt. They pass it through screens and fans, separating the lighter grains as food for cattle and using only the best grain for malt. Ample time is given the barley on the floors, to germinate, and the drying is very careful and perfect. It passes over a screen when thrown from the kilns, and the separation of the rootlets is thus more thoroughly effected while warm and crisp than afterward. Immediately after this, it is placed in bins and covered four inches deep with the rootlets to protect it from moisture. The malt floors are tiled with what are called ferro-metallic squares.

The heavy Scotch ale is manufactured, in some breweries at least, only in fall, winter and spring, when it can be fermented at a low temperature. The famed clearness of the Burton ale is attributed to the calcareous composition of the water used. The manufacture of porter and ale, in Barclay, Perkins & Co.'s establishment, are as distinct processes as if there were two distinct breweries. The mash tuns are commonly of iron, but in Allsopp's new establishment the receptacles and utensils for mashing, fermenting and finishing their beer are of wood; and at another celebrated brewery, that of Truman, Hanbury, Buxton & Co., many of these vessels are beginning to be made of slate, which gives high satisfaction on account of its cleanliness and durability.

The above data are mainly derived from the report of the Commission of the American Brewers, sent over in 1865 to obtain accurate information of the excise laws of Europe relative to malt liquors, to be presented to the United States Internal Revenue Commission.

GERMAN BEER.—Beer, as we have seen, is a great thing in Britain, but in the Saxon mother country (or as we Americans should call it, grandfather land), it is a sort of all-in-all. Its consumption is largely increasing in all the German and kindred countries, notwithstanding the competition of the cheap indigenous wines. In Bavaria, famous for beer, the incredible statement is made by the Brewers' Commission that the consumption is a hundred-fold greater than it was twenty years ago. We are tempted to assume that they meant to say a hundred per cent instead of a hundred fold. Up to 1811 the business of brewing was an aristocratic privilege, confined to the nobility and clergy—the latter being allowed to brew for their own use. In 1785 this monopoly had been relaxed so far as to allow the people to brew for their own use, but not to sell beer. Now, the government puts forth its power to protect and stimulate the manufacture, and provides the people with beer almost untaxed, and even at cost, with its own royal hands. A rise in beer is dangerous, like a rise in bread in Paris of old. A riot resulted in 1847 from an advance of 1¼ cents per quart on account of a partial failure in the barley harvest. The King's Brewery, at Munich, under