Correspondence.

The Editors are not responsible for the opinions expressed by their Correspondents.

Propagation of Roses.---Dwarf Pear Culture.---Ornamental Trees and Shrubs.---Manufacture of Ladies' Apparel.

To the Editor of the Scientific American:

Last week I took an excursion through Monroe and Wayne counties, N. Y., visiting several fruit nurseries and flower seed gardens, and one novel manufacturing establishment, and witnessing practical application of scientific principles to the production of fine fruits and flowers, not less interesting than those involved in the construction of steam engines or the propulsion of canal boats. Moreover, I found an evident willingness, on the part of those who have subjected theories to the test of experience, to impart their dearly bought wisdom to others, thus smoothing for their successors in the business the rugged way over which they have themselves achieved success, and contributing to the higher development of their noble calling. The method of

PROPAGATING ROSES

was minutely described and shown by Mr. John Houston, the skillful propagator at the extensive ornamental and small fruit nursery of A. M. Purdy, Palmyra. This work is done at any time during the season in the greenhouse. I saw plants which were set early in the season and had made considerable growth, others set at various times since, and others still, cut from the bushes and set while I was looking on. Good thrifty shoots from six to twelve inches long were cut and laid in a market basket, sprinkled, and covered with two or three thicknesses of wet paper. They were next taken into the workroom attached to the greenhouses and there cut with a thin bladed keen pocket knife into pieces from one inch to two inches in length, and thrown into water and left from one quarter to one half hour. These cuttings are made with a smooth, somewhat oblique cut, so as to leave but one bud to each, and that at the upper end. The leaf at the base of the bud is cut away, except the two lower leaflets. After having lain in water until all the pores are filled, they are set in coarse sand in the smallest crocks, one in each, or several in a large one. The subsequent treatment consists in keeping them uniformly moist and warm, too much or too little water being injurious. After the cuttings have taken root, they are transferred to larger crocks or to the garden beds. Persons wishing to propagate roses on a small scale may substitute a bottomless box with a light of glass over it for a greenhouse. A writer in *The Garden* says he has succeeded finely by putting a dozen or more cuttings in coarse sand in a marmalade jar, with water enough to stand about a quarter of an inch above the sand, and plunging the jar in a slight hot bed, giving all the light and sun possible, and adding a little water occasionally to replace that lost by evaporation.

Mr. Purdy has 130 acres of rolling land, with soil of sandy loam, devoted to small fruits and ornamental shrubs, probably the largest small fruit nursery in the country. The acres of Mammoth Cluster black cap bushes, literally covered with thimbles of jet, were a sight for an epicure.

From Palmyra, I rode north six miles through a fine farming section, along the line of a projected railroad from the Ontario iron mines by the New York Central to Walworth, a lovely little village which crowns the summit of one of several parallel north and south ridges. Almost encircling and imbosoming the village are the nurseries and orchards or T. G. Yeomans, Esq., to whom, with his estimable family, I am indebted for two days of rare enjoyment in studying the results of twenty years' thorough and systematic devotion to the cultivation of fruit trees and fruit. Though equally successful in raising all other orchard trees and fruits, Mr. Yeomans is without doubt unrivaled as a cultivator of

DWARF PEARS.

From 400 to 500 barrels of pears is the ordinary product of his orchards. The "Duchesse d'Angoulême" is his favorite variety. They are very large, a barrel having been filled with 125 pears. They are delicious and always marketable, $1,000 having been received for the product of one third of an acre for two years. Quince roots are imported from France. These are set in spring and budded in summer, or grafted the following winter and reset in spring. Clean cultivation follows for two or three years, when the trees are ready for the orchard. The "Bartlett," "Louise," "Bonne de Jersey," "Howell," "Seckel," "Sheldon," and "Vicar of Winkfield" are considered next in value to the "Duchesse."

Mr. Yeomans relies on thorough preparation of the soil by underdraining, manuring, deep and frequent plowing before planting, and clean cultivation, frequent stirring of the soil, and skillful pruning afterwards for success in fruit raising. As an illustration, he has laid four miles of tile drain on fourteen acres of lately purchased land. Cultivators and small plows are kept in operation all the season through, the ground being thus kept mellow and clean as a garden. The most perfect system prevails in all parts of the establishment, and one who visits it is at no loss to know why the products of these grounds are so eagerly sought for. The reason is simply this: The very best varieties are cultivated in the very best manner and sold for what they really are, Varieties which he has thoroughly tested and found the best, Mr. Yeomans raises largely. Of the Baldwin apple, for instance, he has entire blocks in the nursery and over sixty acres of orchard. His entire apple, pear, and peach orchards contain over 14,000 trees. A full crop of apples is about 3,000 barrels; of peaches, 1,000 bushels. Every peach tree is full of fruit.

At Walworth, and also at several of the Rochester nurseries, I took note of such

ORNAMENTAL TREES AND SHRUBS

as pleased me most. Omitting those well known, I will name a few, any of which may be safely ordered by those who wish to add a rare and beautiful ornament to their lawns. The cut leaved birch has a graceful form, light drooping foliage, and smooth silvery bark which contrasts finely with the foliage. The red leaved beech is among trees what the *colens* is among plants. The honey locust is a rapid grower and a beautiful tree. The *Salisburiana adiantifolia* is remarkable for its peculiar fan shaped leaves. The magnolia and catalpa are fine trees. The *Wigelia rosea, Spirea prunifolia, Deutzia crenata, Deutzia gracilis,* Japan quince, and red leaved barberry are very desirable shrubs.

While at Rochester I visited the establishment of Messrs Elwell & Moseley, manufacturer of ladies' suits and underwear. They are pioneers in the business. They have already secured an extensive trade, their orders being from almost every State in the Union. In the machine room are stands for 120 sewing machines, which are run by water power, the operator starting or stopping the machine by a slight pressure on the treadle, one foot crowding the band wheel against a disk attached to the shaft, the other removing it. Hemming and puffing are done with the Wilcox & Gibbs machine at the rate of 2,000 stitches per minute. For other work, the Singer, Wheeler & Wilson, Howe, and some other machines are used.

Much of the more elaborately wrought parts of under garments is formed by carefully stitching together narrow strips of bias tucking, puffing, insertion, and edging. The tucking is prepared by laying fine tucks obliquely in two yard pieces of cloth, and then cutting into narrow strips lengthwise. The material used is Victoria lawn, linen, and grass cloth. The wonderful feature of the establishment is that by the aid of machinery and proper division of labor, beautifully wrought garments are made and sold at less prices than the very plainest articles can be made for by hand. Now that ladies' garments have begun to be manufactured by the dozen and hundred by machinery, we may look to see the needle banished to the garret along with the spinning wheel and loom.

C. H. D.

Warsaw, N. Y.

[For the Scientific American.]

NOTES OF ENGLISH SCIENCE.

The treatment of sewage is calling forth a good deal of enterprise. The method adopted by the Peat Engineering Company is to treat with charcoal, a tun of which, they calculate, is equal to the absorption of at least two tuns of solid sewage matter. The mixture is reduced to powder and packed in bags for conveyance or storage. This mode is being applied at Bradford to a sewage of 5,000,000 gallons daily, including waste liquors from numerous dye works and factories. The liquid will be filtered through charcoal arranged in several rows of beds 700 feet long and 4 feet wide, each particle of sewage passing through twelve feet of charcoal. The same company are about to treat the Paris sewage, and offer for the solid *excreta* the high price of 6 francs 7 centimes per cubic meter. The Nuneaton sewage is about to be treated by Anderson's process, in which the sewage is admitted into tanks, and sulphate of alumina, dissolved in water, is thrown in, followed by a little slaked lime. Sulphate of lime is formed, and the alumina is set free. Precipitation follows; the water is run off, and the mud discharged into baskets, of galvanized iron wire lined with flannel, which act as strainers. These, when full, are lifted and the deposit is thrown on a sheet iron floor, heated from beneath with hot air, which, after heating the plate, is drawn back over the surface of the mud, and carried into the flue of the engine furnace. The dried mud forms the manure. Dr. Anderson says that at Nuneaton eight to ten tuns manure can be produced weekly at a cost of £7, including everything.

The Council of the Society of Arts offer prizes of £60, £20, and £10 for the best improved cabs, to be exhibited at the International Exhibition in 1873. The London cabs are thought faulty in the following respects: 1. Want of room. 2. Seats in four wheelers too high, not commodiously made, and the space underneath lost. 3. Difficulty of getting in and out of hansoms from hight of step and interference of wheel. 4. Window arrangements in hansoms are bad. 5. The confined, ill ventilated space in hansoms when the window is closed. 6. Imperfect locking of wheels in four wheelers.

The Prince Consort memorial in Hyde Park is approaching completion. It was designed by Mr. Gilbert Scott, R A., and its estimated cost is £120,000. The monument is elevated on a pyramid of steps, on the upper platform of which rises a pedestal surrounded by sculptured figures. Four pillars of polished granite bear aloft the four main arches of the canopy. The upper part consists of a lofty spire of "tabernacle work," largely gilt and enameled, and terminating in a gilt cross which reaches the hight of 180 feet above the ground. Each side of the canopy is terminated by a gable containing a large picture in mosaic. Various sculptured groups represent Architecture, Painting, Poetry, Agriculture, Commerce, Engineering, etc. The figure of the Prince Consort is not yet placed, and is not likely to be for another year.

A remarkable method of preparing wood pulp for the manufacture of paper is exhibited by Mr. Houghton at the International Exhibition. The logs or blocks of wood, preferably pine, are cut into small pieces about one inch by one half or one fourth of an inch. These are treated with alkali at a temperature of 370° to 380° Fahr. (equivalent to a pressure of 175 to 180 pounds per square inch). All resinous and other matter is thus dissolved out, and the skeleton fibrous framework of the wood collapses into half stuff, under compression, with moisture. The wash liquor is treated (in accordance with a discovery made by M. Tessié du Motay) so as to be utilized again, and this is the essential principle of the process. Carbonic acid gas is forced through the liquor, forming a resinous precipitate, which falls to the bottom on application of heat. The supernatant fluid remains still colored by some vegetal acids, and these are removed by introducing sulphate of soda, a cheap salt. The caustic alkali is thus made fit for use again.

A new mode of paving, called lignomineral, is about to be tried in one of the London streets. It consists of wood blocks impregnated with mineral substances, which make them impermeable to wet and homogeneous. The foundation is prepared with concrete, and the interstices between the blocks are solidly filled in with gravel. The blocks are beveled at the end to an angle of 60°, and those of adjacent rows are inclined in opposite directions. Cheapness and endurance are said to be the benefits of the system. It has been tested in Paris, with excellent results.

The Australian Telegraph Company have announced their readiness to receive telegraphic messages for Australia and New Zealand, at the sender's own risk. The land line is not yet complete, but by means of an express service, news may be received in Adelaide five days after London dates. The work of construction in Australia has been divided into two parts, one from Port Darwin southwards, the other from Port Augusta northwards; of the former 400 miles have been constructed, of the latter, 1,176 miles, leaving 250 miles incomplete. Great difficulties have been experienced from floods. If one walks a mile or two from the camp, he may find, on attempting to return, that he is almost cut off by creeks and water courses, which before had no existence. The rainy season would thus seem to threaten interruption to the line when constructed. Iron poles will further be wanted all through tropical Australia, on account of the ravages of the white ant. The company wishes to carry a submarine cable from Port Darwin to join the Queensland lines in the Gulf of Carpentaria.

A. B. M.

LONDON, July 8, 1872.

Saliva.

The action of the saliva in turning the starch of the potato into sugar is tolerably well known to students of popular science; but few among the ordinary reading public are aware that this saliva consists of a variety of fluids, some of which prepare or predispose the food to change, while others merely serve mechanical objects. Of these the saliva secreted by the parotid glands contains a peculiar ferment named ptyaline, and this principle is the only agent in saliva which has the power of transforming starch into sugar. The diastase of malt has a similar action, and a knowledge of this fact led Baron Liebig to employ diastase in the preparation of a food for infants "brought up by hand," which food supplies efficiently the want of ptyaline and alkaline fluids in the digestive juices. But little is known of the character of saliva in disease; that it is very materially affected cannot be doubted, and further research will probably throw more light on the subject. It is known that the administration of mercury causes a change in its constituents; several medicinal salts, such as iodide of potassium, pass very readily into the saliva from the blood, and, as is well known, the saliva is the bearer of the poison of hydrophobia. From these facts we derive information of a nature probably unthought of by many; for if ptyaline be the only substance in the human economy which can turn starch into sugar—for the gastric juice cannot, and the pancreatic fluid has only a trifling influence in this direction—we see at once how necessary and important it is to thoroughly masticate all food containing starch, not only in order to obtain the full nutritive value of what we eat, but also to prevent overloading the stomach with a mass of food, much of which is probably indigestible.

Canadian Canals.

The New Dominion Government, with a wisdom and foresight which can hardly fail to promote the largest results, is turning its financial prosperity to good account by projecting a series of public improvements on an extensive scale. It is not generally known that the St. Lawrence River above Montreal is not navigable, and that transportation is chiefly by means of canals. These canals were constructed at intervals to meet local wants, and are without uniformity or system. Vessels fully loaded passing through the Welland Canal must discharge part of their cargo, nearly one half, in order to go through the St. Lawrence canals to Montreal. It is intended to enlarge all the canals to a uniform size and depth, so that vessels of 1,000 tuns can pass with full cargoes from the Upper Lakes to tide water. This will be the nearest approach to direct trade between the lake cities and Europe which has yet been attained, and opens up the prospect of a formidable competition between Montreal and New York. Comparatively few vessels will make the voyage from Chicago to Liverpool. It will rather be to the interest of shippers to forward grain to Montreal for reshipment by regular ocean vessels to Europe. The lengthy inland navigation, partly by river with strong currents, and partly by canal, will be only favorable to steamers which it would scarcely be worth while to adapt to the exigencies of the ocean. The consequence is that Montreal is likely to become a great grain distributing port in the immediate future.

THE new postal rate, on transient newspapers, pamphlets, circulars, cards, photographs, roots, cuttings, etc., is 1 cent for each two ounces.

The Magnetic Needle in Mineral Explorations.

Major T. B. Brooks, who has had much experience in the use of the compass as an aid in the exploration of iron bearing localities, recently gave a very interesting paper on the subject before the American Philosophical Society, Philadelphia. In these explorations, the ordinary compass and the dip compass may be used to advantage, and the author is of opinion that by their employment not only can the presence of underlying veins of iron ore be determined, on passing over the surface of the ground, but also the order of superposition or succession of beds of iron bearing rocks. He does not undertake to say that by means of the magnetic needle it is possible to tell whether we have a workable merchantable deposit of iron ore under our feet; but this is certain, that the needle will enable us to trace the course of the iron bed until we come to some outcrop of the mineral, and then we may be able to determine its value. The distance through which a local magnetic pole or bed of iron ore will affect the needle depends on the intensity of the attraction of the bed, and on the position in which the needle is placed. The maximum influence is observed when the needle is moved east or west of the ore bed. The influence of the magnetic rocks at Republic Mountain has been observed at a distance of 2,500 feet horizontally.

The thickness of rock or earth which covers the iron deposit can, the author thinks, be determined by the needle in the following manner:

Remote from any magnetic rocks, neutralize, by means of a bar magnet, the earth's influence on the needle of a solar compass. The needle will then stand indifferently in all directions, and will not vibrate. Record carefully the distance and position of the neutralizing magnet; the compass is then ready for use. Set it up near the magnetic pole to be determined, and fix the magnet in exactly the same relative position it had before. The earth's directive power on the needle will again be neutralized, and the needle will point as near towards the local pole as its mode of mounting will permit; mark the line indicated by the needle on the ground; remove the compass to one, or, better, two other positions, and repeat the operation. If there is no other local force to interfere, the three lines must intersect in one point, which will be directly over the pole whose position is sought. By using a dip compass in a similar manner, it is evident that the data to determine the depth, by the simple solution of a triangle, would be obtained.

A solar compass must be used to fix the position of the artificial magnet used in neutralizing the earth's force, or it may be fixed by an observation on the north star, or from a meridian line brought in from a non-magnetic area.

When considering the magnetism of the rocks of the four great geological epochs represented on the upper peninsula of Michigan. I observed that considerable magnetic variations were noted by the Federal surveyors, over rocks of silurian age, which had never been observed to be in themselves magnetic. In some instances these variations had been observed over a limestone, supposed to be Trenton, and at a distance of 75 miles from the nearest Huronian or other (known to be) magnetic rocks.

This phenomenon may be due either: 1. To the presence of magnetite in such rocks, due to local metamorphism or other cause. 2. To accumulations of magnetic sand in the drift. 3. To the underlying Huronian rocks, which may be supposed to exert their influence up through the overlying silurian.

Without having made a study of any of these localities, I incline decidedly to the latter hypothesis, as embracing the known facts better than either of the others.

Should this prove true—and I hope to settle it the present season—it may lead to a novel and interesting application of the science of magnetism to some of the most important questions of geology—the determination of the thickness of sedimentary rocks by magnetic triangulation in places where it would otherwise be difficult to arrive at such thickness. It might also enable us to work out the structure and distribution, in a rough way, of those oldest rocks which underlie great silurian areas, which would in no other way be possible, thus throwing light on the nature of the rocky bottom of the ancient seas.

On the same principle we can, of course, trace magnetic iron belts under water. I have in many instances made very satisfactory magnetic observations from a canoe in the inland lakes of the upper peninsula.

The bottom of Lake Superior may be partially mapped out in the same way. Silt and sand will make no difference with the needle; it looks through everything but iron.

New Material for Bricks.

During the last few years, experiments have from time to time been made with the view to utilize in some way the mounds of shale (the refuse of the coal mines) which cover an area of several thousands of acres in South Staffordshire, England, by converting them into bricks. Several enterprising firms have already embarked in this novel but profitable business. When properly pulverized, the shale is found to be an excellent material for the purpose, the bricks produced being hard and durable, resembling in color the fire clay bricks of the Stourbridge district, although for furnace and such like purposes they are not so valuable. For ordinary building, however, they are found to be of equal practical value to the ordinary red bricks. The material is to be had in any quantity for a mere nominal sum, and there is every reason to believe that this method of utilizing the innumerable dusky hillocks which disfigure the South Staffordshire landscape will gradually develop into an industry of some importance.

Cheap Concrete Houses.

The latest method of concrete building, as practised in Scotland, is thus described by the *Aberdeen Journal:*

The whole process of building houses of concrete is so exceedingly simple that the employment of skilled labor is quite unnecessary. A foundation having been laid, a double framework of wood, or paneling, 9 inches apart and 18 inches high, is placed above the foundations round the entire building, forming a kind of box. This paneling consists of pieces of wood, varying in breadth from 3 or 4 inches to over 1 foot, with a bead on the upper edge having an aperture by which the pieces are slid on to an iron rod. Being thus telescopic in construction, the pieces of wood can be lengthened or shortened according to the extent of the building. At intervals between the panels are placed upright bars, called separating posts, several feet high, through which the iron rods supporting the panels pass and are secured. At equal distances of 18 inches, ascending upwards, there are apertures in the posts for the insertion of the iron rods, and the paneling round the entire structure can be raised with great ease as the building advances. When operations are to be commenced, a quantity of packing, which may consist of rough stones of any shape, the more rugged the better, which forms the first layer of the building, is thrown in, care being taken to keep the packing 1 inch from the face of the work, so that it may not show through it. When the 18 inches of packing are filled up, the concrete, which is in a semi-liquid state, like mud, is poured into the box and percolates down through the stones, thoroughly filling all cavities, and binding the stones and rubble together so tightly that the whole forms one solid mass. For a day, the portion of wall thus made lies encased within the paneling. By that time it has become quite dry, and the paneling or frame is taken off and lifted up other 18 inches, the bottom of the frame resting where the top was before. Thus another box is formed above the piece of finished wall, and identically the same process which we have described is repeated, stones and rubble being thrown in, and the liquid cement being poured over them. In this way 18 inches of building are finished each day if the weather be good, so that in the course of a week the walls of a cottage 8 or 9 feet high are strongly and firmly built.

When the paneling is screwed together to the separating posts, it is so mathematically exact, owing to its careful structure, that the wall is built as straight as if tested with a plumb line. Indeed, it cannot fail to be so, and it is interesting to note that the whole building is finished without the aid of a plumb line, which is quite unnecessary.

A noteworthy feature in connection with the building of these concrete houses is that the usual cumbrous and often dangerous scaffoldings which are used in erecting ordinary buildings is superseded by a much better, more secure, and much less unwieldy arrangement, by which ropes are entirely dispensed with. Little hollow iron tubes, called cores, are placed in the walls, through which iron rods are inserted, connected with brackets which are securely attached to the wall, being firmly screwed through the building with nuts. The brackets are just similar in form to supports used for shelving, and on the top of the brackets are laid the planks for the scaffolding, forming altogether a neat and strong support.

Two cottages, which are built as one, are 32 feet in length by 22 feet, and 8 feet high. In each cottage there are three rooms, those in the front being about 12 feet square, and the back rooms measuring about 7 feet by 12. The cottages are lighted by two windows in front, and four in the back. The flooring is of concrete, which, being thoroughly impervious to moisture, makes the apartments very dry and comfortable. It is intended to have the roof built in the ordinary way with rafters and slating, but it is not uncommon for concrete to be used as a roofing material, for which purpose it answers very well. The outside walls, when built, are finished with a coating of concrete, about a ¼ of an inch thick, a little finer in the quality than that used for the ordinary building, which gives a smooth finished appearance to the structure. No supports are requisite for the lintels of the doors or windows, because after the concrete is hardened, it is stronger than any support of wood or stone. When the building is in progress, spaces are left for the joists, which are temporarily filled with sand, which is easily removeable at any time with trowel. The spaces for the joists are made, alternately 3 inches and 6 inches in depth, on each side of the building, which diminishes the pressure on the walls considerably.

Houses finished in the way we have described are much cheaper than those built in the ordinary way, the saving being from 35 to 40 per cent. The buildings, at the same time are more comfortable, because, being impervious to moisture and heat, they are warm and dry in winter, and cool during summer. The rooms can be papered over the bare walls, no lath or plaster being required, though a coating of plaster in no way affects the concrete, if it is preferred.

An important element, of course, in the process of building is the concrete or cement itself. It is burnt down from stone somewhat in the same way as lime, but, of course, is of an entirely different nature. When the cement is to be used, it is mixed with rough sand, generally for ordinary purposes in the proportion of eight pailfuls of sand to one of cement. The two are mixed simply in the ordinary way, water being poured over the sand and cement until they are in a semi-liquid state. When the sand is very sharp and shelly, the concrete can be made in proportion of nine pailfuls of sand to one of cement; while in other cases again, where the sand is of a soft inferior description, one pailful of cement is necessary to seven pailfuls of sand.

CAPITAL is only another name for the savings of society.

Aniline Black.

Aniline black is generated by the action of oxidising agents upon aniline, or the aniline oils of commerce. Its formation is consequently similar to that of other aniline colors. In these operations a molecular condensation takes place, in consequence of the more complex combination into which the atoms of aniline and toluidine enter. A like condensation occurs in the formation of aniline black.

These oxidation products of aniline and its homologues, namely, the aniline colors, are of a basic character. Aniline black is decidedly basic. As to the nitrogen, it either remains—as in magenta—in the new formed compound, or it is partially disengaged as ammonia. The latter reaction occurs in the formation of aniline black, or, as it may be called, nigraniline.

The author used as ingredients muriate of aniline, chlorate of potash, a trace of chloride of copper and water, mixed at common temperatures. The formulæ for the preparation of this color all contain sal ammoniac. The author finds, however, that a color equally fine and pure can be prepared without this addition. The mixture was evaporated at common temperatures in the air in a porcelain capsule and repeatedly remoistened till a dry, water repelling powder of a velvet blackness appeared—a sign that the process was complete. The aniline oil, muriatic acid, and chlorate of potash were used in equal weights, and at the conclusion a number of undecomposed crystals of chlorate of potash were found. No free aniline was detected in the acid liquid, but ammonia was found in its stead. After washing in hot water, the black powder was combustible without residue, giving off when ignited a smell, first of naphthylamine, and afterwards of cyanogen.

The aniline oil employed contained toluidine, and yielded 120·5 per cent of the washed black powder. This large yield, and the circumstance that the color, as fixed upon the tissues, is a deep green and does not become a violet black till after treatment with an alkali, led the author to suppose that it was a base, and contained when green a muriatic acid in combination. This proved to be the case. The dark green body is a muriate of nigraniline (aniline black), the deep violet being the free base.—*Rheinbeck.*

Solubility of Ozone in Water.

L. Carius has made the observation that ozone is, under proper conditions, appreciably absorbed by water, which fact he has communicated to the Chemical Society of Berlin. He recommends for the purpose that the water shall be near its freezing point, and that the vessel containing it shall have but a small neck. If these conditions are observed, and a stream of ozonized oxygen is conducted into it, the water will take on gradually the characteristic smell of ozone, and its presence may afterwards be proven by all the usual reagents.

The method of preparing the gas followed by the author was that of Soret, namely, by the electrolysis of cooled diluted sulphuric acid, using platin iridium poles.

The ozone solution so prepared may be brought upon the lecture table, and used to bring about all the oxidizing experiments usually performed with the gas itself. Several analyses, made by the author, gave the amount of the absorbed ozone at very nearly one half per cent by volume.

The City of New York.

The population is now about one million. Its territorial area covers New York city, twenty-two square miles. It has twenty nine miles of water frontage, 300 miles of paved and 160 miles of unpaved streets. Twenty thousand gas lights nightly burn in the streets and public places, at a public expense of $43 per year for each lamp. There are 350 miles of Croton water pipes and 277 miles of sewers. There are over 2,000 men in the police force and 600 firemen, whose salaries together amount to a round sum of $3,000,000. 3,000 workmen are employed. The city contributed to the support during the past year of 51,466 criminals. It alleviated during the same time, by out door and institutional charity, the sufferings of 195,334 of the sick.

THE brain of a horse seems to entertain but one thought at a time; for this reason continued whipping is out of the question, and only confirms his stubborn resolve. But if you can by any means change the direction of his mind, giving him a new subject to think of, nine times out of ten you will have no further trouble in starting him. As simple a trick as a little pepper, aloes, or the like, thrown back on his tongue, will often succeed in turning attention to the taste in his mouth.

TEXAN RAILWAYS.—Texan railway progress is very rapid. The Central railroad is in working order to Dallas, and will be completed to the Red River by January 1. Large consignments of bar and plate railroad iron have recently been received at Galveston. Eight lines of road are now under construction in northern Texas. Many of these are extensions of Eastern lines, and three are lines in the transcontinental system. Texas, with its internal resources and its immense prairies, is destined to become a great railway state.

PRESERVATION OF IRON BOLTS.—M. Maitrasse-Duprez has introduced a process which may become invaluable in hydraulic works, namely, for the protection and preservation of iron bolts and ties embedded in wooden constructions. This consists simply in lining the bolt hole with a compound of grease and zinc filings, which is found to galvanize the iron, as it were, and so perfectly protect it.

THE Maryland Institute for the Promotion of the Mechanic Arts will hold its twenty-fifth annual exhibition, to commence on October 1st, at Baltimore.