THE INDOOR GARDEN AND THE SHRUBBERY.

The numerous lovers of flowers are now turning their attention indoors; and the conservatory and the window sill again receive the chief share of consideration. We introduce to notice an exquisite flowering plant, easily cultivated in a hothouse. It is called the lemon-scented gardenia, and is especially suited for bouquets, and for any purpose for which choice cut flowers are in demand. It is readily propagated by means of cuttings inserted in a genial bottom heat, and young plants, if liberally treated, seldom fail to flower the first year. A rich peaty soil suits it admirably; and during the growing season, it requires copious supplies of moisture, both at the roots and in the atmosphere. Apart from its attraction as a decorative stove or warm greenhouse plant, its flowers are extremely useful for buttonholes, as they can easily be mounted on thin wires, either singly or in clusters. Like other gardenias, this species is very liable to be infested with insects, which must be carefully looked after. Its pearly sweet-scented flowers, which are produced in winter, form a good substitute for orange blossom, and on that account alone it deserves attention. It is a native of Southern Africa.

The flowering bulbs which decorate our mantelpieces are being much inquired for. Among the best for indoor growth are narcissus (such as the paper-white and *soleil d'or*), hyacinths, snowdrops, crocuses, and tulips. All these may be potted in a light compost, and the two first mentioned grown well in glasses of water. A more effective method of displaying their beauties is the use of a perforated vase, as shown in our engraving. It is pierced with holes, opposite each of which a flower bulb is placed; and the intervening spaces are filled with compost. Some use moist sphagnum (moss) in place of soil; and if the bulbs are well ripened, it answers nearly equally well. A hyacinth bulb, planted at the top, finishes off the arrangement in a pleasing and artistic manner.

Hyacinth and narcissus bulbs may also be placed in common hyacinth glasses, filled nearly full of tepid water. Care should be taken to prevent the base of the bulbs touching the water below; and if a space of about half an inch is left between, the roots, attracted by the moisture, soon protrude from the base of the bulb, and find their way down inside the glass. If this point is not duly attended to, it often results in the bulbs rotting away at the base, and this is especially the case if they are unripened or loose in texture. Few early flowering plants give greater satisfaction to the amateur than these, as they are so easily grown, and flower so quickly after being potted.

In addition to those mentioned above, flowering bulbs of both the belladonna and Guernsey lilies, if carefully potted in any light rich soil, will flower in a week or two, and will keep the window gay until hyacinths and narcissus develop their delicate, wax-like, richly perfumed flowers.

Leaving the greenhouse and parlor, we come to a very hardy shrub, recently brought from Japan, and exhibited in Paris; it is the *rhodotypus kerrioides*, and is shown in our third illustration. The flowers are pure white, and are abundantly produced, the plant being about three feet high. It is easily propagated by cuttings, and by separation of the suckers. In favorable seasons, it begins to flower about the middle of April, and continues to bloom throughout the month of May. We know of no subject, says the English *Garden*, from which we select the illustrations, more worthy of a place in the flower garden or choice shrubbery.

PERFORATED VASE FOR FLOWERING BULBS.

THE LEMON-SCENTED GARDENIA, AND BLOOM (natural size).

The Java Agricultural and Industrial Exhibition.

There will shortly be no corner of the world which the industrial exhibition idea has not reached. The Dutch colony of Java announces her second "Exhibition of the Works of Certain Industries of all Nations," to be opened at Diocjakarta, in April, 1875. The colonies of Holland in the great eastern archipelago are very extensive, and contain a population of 30,000,000. The demand for machinery, especially agricultural implements, is large, and the natural productions of the islands are very numerous and valuable. The agriculture of Java is excellent, showing much of the care in tillage and irrigation which distinguishes the Dutch people in their own country.

The managers of the Exhibition especially wish to introduce to the people of these islands: Labor-saving tools, implements, and machinery of every description and for every purpose, for use and appliance in industrial, agricultural, or domestic pursuits; as well as articles for general use, either for wear or food, adapted to the requirements of a people of thrifty and frugal habits, "containing among them numerous native and European planters and dignitaries, people of distinction and of cultivated and refined tastes."

It is worth knowing that books, engines, machinery of all kinds, and metals (raw and manufactured) are admitted to these islands free of duty; while textile manufactures, leather, clocks, domestic wares, and provisions pay a duty of only 6 per cent *ad valorem*.

Mr. L. W. Morris, of 50 Broadway, New York city, is the agent for the United States, and will be happy to give detailed information.

The Glace or Enameled Photograph.

The glass upon which the enameling is to be done must be scrupulously clean. Plate glass, free from scratches, is the best, although good photograph glass will do if not scratched. Blisters in the glass hurt nothing. After it is thoroughly clean, sprinkle over it, by means of a five cent pepper box, powdered talc (or French chalk), and with a tuft of cotton rub in a circular motion(carefully going over the whole surface) until no trace of the chalk is perceptible. Do not rub heavily. The chalk gives a surface to the glass that assists in the lifting the enameled print from it. Now flow the plate with collodion made as follows, namely,ether, 4½ ounces, alcohol 3½ ounces, cotton to thicken (say from 5 to 7 grains to the ounce of solution),and 24 drops (or minims) of castor oil. When this flow is dry, apply the prints face down, after immersing them in a gelatin solution made as follows: Coxe's gelatin 1 ounce, water 8 ounces, glycerin 50 drops. Add the gelatin and glycerin to the water, and let it stand over night,when it will be ready for use after filtering, which can be done by warming sufficiently to make the solution limpid. Allow the prints to remain in this solution aoout five minutes before laying them on the collodionized glass, and then pass a gum roller lightly over them to press them tightly to the glass, and also to remove the surplus gelatin. After the prints are nearly dry they are ready for the mounts. For this purpose, light Bristol board is best. Use the gelatin solution for mounting, and mount on the glass as the prints lay. The whole thing must be perfectly dry before an attempt is made to remove them from the glass. When they are dry, run a knife blade around the edge to start them up; and if thoroughly dry and the work properly done,they will come off all right. "I forgot to say, in the proper place, that it is a good idea to lay upon the back, after the mounts have been applied, a weight of some kind, say a heavy piece of glass, which should remain there for an hour at least. This assists in securing a complete contact to the print. At the end of an hour remove the weight and leave the print, back up, until perfectly dry all through. Sometimes they start off without help, which shows perfect success. Rememeber that careful manipulation is the only surety for success. A little experience will enable any one to perform this operation well."—*Philadelphia Photographer*.

Carrots.

In Belg um and other continental countries, the carrot has been grown as a field crop for a longer time, and to a much greater extent, than in Britain. In the year 1765, the attention of the Society for the Encouragement of Arts, etc., was directed to this branch of husbandry, and, in consequence, an account of the culture of carrots and the uses to which they may be applied was published by Robert Billing, a farmer in Norfolk, who states that he obtained, from twenty and a half acres, five hundred and ten loads of this root, which he found equal in use and effect to a thousand loads of turnips, or three hundred loads of hay. Some of them measured two feet in length, and from twelve to fourteen inches round. Horses are remarkably fond of carrots, and when mixed with oats they form very good food for them. The efficacy of these roots in preserving and restoring the wind of horses had, it is said, been partially known in Suffolk, where carrots were administered as a secret specific for the complaint long previously to their being commonly applied as food for that animal. Carrots are equally beneficial as nourishment for cows, sheep, and swine. It was stated some years since that at Purlington, in Yorkshire, the stock of a farm, consisting of twenty working horses, four bullocks, and six milch cows, were fed from the end of September to the beginning of May on the carrots produced from three acres of land. The animals, during the whole of that period, lived on these roots, with the addition of only a very small quantity of hay.

Carrots contain a large amount of water, 86 parts in 100 lbs. Their most distinguished dietetical substance is sugar, of which they possess nearly 6½ per cent. Starch is also found in small quantities, with a small portion of albumen. The ancients used the seed both of the wild and cultivated carrot as an internal medicine against the bite of serpents; they also gave it to animals that had been stung by them.

Dr. James says that carrots strengthen and fatten the body, and are very proper food for consumptive persons. The root of the garden carrot is much used as a poultice for cancers, on account of its antiseptic qualities. In some parts of Europe a spirit is distilled from this vegetable. The abundance of sugar contained in the roots is readily converted into alcohol. About 160 lbs. of the crushed roots are required to yield one gallon of spirit. Sugar has been obtained from them; but notwithstanding the large amount existing in them, the manufacture has not been found profitable. In Germany, a substitute for coffee has been made of the roots chopped up into small pieces and partially carbonized by roasting. A dye similar to wood has been obtained from them.

Parkinson, botanist to James I., tells us that ladies of his time used to decorate their hats or heads with the leaves of the wild carrot, which in the autumn are exceedingly beautiful. This, says Phillips, would rather show the simplicity of our ancestors than their want of taste; as we have seen ladies' dresses trimmed with the curled leaves of the garden parsley, which were not more admired for their novelty than for the elegance they displayed.

If in winter a section be cut from the end of the thick part of the root, and this be placed in a shallow vessel con-

RHODOTYPUS KERRIOIDES.

taining water, young and delicate leaves are developed, forming a radiated tuft, the graceful and verdant appearance of which makes it a pleasing ornament to a room in that season when any semblance of vegetation is a welcome relief to the eye. Flowers may be cut out of large carrots that closely resemble ranunculuses, without the least aid of coloring.—*Hompden G. Glasspole, in Science Gossip.*

PATENT OFFICE YEARLY REPORT.

The Annual Report of the late Commissioner of Patents, General M. D. Leggett, was recently submitted to the Secretary of the Interior, and we here give an abstract.

The following table shows the receipts, expenditures, and business of the Office during the year from October 1, 1873, to September 30, 1874:

MONEYS RECEIVED.

Amounts received for applications for patents, extensions, caveats, disclaimers, appeals, and trade marks	$645,480
For caveats	47,923
For recording assignments	18,152
For subscriptions to *Official Gazette*	8,913
For registration of labels (since August, 1874)	642
Total	$721,110

MONEYS EXPENDED.

Amount paid for salaries	$484,694
Amount paid for photographing back issues	36,223
Amount paid for photographing current issues	46,313
Amount paid for illustrations for *Gazette*	35,292
Amount paid for contingent expenses	83,082
Amount paid for tracings	8,668
Total	$694,072
Excess of receipts over expenditures	27,038

STATEMENT OF THE BUSINESS OF THE OFFICE.

Number of applications for patents from Oct. 1, 1873 to Sept. 30, 1874	21,077
Number of patents issued, including reissues and designs	13,545
Applications for extensions of patents	229
Patents extended	308
Caveats filed	3,129
Patents expired	5,287
Patents allowed but not issued for want of the final fee	2,680
Applications for registration of trade marks	589
Trade marks registered	524
Application for registration of labels	107
Labels registered (since August, 1874)	50

The number of applications and of patents granted is a slight increase upon those of the preceding year.

The prompt publication of abstracts of patents issued has improved the character of such applications, thereby warranting the issue of patents for a larger proportion than could otherwise be granted. Before the establishment of the Patent Office *Gazette*, it was from two and a half to three years after the issue of a patent before the public had any means of knowing of its contents. Consequently there would be in existence from twenty-five to thirty thousand patents, the substance of which was sealed to all except their owners; hence applications were constantly being made to patent devices which had been previously patented by others.

REPRODUCTION OF DRAWINGS OF OLD PATENTS.

The importance of printing the older existing patents is illustrated and explained.

No one thing in the Office is needed more than a thorough digest, published in convenient form, of each one of the 145 classes of inventions, as represented in the Patent Office. The number of applications on file in the Office is nearly 300,000. To look back over these applications and the devices represented by them, in considering new applications, is a work the vastness of which need not be further explained to be fully understood. The digest referred to should, in a classified form, briefly describe each one of these, in such a manner that they would become sufficient in the examination of cases, without constantly resorting to the files. If correct and thorough digests of this character, from the organization of the Office down to the present time, were in the hands of the examiners, inventors, and attorneys practising before the Office, the labors of the examining corps would be 25 per cent less than at present, and would bear a considerable reduction, unless the number of applicants largely increased. In many of these classes a sufficient number of volumes could be sold to reimburse the government for the entire expense of their publication. Such digests would, therefore, be an economical investment, saving money to the Treasury, and securing far greater accuracy in examining applications and the granting of patents. "To this matter, therefore, I would earnestly request the Secretary to give special thought and attention. A special appropriation would be needed for the purpose."

MORE ROOM NEEDED.

Additional room is required for the use of the Patent Office. It is utterly impossible to properly transact the work of the Office in the narrow quarters granted to it. Eight additional rooms are needed immediately. The report pays a just tribute to the character of the persons employed in the Patent Office, and regrets that the salaries paid are not sufficiently large to retain the best men in the service, who are constantly leaving it for more lucrative employment.

THE new American built steamer Tokio has made a successful first voyage, from New York to Aspinwall. Time, seven days and fifteen hours, being an average of eleven knots an hour, on thirty-nine tuns of coal per day, with fifty pounds of steam and six boilers. There was no occasion to stop the engine during the entire trip of two thousand miles.

Odors.

Among mineral substances, few solids, but quite a number of liquid and gases, are endowed with more or less powerful scents, in most cases not very pleasant ones, and usually characteristic. Those odors belong to simple substances, such as chlorine, bromine, and iodine; to acids, as hydrochloric and hydrocyanic acid; to carburets of hydrogen, as those of petroleum; to alkaline substances, ammonia, for instance, etc. The odors observable among minerals may almost all be referred either to hydrocarbonic or hydrosulphuric gases, or to various solid and liquid acids produced by the decomposition of fats, or to peculiar principles secreted by glands, such as musk, ambergris, civet, and the like.

The odor of plants is due to principles very unequally distributed throughout their different organs; some solid, as resins and balsams, others which are liquid, and known by the name of essences or essential oils. In most cases the essence is concentrated in the flower, as occurs with the rose and the violet. In other plants, as in bent grass and Florence iris, only the root is fragrant. In cedar and sandal wood, it is the wood that is so; in mint and patchouli, the leaves; in the Tonquin bean, the seed; in cinnamon, it is the bark which is the seat of the odorous principle. Some plants have several quite distinct fragrances. Thus the orange has three: that of the leaves and fruit, which gives the essence known by the name of *petit grain*; that of the flowers, which furnishes neroli; and again the rind of the fruit, from which essence of Portugal is extracted.

What, now, is the chemical nature of the odorous principles in plants? The chemistry of today reduces almost all of them to three categories of well ascertained substances: hydrocarburets, aldehydes, and ethers. We will endeavor to give a clear account of the constitution of these three kinds of substances, and to mark their place in the register of Science. The hydrocarburets are simple combinations of carbon and hydrogen, as, for instance, the petroleum oils. They represent the simple compounds of organic chemistry. As to aldehydes and ethers, their composition is rather more complex; besides carbon and hydrogen, they contain oxygen. Every one knows what chemists mean by an alcohol; it is a definite combination of hydrogen, carbon, and oxygen, neither acid nor alkaline, which may be regarded as the result of the union of a hydrocarburet with the elements of water. Common alcohol, or spirits of wine, is the type of the most important series of alcohols, that of the mono atomic alcohols. Chemists represent it by the formula C^2H^6O, to indicate that a molecule of it arises from the union of two atoms of carbon with six atoms of hydrogen and one of oxygen. Independently of the alcohols, which are of great number and varying complexity, organic chemistry recognizes another class of bodies, of which vinegar is the type, and which receive the name of organic acids, to mark their resemblance to mineral acids, such as oil of vitriol or aquafortis. Now, every alcohol, on losing a certain amount of hydrogen, gives rise to a new body, which is called an aldehyde; and every alcohol, on combining with an acid, produces what is called an ether. These rapid details allow us to understand precisely the chemical character of the essences or essential oils which plants elaborate within their delicate tissues. Except a small number among them which contain sulphur, as the essences of the family of crucifers, they all present the same qualitative composition—carbon and hydrogen, with or without oxygen. Between one and another of them merely the proportion of these three composing elements varies, by regular gradations, but so as always to correspond either to a hydrocarburet, or to an aldehyde, or to an ether. In this case, as in almost the whole of organic chemistry, everything is in the quantity of the composing elements. The quality is of so little importance to Nature that, while following always the same laws and constantly using the same materials, she can, by merely changing the ponderable relations of the latter, produce, by myriads of various combinations, myriads of substances which have no resemblance to each other. The strange powers of the elements and the mysterious forces concealed in matter make themselves known to us in a still more remarkable phenomenon, to which the name of *isomery* is given. Two bodies, thoroughly unlike as regards their properties, may present absolutely the same chemical composition with respect to quality and quantity of elements. "But in what do they differ?" it may be asked. They differ in the arrangement of their molecules. Coal and the diamond are identical in substance. Common phosphorus and amorphous phosphorus are one and the same in substance. Now, the odorous principles of plants offer some exceedingly curious cases of isomery. Thus the essence of turpentine, the essence of lemon, that of bergamot, of neroli, of juniper, of savin, of lavender, of cubebs, of pepper, and of gillyflower are isomeric bodies, that is, they all have the same chemical composition. Subjected to analysis, all these products yield identical substances in identical proportions, that is, for each molecule of essence, ten atoms of carbon and sixteen atoms of oxygen, as denoted by their common formula, $C^{10}O^{16}$. We see how these facts as to isomery prove that the qualities of bodies depend far more on the arrangement and the inner movements of their minute particles, never to be reached by our search, than on the nature of their matter itself; and they show, too, how far we still are from having penetrated to the first conditions of the action and forces of substances.

But chemistry has not stopped short with ascertaining the inmost composition of these substances; it has succeeded in reproducing quite a number of them artificially; and the compounds thus manufactured, wholly from elements, in laboratories, are absolutely identical with the products extracted from plants. The speculations of theory on the arrangements of atoms, sometimes condemned as useless, do not merely aid in giving us a clearer comprehension of natural laws, which is something of itself, but they do more, as real instances prove: they often give us the key to brilliant and valuable inventions. An Italian chemist, who was then employed in Paris, Piria, in 1838, was the first who imitated by art a natural aromatic principle. By means of reactions suggested by theory, he prepared a salicilic aldehyde, which turned out to be the essence of meadowsweet, so delicate and subtile in its odor. A few years later, in 1843, Cahours discovered methyl-salicilic ether, and showed that it is identical with the essence of wintergreen. A year after, Wertheim composed essence of mustard, while believing himself to be making only allyl-sulphocyanic ether. These discoveries produced a sensation. Nowadays the chemist possesses the means of creating many other natural essences. Common camphor, essence of bitter almonds, that of cummin and of cinnamon, which are aldehydes, as we have seen, may be prepared without camphor leaves or almonds, without cummin or cinnamon. Besides these ethers and aldehydes, whose identity with essences of vegetable origin has been proved, there exist, among the new bodies known to chemistry, a certain number of products formed by the union of common alcohol or amylic alcohol with different acids, that is to say, of ethers, which have aromatic odors more or less resembling those of some fruits, but as to which it cannot yet be affirmed that the odors are due to the same principles in both cases. However this may be, perfumers and confectioners, more industrious and wide-awake than chemists, have immediately made good use of many of these properties.

Artificial aromatic oils made their first appearance at the World's Fair of London in 1851. There was there exhibited a pear oil, diffusing a pleasant smell like that of a jargonel, and employed to give an aroma to *bonbons*. This product is nothing else than a solution of amylacetic ether in alcohol. Apple oil was exhibited beside the pear oil, having the fragrance of the best rennets, and produced by dissolving amyl-valeric ether in alcohol. The commonest essence was that of pineapple, which is nothing else than ordinary butyric ether. There was observed, too, an essence of cognac, or grape oil, used to impart to poor brandies the highly prized aroma of cognac. The product which was then, and still is, the most important article of manufacture, is the essence of mirbane, which very closely resembles in its odor that of bitter almonds, and which commerce very often substitutes for the latter. Essence of mirbane is nothing else than nitrobenzine, which results from the action of nitric acid on benzine. Benzine, in turn, is met with among the products of distillation of tar, which also yield the substances used in preparing those beautiful colors called aniline.—*F. Papillon, in Revue Scientifique.*

SCIENTIFIC AND PRACTICAL INFORMATION.

OCCLUSION OF GASES BY IRON WIRE.

In drawing certain numbers of iron wire, it often becomes necessary, in order to continue the use of the drawing bench, to anneal the iron. This is done in a hermetically closed receptacle, so as to avoid, as much as possible, the oxidation of the metal. In spite of this precaution, however, the latter becomes covered with an ochraceous film, which it is necessary to remove by an acidulated bath. It frequently happens, however, that, subsequent to this process, the metal becomes so brittle as to render its further drawing impossible. M. Serez, engineer of the *Société des Forges de La Franche Comté*, has examined into this phenomenon, and finds that the iron becomes charged with a condensed gas. On breaking the wire under water in a test tube, inflammable bubbles were generated, which detonated in the air. The exact nature of the gas has not yet been decided, nor that of its direct action upon the metal; but it is believed to be either hydrogen or carbonic oxide.

THE EUCALYPTUS GLOBULUS.

In addition to its remarkable properties as preventer of miasmatic fevers, Dr. Behr, of San Francisco, Cal., states that he has been recently informed by an Australian correspondent that the wood of this tree made most excellent shingles, by reason of its non-inflammable characteristics. It was a common joke in Australia to hand new comers an ember, from the fireplace, of this wood, by which to light their pipes. It would go out as soon as drawn from the fire. Made into shingles, it furnishes a first rate fireproof material for buildings.

THE ORIGIN OF GUANO.

Dr. Habel, who has devoted several years to the exploration of guano islands and the microscopic study of the fertilizer, has recently arrived at the conclusion that the material is not the dejection of sea birds, as ordinarily supposed. He has obtained an insoluble residue after chemical treatment, composed of fossil sponge and marine plants and animalculæ. He thinks, therefore, that guano results from the accumulation of fossil remains, of which the organic matter has been transformed into a nitrogenized substance, while the mineral portion has remained intact.

COOKING OATMEAL.—W. says: One reason why oatmeal is not more generally used as food is that, in the way in which it is usually cooked, it requires constant stirring, which takes a good deal of time and attention. If, after the porridge is mixed, that is, as soon as the oatmeal is stirred into the boiling water, the cover is put on and the tin saucepan containing it placed in another pot of boiling water on the stove, and the water let boil, good oatmeal porridge will be made, without the least danger of its being scorched.