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, there fore, 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 amylvaleric 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. Seroz, 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.

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