gallnuts are crushed to a coarse powder and boiled in water, or better, digested for several hours at a temperature near the boiling point, and the gum and green vitriol added to the filtered decoction in solution.

The following example will serve as ink for ordinary use: 12 parts galls, 5 parts green vitriol, 5 parts gum senegal, and 120 parts water.

An exceedingly fine ink is said to be produced by the following recipe: 11 parts galls, 2 parts green vitriol, one-seventh part indigo solution, and 33 parts of water. Here the relatively larger quantity makes the gum unnecessary, while the indigo solution makes the brilliant black seem still deeper. Writing executed with this ink may, it is true, be removed by means of dilute acids, but it may be rendered visible again by chemical means.

There is also an ink in the market in which the galls are replaced by logwood; but the writing is less black and can be totally destroyed by treatment with acids and cannot be restored by other means.

The so-called alizarin inks flow easily from the pen, but they mostly suffer from the fact that the writing appears at first only of a faint greenish, bluish, or reddish color, although it gets darker afterward.

The most permanent writing is done with India ink, because the black coloring matter of this ink consists of finely divided carbon, which is unaffected by chemical reagents. Its high price seldom permits of its use.

For ordinary use only such ink is recommended as consists either of pure galls and iron, or of some mixture in which these are the chief ingredients.

A small quantity of salicylic acid, one-half gramme to the liter, will prevent it from moulding even when kept in open ink bottles. This is far preferable to the bad smelling carbolic acid, or the very poisonous bichloride of mercury, so frequently used both in ink and mucilage to prevent souring, fermentation, or mould.

PROPOSED DIGEST OF PATENTS.

In his recent annual report the Commissioner of Patents, Mr. Marble, calls the attention of Congress to the necessity of having a digest made for the use of the office and the public, of the inventions patented in this and foreign countries. The preparation of such a work, he says, would cost a large sum of money, but he thinks the government would soon be reimbursed by its sale. The advantage to the public, especially to inventors and manufacturers, would be incalculable, and for these reasons he earnestly recommends Congress to take action looking to an early commencement of the work.

To prepare such a digest would, indeed, be an immense work, but there is no doubt of its value as an assistance to inventors in determining the probable novelty of their inventions, provided the books were kept up to date and made readily accessible to the public. To Patent Office examiners the work would be of especial convenience in helping them to reject new applications for patents.

A beginning of the proposed work might be made with the American Patents; and when that digest is complete then take up the foreign patents, as the latter would necessarily contain many repetitions of the devices found in the American patent lists.

But before anything is done in respect to this proposed compilation we would suggest that the Commissioner of Patents take steps to provide for the convenient access of the public to the printed patents that now exist in the Patent Office. This would seem to be a comparatively simple matter; but somehow or other it is hedged about with insuperable difficulties It is a curious fact that although the U. S. patents are printed in convenient form, and are public records, kept in a public building especially designed for the access and information of the people, still it is next to impossible for an individual to go to the Patent Office and refer to any complete part of the printed patents. For example, an inventor having made an improvement in flat irons, calls at the Patent Office and requests the privilege of looking over the various flat iron patents, with a view to applying for a patent if his supposed invention is new. He is shown sundry portfolios or volumes, purporting to contain all the previous inventions, finds nothing like his device, files his application, and is rejected. He then ascertains that some of the drawings or some of the patents, including the one resembling his device, had been temporarily removed, on some excuse or other, from the portfolio when he examined it, and that the set was not complete; so his examination was fallacious. He further finds that there is no uniform system followed at the Patent Office whereby the public may enjoy convenient and certain access to all of the printed patents in any particular class or branch. We suggest that before the new digest proposed by the Commissioner be commenced, the printed patents should be thoroughly classified, and several complete sets thereof maintained in convenient places for public reference.

We are inclined to believe that the Commissioner of Patents already has authority to establish such a system. Its efficient realization would be of great value to manufacturers, inventors, and all who are concerned in patent affairs.

THE SUN SPOT MAXIMUM.

We are now approaching the period when frequent and large sun spots may be expected. In 1870–71 this was the case, and the evidence is quite conclusive that they return with tolerable regularity at intervals of about ten or eleven years. As I write (January 28) there is in the sun's southern hemisphere, near the western border, a dark and conspicuous spot surrounded by a distinct penumbra. The umbra by itself is about 20 seconds in diameter, or in linear units about 9,000 miles, larger than the earth would appear at the same distance. There is also in the northern hemisphere a pretty group of four spots; and there are several others scattered about the surface of the sun. This is not very unusual. Spots have been recorded over 100,000 miles in diameter and visible to the naked eye, and as many as a hundred are sometimes noticed at one time. Frequently, however, the surface is entirely barren. The large spot mentioned above may almost be seen through a piece of smoked glass, and a spyglass of quite low power will render it easily visible. It is now moving off the disk; but in about twelve days it will probably return on the eastern edge; probably, but not certainly, for these large spots sometimes last for months and sometimes are dissipated in half an hour.

Care must be taken not to look at the sun through a telescope without the intervention of a piece of smoked glass over the eye end of the telescope. Loss of sight may result from neglect of this precaution. The best way to view the surface of the sun is to point the tube through a hole in the window shutter or other screen, and allow the image to fall on a piece of white paper, the eyepiece being first drawn out and the paper moved toward and away from it till the true focus is found. This gives a miniature but correct map of his surface, which can be seen by a number at a time without any risk or difficulty. If some of the readers of the SCIENTIFIC AMERICAN would keep a regular record of this kind, mapping and describing the phenomena observed systematically and accurately, they would find themselves much interested, and the records might have a scientific value. It is said of Schwabe, to whom we are indebted for more of our knowledge of the sun spot and associated phenomena than to any one else, that "twelve years he spent to satisfy himself; six more years to satisfy, and still thirteen more to convince mankind. For thirty years never has the sun exhibited his disk above the horizon of Dessau without being confronted by Schwabe's imperturbable telescope, and that appears to have happened, on an average, about 300 days in a year." This persistent work of observation, even sometimes with very limited means, has given us the reliable basis of theory; and there is nothing to hinder many an American observer continuing the record and keeping watch for the phenomena now to be explained, which seems to be associated with these sun spots.

These observations of Schwabe's, continued till 1868, and those of Wolf since, show very conclusively the ten year period above referred to. This being unquestionably determined, all kinds of eleven year cycles have been supposed to be discovered on the presumption that whatever affects the sun affects also all terrestrial activities. Herschel endeavored to show that the price of wheat changed with the sun spot period, being lower at times of maximum. But notwithstanding the authority of his great name, his success is very doubtful. Equally fruitless is the attempt to find an eleven year cycle coincident with sun spot maxima in the great financial panics and eras of commercial failures, which some Englishmen of good reputation have been recently indulging in. But there is one relation in which the observations are so complete that we may believe it to be established —the relation between photospheric activity on the sun and electrical activity on the earth. Through a long course of years it has been shown that the periods of magnetic variation coincide with the period of sun spots; not rigidly, but sufficiently close to prevent the probability of a chance connection. In at least one case, when observers have been looking at the sun through telescopes, and have recorded the exact instant of solar activity, the magnetic needles over the earth were violently affected, rigidly pointing out a new meridian. Auroras were noted, even in southern latitudes. Telegraphic lines refused to work, and shocks were given to the operators.

It is not difficult to explain a connection between earth currents of electricity, auroral display, and magnetic disturbance, but how these are caused by sun spot prevalency, or how a common cause produces all, is a problem which has not been satisfactorily solved. In the meantime it is well to heap up the records; to keep a close watch on the sun and note the size and character of his dark and bright spots; to look out also for auroras and record their appearance and duration; and for those who have opportunity to observe any especial disturbances in telegraphic currents and any odd freaks of the magnetic needle. I. S.

ANOTHER NEW DISINFECTANT.

Preserving and disinfecting agents have in recent times acquired an importance and scope regarding the methods of using them that could scarcely have been suspected at a relatively recent date. Dr. Koller cites, as examples, the antiseptic treatment of wounds which has been so exceptionally successful in the science of medicine. The discovery and application of true disinfectants and antiseptics may be designated as a most important practical question. The sanitary weal of the individual, of the masses, of cities, and of countries depends upon rational disinfection. The army of contagious diseases cannot be conquered by anything more successfully than by the weapons of disinfection.

The mutability, the changeableness, the self-sufficiency of the germs of decomposition and decay are characteristic of everything organic; but also characteristic of no men is that restless striving to lend a longer life, a quiet stability, to changeable nature. This conservative character is a feature of everything human; the shadows of the war for existence are sharply defined in this well-lighted picture, and time alone, with her flitting and varying forms, conjures up the conflict, whose final solution, however, only testifies to the old and innate conservatism.

The step up which the present has climbed in the recognition of disinfectants and antiseptics is quite a high one; but glancing back upon leaves of science, covered with glory, it is not difficult to predict that in this domain we shall still have many important advances yet to rejoice over.

At the head of the list of disinfectants which belong to modern times are carbolic and salicylic acids and thymol. A definite circle of action was found to belong to each when experience had leveled the way. Carbolic acid is in general the disinfectant of crude masses of organic substances; salicylic acid is the disinfectant of the kitchen, the cellar, and the larder, but thymol (most costly of all) is the disinfectant of the boudoir.

To the above mentioned must now be added a new one, says Andeer, viz., *resorcine*. Before we enter into a discussion of how it acts it is advisable to consider more closely its nature.

Resorcine was discovered about fifteen years ago by Barth and Hlasiwetz. At that time it was obtained as a product of the decomposition of certain gum resins like gum ammoniac, galbanum, assafœtida, etc., by fusing them with caustic potash; also by the dry distillation of Brazil wood. It derives its name from *resina*, resin, and orcin, a substance which it resembles, and which occurs ready formed in all lichens used for making litmus and archil, and is also obtained by the dry distillation of acids and ethereal bodies obtained from these lichens.

Sommer afterward called attention to the fact that umbelliferone, obtained from the umbellifera resins, when fused with alkalies gave the same substance. This umbelliferone crystallizes in colorless, odorless, and tasteless prisms, which are very soluble in boiling water, alcohol, and ether, and fluoresce strongly. It can be made from the resin which occurs as a drug in the market, or from the resin obtained by extracting angelica root, or levisticus, or imperatoria, with alcohol, and evaporating the alcoholic extract.

Resorcine belongs to the numerous compounds of benzole derivatives, especially to the dihydrox-benzoles or diphenols. A cheap method of making resorcine from benzole derivatives has been invented, and the dyes derived from it have justly attracted very extended attention.

Among the methods for making resorcine, the following are worthy of mention, because they furnish it at a reasonable price:

The chlorobenzol-sulpho-acid is made by dissolving chlorobenzole in fuming sulphuric acid. Its sodium salt when fused with caustic soda forms resorcine.

On warming a solution of phenol in sulphuric acid the metaphenolsulphonic acid is formed, and its sodium salt fused with caustic alkali also yields resorcine.

The third and best method, it seems, for making resorcine is from the dibenzolsulphonic acid, which is made by benzole vapors into warm sulphuric acid. A large quantity of resorcine is formed by fusing its sodium salt with caustic soda.

The relation that exists between resorcine and phenol (carbolic acid) as to their constitution led Andeer to ask whether their action might not be similar. In fact further experiments proved that resorcine has the property of stopping decay. Chemically pure resorcine, which withstands the light, when in a one per cent solution stops the development of fungi and mould. This has been proven not only by artificial experiments in the laboratory, but also chemically on the appearance of the symptoms of disease.

What seems deserving of special remark is that absolutely pure resorcine, in every degree of concentration, coagulates albumen and precipitates it from solution. On this account the author considers it an excellent caustic to remove unhealthy tissue. In crystals it cauterizes as powerfully as lunar caustic, but, he assures us, without pain, nor does it form metallic albuminates, which are insoluble or difficult of solution, causing a scar. In a comparatively short time, say three or four days, the skin regains its natural appearance.

In homeopathic doses the pure resorcine will preserve ink and colors which would otherwise mould very quickly, and not injure the color.

A one per cent solution will not prevent fermentation, but only retard it in favorable cases. To stop it completely requires a comparatively strong solution of 1½ to 2 per cent.

Andeer adds that resorcine is soluble in all liquids except chloroform and sulphide of carbon, and unites readily with animal fats and oils, especially in the presence of alkalies, and helps to emulsify them. Hence it is an antiseptic, caustic, to a certain extent a styptic, and an emulsifying agent. It has one advantage over the other disinfectants derived from benzole, that it can be used in every form prescribed by the pharmacopœia.

It seems that we are to be enriched by a new disinfectant which shall take a position in the future of unlimited usefulness. Resorcine will be the disinfectant, and in a certain sense the antiseptic of the physician, the druggist, and the laboratory.

MR. WATSON, in his *Mechanical News*, says that the best packing he ever used for faced joints, either steam or water, is common drawing paper soaked in oil. After a short time the heat of steam converts it into a substance like parchment, so that it is practically indestructible. It has the advantage of stripping readily from surfaces when it is desired to break a joint.