Correspondence.

Self-Mending Insects.

To the Editor of the Scientific American:

One of your correspondents asks for a scientific reason or for an explanation of this most marvelous operation of the self-mending snake and the earwig; and whether any other living objects do the same.

In the extract below, taken from the Encyclopædia Britannica, he will find a statement of as marvelous operations and of still more marvelous reasons or explanations (so-called scientific explanations):

"The spontaneity of certain polyps under injury is a good example of the indwelling power of all the cells and tissues to return to the established order, to the order and harmony which had been slowly acquired, and of which the memory is vividly retained. Trembla cut a hydra longitudinally, and 'in an hour or less,' says Paget, 'each half had rolled itself, and seamed up its cut edges so as to be a perfect hydra.' He split them into four; he quartered them; he cut them in as many pieces as he could; and nearly every piece became a perfect hydra. He slit one in seven pieces, leaving them all connected by the tail, and the hydra became seven-headed, and he saw all the seven heads eating at the same time. . . .

"This spontaneity resides in every living thing, and its efforts are directed by the memory of what the species had come through in reaching its place in the scale of organization. It is able, indeed, to make perfect reparation for injuries or losses only where the cells are little differentiated into tissues, or where the tissues are little specialized for diverse functions. In all animals, and most notably in the higher, this spontaneity is most effective for repair in the periods of development or growth."

So much from the Britannica. It is a pity that the learned pathologist has not stated where the memories are located, or how many such memories belong to each organism. Perhaps each cell contains one for itself, or each organism the sum of all the memories of its ancestry. R. O. GERCKE, M.D.

Augusta, Ga.

The Mineral Wealth of Siberia.

Referring to the resources of coal and iron in Siberia, a writer in one of our English exchanges says:

It is one of the finest undeveloped countries in the world, and it is really difficult to exaggerate the enormous wealth of this gigantic region. The soil is of almost inexhaustible wealth and the crops magnificent. There is almost no limit to the production of the land. The Russians themselves have but an imperfect idea of the immensity of their natural wealth, and other people outside Russia cannot realize it at all. Siberia, so far from being a region of desolation and of death, is a northern Australia, with larger rivers, more extensive forests, and mineral wealth not inferior to that of the island continent. In a very few years Siberia will be bridged from end to end with railways, and in this matter the Russian government is showing a large and wise policy. The magnificent water communications—for it is irrigated from end to end with some of the largest rivers in the world, navigable for thousands of miles through fertile and richly wooded lands destined to be the home of millions of colonists—and a canal is now being made between the Obi and the Yenisei, which will enable goods to be conveyed by water the whole way from Tiumen to beyond Lake Baikal. At Tiumen there is a railway which passes through the Ural mountains to Ekaterineburg and Perm, through the heart of the richest mining district in western Siberia.

The Manufacture of Japan Soy.

At a recent meeting of German chemists a Mr. Erich communicated a paper on the preparation of Japan soy, a product of which the details of manufacture are as yet imperfectly known. Soy has been manufactured in Japan for over a thousand years, and forms a very considerable article of consumption in that country and throughout the East. There are many factories of the condiment in the country, one of the largest being at Tokio, where considerably over one million gallons are specially prepared for export every year. The principal ingredients known to be used in the manufacture of soy are a very hard long-awned variety of barley, common salt, soya beans (*Dolichos soya*), a specially prepared ferment, and water. The soy beans are roasted like coffee, the barley is partly roasted and partly malted. The roasted parts of the barley and the beans are soaked in cold water, cooled, and preserved by the addition of a liberal dose of common salt. To this are added first a diastase solution, and afterward a specially prepared ferment, which causes an extremely slow fermentation, but without any considerable formation of carbonic dioxide or alcohol. The degree of strength of the soy depends upon the time used in the process of manufacture, which varies from one to three years. If kept cool and out of the light, soy can be kept good for a very long time, but the action of light and free access of air cause fermentation.

PHOTOGRAPHIC NOTES.

Illuminating Negatives by Artificial Light for Copying.—In an article giving an account of the various methods of illuminating negatives by oil, gas, electric, or the oxyhydrogen light the *Br. Jour. of Photo.* describes a simple method, which consists in the use of magnesium ribbon. It says:

Since magnesium has at last come down to so moderate a price, there remains no valid reason why a cheap, convenient, and highly powerful light should not be available for the purpose we indicate wherever lantern slides or enlargements are made.

The simplest mode of using it scarcely requires any apparatus or preparation, all that is necessary being to ignite it at a sufficient distance from the negative, with or without the intervention of a translucent screen; or the light may be allowed to fall upon a white sheet and passed, by reflection, through the negative to the camera, in which case the perfection of uniformity is secured. But though these makeshift methods may answer very well for lantern slide purposes where the sensitive plate is exposed in the camera, and thus protected from extraneous light, for enlarging they are wholly useless, since the sensitive surface is usually freely exposed, and it therefore becomes necessary to inclose the light in a suitable lantern. This is not a difficult task, and as, with the aid of magnesium, it removes all the difficulty of equal distribution of the light without inconveniently lengthening the exposure, no doubt many amateurs, in addition to those who have addressed us on the subject, will think it worth while to erect a simple lantern on the lines of the one we shall describe.

This consists, roughly, of a wooden body with ground glass front, and acts at the same time as lantern and reflector combined, the ground glass intercepting the whole of the light, both direct and reflected, and becoming converted into a powerfully actinic radiant suitable for either enlarging or reducing purposes and for negatives of any size. The details of construction are so simple as to scarcely require a diagram, so we shall endeavor, by means of a verbal description, to make the arrangement clear.

We may premise that though the instrument we describe is constructed for use with negatives up to 12 × 10, and is equally available for quarter plates, it might be made of any smaller dimensions if preferred, though, as nothing is lost in the larger size, and little added to the cost, we should strongly recommend the 12 inch square front to be adhered to.

The shape of the lantern, or reflector, is a hollow pyramid, the base of which is 12 inches square, clear, and the sides slope at an angle of sixty degrees, which will make the height of the pyramid, roughly, between 10 and 11 inches. Such are the interior shape and dimensions; but for convenience in construction, as well as in use, the structure may be built up in the following manner:

Cut two pieces of wood accurately to the shape and internal dimensions of the side of the reflector, and cut also two rectangular pieces of such size that, when placed together to form a V-shaped trough, the two triangular pieces will fit in at the proper angle to complete the reflector. The square ends of the two rectangular sides will then serve as feet, upon which the reflector will stand without further assistance. Before fastening the sides together, mark on each a line parallel with, and 6 or 7 inches from, the front or base edge, and nail or glue on four fillets of wood to form a rabbet or projection against which to fix a square of glass. In each of the triangular pieces which will form the top and bottom of the lantern when in use cut a hole an inch and a half or two inches in diameter, for ventilating purposes, the upper one to be fitted with an external chimney to carry off the smoke.

When the frame is put together, let it be lined with white paper or painted dead white. Fit a square of clear glass into the rabbet formed by the fillets already mentioned, and in the center of this cement a disk of opal glass about an inch in diameter. The clear glass will convert the back portion into a separate lantern, and by reducing the space assist in carrying off the smoke, while the opal disk softens the intense brilliancy of the burning magnesium, and helps to equalize the illumination. The front of the arrangement is provided with a frame, into which a sheet of ground glass slides, with a second groove at a distance of about an inch, into which carriers to hold different sized negatives can be inserted. So far as the lantern is concerned, nothing now remains but to supply the illuminating arrangement.

This of the simplest. Procure two narrow brass tubes, 5 or 6 inches in length and an eighth of an inch in internal diameter. Saw off the apex of the pyramid and replace it with a flat piece of wood, through which the two tubes are passed, one a quarter of an inch above, the other a quarter of an inch below the center, and reaching to an inch or so of the clear glass screen, or 8 inches from the ground glass front. The upper tube serves as a guide for the magnesium wire. The lower tube carries a strand of cotton wick, kept saturated with spirit, and serves to light the magnesium as it is passed through the upper tube. If the outside end of the wick tube be bent at a right angle, it may be passed through a cork into a small bottle of methylated spirit, and so converted into a permanent spirit lamp. A small aperture cut in one of the sides and glazed with blue glass will enable the operator to watch and regulate the supply of magnesium during use.

When required for work, all that is necessary is to light the spirit lamp by passing a taper through the air inlet at the bottom and to allow that to burn continuously. When an exposure is to be made, a strand of magnesium ribbon is passed slowly, but regularly, through the upper tube, and being ignited by the spirit flame, continues to burn as long as the supply is kept up. If the reflector be constructed of the shape and angle given, and the light arranged at a distance of 8 inches from the front glass, the illumination over a surface of a foot square will be brilliant and uniform in the highest degree.

Not the least recommendation of this apparatus beyond its efficiency is its economy. It may be made by any one who can use tools at all, for a few shillings, and will serve a variety of purposes.

While the above described arrangement is well adapted to the burning of ribbon, we can suggest a more simple plan, which consists of inserting a metal sheet on the bottom of the box, then placing upon it the new magnesium powder and gun cotton compound, and igniting and flashing it by means of a wax taper inserted through a small hole in the back of the box, or by a platinum wire made red with an electric current.

Chromo-Collotype Process.—One of the latest inventions patented in this country is the chromo-collotype or chromo-lichtdruck of F. L. Hosch, of Munich. As many of the readers will probably remember, the late Jos. Albert, of Munich, many years ago invented a similar process. He photographed a painting three times. The first negative was taken through a red colored glass plate, the next through a blue glass plate, and the last through a yellow glass plate. In this way he obtained three negatives, all of the same size, but in taking of which respectively the rays of the three primary colors—red, blue, and yellow—had been absorbed. From these negatives he secured three lichtdruck plates, one from each, the first of which he printed in red, the second in blue, the third in yellow, one over the other, and thereby he obtained more perfect pictures than could possibly be got by any other method. The Hosch process, though being also based on photography, is a different one. In this process a painting is photographed, and behind the resulting negative is exposed a lichtdruck plate. From this plate as many prints as color plates are required for the finished picture are taken on well sized paper. The prints, or off-sets, are fixed to card-board or to glass plates, and with specially prepared oil colors painted gray on gray, then they are all photographed again. In the negatives thus obtained, the highest lights, and also the margins of the picture, which should print perfectly white, are backed, then lichtdruck plates are exposed behind the prepared negatives, which are washed, etched, and respectively printed in the colors yellow, red, flesh tint, and blue, one over the other. The advantages of this process are that a considerably smaller number of color plates are sufficient for the reproduction of a painting than in the case of chromo-lithography, and that the finished pictures are much more perfect and of a greater softness than chromo-lithographic prints. On the other hand, more time is occupied by this process, and the printing and plates are more expensive.

Sresniewski's Gelatino Emulsion.—Professor Eder, in reviewing a new handbook of photography, written by a Russian dry plate manufacturer, M. Wiatcheslaus Sresniewski, describes a new method of preparing gelatine emulsion. It is a modification of Mr. Henderson's process, and consists in the following:

No. 1.

Potassium bromide	8 grammes.
Distilled water	20 c. c.
Gelatine (Nelson's No. 1)	1 gramme.
Carbonate of ammonia	1 "
Potassium iodide	0·2 "

No. 2.

Nitrate of silver	10 grammes.
Distilled water	40 c. c.
Nitric acid (10 per cent solution)	2 drops.

No. 3.

Alcohol, 95°	50 c. c.
Ammonia	4 "

(Temperature, 68° F.)

First add No. 2 to No. 1, then mix it slowly, and well shaking, with No. 3. The emulsion is kept for eight to ten hours in a room of the usual temperature. At last add a warm solution of—

Gelatine	18 grammes.
Water	120 c. c.

and finish by precipitating with alcohol, or by setting and washing with water.—*Hermann E. Gunther, in Photo. News.*

THE Klamath Indians have built up a considerable carrying trade along the Pacific coast. In their large canoes, hewn out of the solid trunks of immense trees, they carry dairy and farm products for the settlers and return with groceries and other supplies.