over the glued edge and pressed along. The next adjoining edge must be treated in the same manner and so on until all sides are secured. Wetting paper on the right side with a sponge or cloth is a bad habit and tends to destroy the fine surface, rendering it unsuitable to receive clean washes of ink or color. The right side of Whatman's paper can be told by holding the sheet up to the window, and noticing that the water mark reads from left to right; the reverse side should not be used except for rough sketching, as it generally has knots and other imperfections, which exhibit themselves when washed over.

As regards pencils, the market offers quite a number of excellent varieties from which a selection can be made. Faber's are standard articles, though a cheaper but equally good pencil is made by the Dixon Crucible Company. The latter is used by the artists of the SCIENTIFIC AMERICAN in drawing upon wood, no light test for the qualities of a pencil, by the way, and has proved of excellent quality. In sharpening a pencil, it should be remembered that, for sketching, a fine conical point is required, but for fine drawing it is much better to have the end thin and flat. To produce this, the wood is cut away from two sides only, so as to make a chisel-shaped extremity, and afterwards removed from the other sides only sufficient to slightly round the edge. This kind of a point can easily be kept sharp by rubbing the lead occasionally upon a bit of fine sand paper.

The best eraser is known as bottle rubber, which is quite soft. It has the merit of not fretting the surface of the paper. A good way of hiding small mistakes in ink lines, in places where scraping with a knife cannot be well accomplished, is to touch the spots over with flake white, mixed rather dry, with a fine sable brush.

A good black and indelible drawing ink, it is stated, may be made by dissolving shellac in a hot water solution of borax and rubbing up in this a fine quality of Indian ink. After using, the drawing pen should be dipped in alcohol and wiped dry. Good Indian ink will show, when the stick is broken, a very bright and almost prismatic colored fracture; if employed singly and without admixture, it should be used at the first rubbing. Redissolving renders its washes cloudy and irregular in tone.

To fix pencil drawings, various plans are in use. The simplest way is to cover the paper with new milk and dry carefully. Water starch, cold isinglass water, size or rice water, may also be applied with a camel's hair brush. Collodion mixed with paraffin, stearin, or castor oil, has been suggested for the same purpose, and is said to render the sketches much clearer and more easily copied.

Drawings may be copied in facsimile by the aid of various mechanical contrivances, or transferred by the use of transfer paper. The latter is made by rubbing white paper with a composition consisting of 2 ounces of tallow, ½ ounce powdered black lead, ¼ pint linseed oil, and sufficient lamp black to make it of the consistency of cream. These should be melted together, and rubbed on the paper while hot. The prepared sheet is placed between the original and the blank paper, blackened side against the latter. The lines of the original are then gone over with a steel point (a darning needle with the point ground off will answer) and are thus caused to appear on the paper below. Copies may be multiplied by perforating the picture, or a copy of it if it be desirable not to destroy the original, with a number of fine needle holes along the outlines, and then laying upon the paper. A piece of cotton wool dipped in finely powdered blacklead, (or chalk, which is better), is then gently patted over the surface, so that the powder passes through the holes and appears on the sheet below. The outline is then filled out with pencil.

Rénault's reproducing process consists in first making the drawing on strong glazed paper with glutinous ink and afterwards covering the lines with bronze powder. If the drawing thus prepared be pressed upon a sheet of sensitized paper, the lines of the original drawings are reproduced in black by the chemical action of the pulverized metal upon the sensitized paper. By softening the ink with the vapor of alcohol, and renewing the bronze when it is exhausted, many impressions may be produced.

Tracing paper can almost always be readily procured at a small expense. It is not difficult to make by washing thin paper with a mixture of spirits of turpentine 6, resin 1, and boiled nut oil 1, parts by weight, applied with a soft sponge; or a simpler way is to brush over thin unsized paper with a varnish of equal parts of Canada balsam and turpentine. Vegetable parchment, sometimes used for drawing purposes, is made by dipping ordinary paper for a few seconds in a solution containing one part water to six sulphuric acid. Careful washing at once is necessary to remove every trace of the acid.

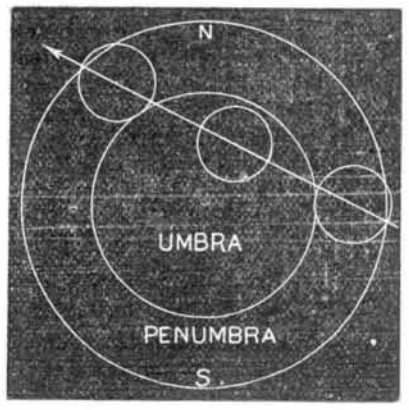
In using colors, at the outset purchase none but the very best, as with no other can purity of tone in washes be gained. The following table, showing the general indication of tints used in mechanical drawing, will perhaps prove useful: Carmine or crimson lake for brickwork in plan or section to be executed; Prussian blue, flint work, lead, or parts of brickwork to be removed by alteration; Venetian red, brick work in elevation; violet carmine, granite; raw sienna, timber not oak; burnt sienna, oak or teak; Indian yellow, fir; Indian red, mahogany; sepia, concrete or stone; burnt umber, clay earth; neutral tint or Payne's gray, cast iron, rough wrought iron; dark cadmium, gun metal; gamboge, brass; indigo, bright wrought iron; indigo with a little lake, bright steel; Hooker's green, meadow land; cobalt blue, sky. If washes do not flow well, owing to greasiness of the paper, a few drops of prepared ox gall in the water with which they are mixed will generally remedy the trouble. In coloring tracings on thin paper, work on the back and mix the colors quite dark.

Correspondence.

Total Eclipse of the Moon, October 24, 1874.

To the Editor of the Scientific American:

On October 24, 1874, a total eclipse of the moon will occur, which will be visible throughout the United States and Canada.



The accompanying diagram represents the path of the moon through the earth's shadow during the eclipse and the moon's position at the time of the middle of the eclipse. The first and last contact with the umbra, or shadow, are also shown. The Washington mean times of the different phases, as given in the *American Nautical Almanac* for 1874, are as follows:

First contact with penumbra	11h.	35·8m.
First contact with shadow	12h.	33·7m.
Total phase begins	13h.	51·7m.
Middle of eclipse	14h.	8·6m.
Total phase ends	14h.	25·4m.
Last contact with shadow	15h.	43·5m.
Last contact with penumbra	16h.	41·3m.
Magnitude of eclipse (moon's diameter = 1)		1·053
Duration of total phase		33·7m.
Entire duration of eclipse	5h.	5 5m.

The mean time at which the phases occur at any other place may be easily found by simply adding or subtracting the longitude of the place from Washington, to or from the times above given, the correction being added when the longitude is east, or subtracted when it is west.

The times of the occurrence of this eclipse, as given above, are astronomical, being reckoned from 0h. at noon of October 24 upwards, so that the greater portion of the eclipse occurs on the morning of October 25, civil time.

St. Catharine's, Ontario, Canada. J. M. BARR.

The Devil Fish of Newfoundland.

To the Editor of the Scientific American:

In your article on the devil fish. in No. 9, volume XXIX., you speak of "historians, otherwise credible, reporting the capture of some which measured 40 feet." As a proof of their veracity, I inclose you a photograph of an arm or sucker which measures 17 feet in length. It was coiled for the purpose of bringing the whole within the field of the camera, the diameter being 2 feet 6 inches as it lay on the table of the artist. It is of a nearly uniform circumference of 3½ inches for 14 feet 6 inches of its length, and 6 inches at the thickest portion of the remainder containing the suckers.

While off the eastern end of Belleisle, in Conception Bay, the crew of a fishing boat noticed what they supposed to be an old sail upon the water, and proceeded to make prize by striking it with a boat hook, when, to their astonishment, the limb now photographed was thrown across the boat from gunwale to gunwale; it was broken from the creature some feet (not less than two) from the body, and subsequently pieces were cut off by the boys of the settlement to which the men belonged, before an attempt was made to preserve the specimen. How much was lost in this way cannot be told. When fresh, the length was taken by a reliable person as 19 feet, but with the same tape line, some time afterwards, I found it reduced to 17, probably by the strong pickle used for its preservation.

Another sucker, described as being as thick as a man's thigh, was also thrown into the boat, of which a length of five feet was chopped off but, unfortunately, lost. The men used their oars as levers over the gunwale to pry the boat from the creature, which shortly rushed off at great speed, then, stopping, went into a flurry, throwing the peculiar inky fluid of the squid with great violence over a space of two hundred yards, and in such quantities as would have swamped the boat had the discharge taken place close to it.

The hurried and alarmed observations of the crew are, of course, worth but little as to actual size, but the men think the total length could not have been less than 60 feet.

About three weeks previously a creature, described as of great length (probably 60 feet), was seen from the shore while swimming in the bay, within a few miles of the same place.

The specimen is now in spirits in the museum being formed by Alexander Murray, Esq., F.G.S., our geological surveyor.

Since writing the foregoing, an entire devil fish was captured by getting foul of some nets at Torbay, about nine miles from here. The body is about 6 feet 6 inches long, and the eight main tentacles about the same length, with two others of 22 feet each, measured from the head to the extreme point. To bring the entire length into view these were hung over a rail. The body and eight tentacles around the head are about of equal length, and this seems to be the usual proportion of the structure of these creatures, with two other slenderer arms three and a half to four times longer.

The notice of this specimen has brought out many anecdotes of large squids having been stranded on our shores, in all cases reliable as to great size, and more or less so as to actual dimensions, which range (for the bodies) to eighty and even ninety feet. Without accepting them as authentic, the fact seems established that a considerable number of these creatures, of large size, exist in the Newfoundland and Labrador waters.

J. T. NEVILLE,
Inspector of Lighthouses.

St. John's, Newfoundland.

[Our thanks are due to our correspondent for the photographs mentioned in his letter, and which have safely reached us. They exhibit a hideous and formidable monster, and represent with great clearness, on the long tentacles, the suckers by which the animal attaches itself to whatever may come within its grasp. It is to this species that Victor Hugo alludes in his novel, "The Toilers of the Sea," in which one of the personages is clutched by a devil fish, and slowly drawn to a horrible death.—ED.]

Poisonous Aniline Dyes.

To the Editor of the Scientific American:

I fully agree with you that aniline dyes should not be used in candies. I recently ate about three inches of stick candy, of a red color, and was taken sick with a burning pain in the stomach and upper intestines. I grew worse; in three days I was not able to walk without being faint and giddy, and had much pain all the time. A doctor prescribed for a case of aniline poisoning, and three doses of medicine put me out of danger. I am now about well again.

WILLIAM WARD.

Cleveland, Ohio.

Microscopical Exhibition.

The Odontographic Society lately gave a microscopical exhibition in the rooms the of Philadelphia Dental College, before an audience of about five hundred ladies and gentlemen, who manifested the most marked interest in the display of instruments and objects.

The microscopes, forty in number, were placed upon the operating tables, extending one hundred feet. The instruments were arranged so as to be a distance apart sufficient to afford a fair view of the objects without inconvenience to the visitors. In addition to the microscopes belonging to the members of the society, a number of valuable instruments were kindly loaned for the occasion by the Biological and Microscopical Section of the Academy of Natural Sciences, and by several eminent microscopists. The microscopes included every variety of form, from the one thousand dollar grand microscope of Ross and the binocular of Beck, to the inexpensive student's microscope.

The objects exhibited were mainly confined to the teeth of man and animals. The sections of the teeth of man, the cat, horse, cow, sheep, elephant, hog, etc., afforded an excellent opportunity of observing and contrasting the difference in the arrangement of the enamel, dentine and cementum in those animals, while the gizzards of the cricket and the cockroach showed the provision made by Nature for the comminution of their food. Among the more notable specimens shown, in addition to those already named, may be mentioned: 1st, a longitudinal section of a dilacerated incisor, and section of a human incisor with the cementum covering a portion of the enamel; longitudinal section of a human molar with vascular canals in the dentine, and a human embryo of twenty-nine days; section of an adult human incisor and the lower jaw (tooth *in situ*) with the vessels of the dental pulp and Haversian canals injected with carmine; hypertrophied root of human molar; enamel columns of human tooth; transverse section of buck's horn and other sections of teeth; section of molar tooth and jaw of a cat, with vessels of dental pulp; periosteum and Haversian canals injected with carmine.

Dr. Joseph G. Richardson gave a very satisfactory demonstration of the circulation of the blood in the capillaries of the web of the frog's foot, in the museum of the college.

Professor S. B. Howell, aided by Professor Hunt, exhibited a number of interesting objects by means of the gas microscope, and demonstrated the importance of this instrument as a valuable and indispensable aid to the teacher of histology and physiology.

The success attending this effort on the part of the society has decided the members to give another microscopical exhibition at no distant day.—*Dental Cosmos.*

Physiology of the Siamese Twins.

Dr. Hollingsworth, of North Carolina, who examined the bodies of the Siamese twins at the time of their decease, found the band which connected them to be an extension of the sternum, for about four inches in length and two in breadth. The band was convex above and in front, and concave underneath. The two bodies had but one navel, which was in the center of the band, and it is supposed that there were two umbilical cords branching from this, one extending into each body. The connecting link was found to be the ensiform cartilage, and was as hard as bone, and did not yield in the least. [It may be here mentioned that, for some time previous to their death, no motions were observable in the band.] The doctor said that he did not think they would have survived a separation, not from the fact of being afraid of separating the arteries, but from fear of producing peritonitis. No hæmorrhage would have been produced, so far as could be seen, as there were no arterial connections of any account.