cal process known only by themselves, have removed this objection.

Our illustrations show the several processes through which the fish are passed after being taken. They are first brought to the scaler, which consists of a long shaft, on which are twelve wheels filled with long blunt teeth, which revolve very rapidly, and take off every scale in an incredibly short space of time. From the scalers they are passed to hands who chop off the heads and cut out the entrails. They are then placed in the washing troughs, above which are a number of revolving circular brushes, by contact with which the insides are thoroughly cleaned. They are then placed in pickle vats, where they remain for a few hours, until they are sufficiently salted; after which they are spread upon large tables, where they are placed in the cooking cans. They are then taken to the steaming tanks, of which there are seven, each having a capacity for holding 1,000 boxes. From the steaming cans, they are again taken to the tables and transferred to the permanent cans, when they are oiled and spiced, and then handed over to the tinsmiths to be soldered. The time from the fish being brought to the factory until they are boxed and labeled, is three days.

These fish are shipped in large quantities to every part of the country, and by many are considered quite equal in flavor to the sardines imported from France and Italy.

ASTRONOMICAL NOTES.

OBSERVATORY OF VASSAR COLLEGE.

For the computations of the following notes (which are approximate only) and for most of the observations, I am indebted to students. M.M.

Positions of Planets for February, 1875.

Mercury.

Mercury is at its greatest elongation from the sun on the 13th of February, when it sets at 6h. 10m. P. M., and should be seen in the twilight, north of the point at which the sun disappeared. On the 28th of February, Mercury sets at 6h. 3m. P M.

Venus.

Venus was at its greatest brilliancy on the 12th of January, and must have attracted the attention of all observers during the whole month. Its meridian passage being near 9 A. M., it could be followed with the naked eye during the morning, and for some time after it passed the south point. Its crescent shape could be seen with a small telescope.

On the 1st of February, Venus rises at 4h. 13m. A. M., and sets at 1h. 48m. P. M. On the 28th of February, Venus rises at 4h. 18m. A. M., and sets at 1h. 54m. P. M. If its motion is watched among the stars, it will be seen to be moving rapidly toward the east.

Mars.

Mars is coming into a better position as to time of meridian passage, but is lower and lower in the south. It rises at 1h. 50m. A. M., of the 1st, and sets at 11h. 36m. A. M. On the 28th it rises at 1h. 16m. A. M., and sets at 10h. 36m. A. M.

Jupiter.

We are coming into better position relatively to Jupiter, but it is still best seen in the early morning hours.

On the 1st of February, Jupiter rises at 11h. 49m. P. M., and sets at 10h. 31m. the next morning. On the 28th, Jupiter rises at 10h. 3m. P. M., and sets at 8h. 45m. A. M. the next day. Early in the month Jupiter is directly south near 5 A. M., in the middle of the month at 4 A. M., and near 3 A. M. at the last of the month.

Saturn.

On the 1st of February, Saturn rises at 7h. 32m. A. M., and sets at 5h. 26m. P. M. On the 28th, Saturn rises at 5h. 56m. A. M., and sets at 3h. 58m. P. M.

Uranus.

Uranus is in a good position, as it comes to meridian at midnight and at a high altitude.

On the 1st, Uranus rises at 5h. 10m. P. M., and sets at 7h. 20m. in the morning. On the 28th, Uranus rises at 3h. 18m. P. M., and sets at 5h. 32m. the next morning. An ordinary telescope will show the disk of Uranus, so that it can be known from a star.

Neptune.

Neptune rises on the 1st at 10h. 27m. A. M., and sets at 11h. 33m. P. M. On the 28th Neptune rises at 8h. 42m. A.M., and sets at 9h. 50m. P. M.

Sun Spots.

Photographing has been interrupted since the last report by the holidays, and later by clouds and wind. From January 7 to January 16, the sun was observed with a small telescope nearly every day, and the spots were very few and small.

How to Grow Lean.

From a quotation in the London *Medical Record*, we learn that M. Philbert states that the principal measures for reducing obesity come under four heads:—1. *Régime*; 2. Hygiene; 3. Exercise and Gymnastics; 4. Waters with sulphate of soda. The basis of the *régime* rests on the prevention of the introduction of carbon into the system, or on favoring its transformation, and augmenting the amount of oxygen. The food must, therefore, be non-nitrogenous, varied with a few vegetables containing no starch, and some raw fruit. But the temperament of the patient must be kept in view. The lymphatic should have a red diet, beef, mutton, venison, hare, pheasant, partridge, etc., and the sanguine should have a white diet, veal, fowl, pigeons, oysters, etc. Vegetables, not sweet or farinaceous, may be allowed: grapes, gooseberries, apples, etc. *Café noir*, tea with little sugar and the addition of a little cognac, may be used. We must forbid sugar, butter, cheese, potatoes, pastry, rice, beans, peas, etc.

The hygiene consists in favoring the action of the skin, in wearing a tight roller to support the walls of the abdomen, in taking plenty of exercise on foot or on horseback, playing at billiards, fencing, swimming, gymnastics, etc.

The Banting treatment is not very different. It consists in abstaining from bread, butter, milk, beer, potatoes, pudding, and from sugar in every shape. It allows some biscuit or dry bread, every kind of fish except salmon, and every kind of meat except pork, all vegetables except potatoes.

Purgatives have a good deal to do with the success of treatment of cases of obesity, and some have thought scammony as effective as sulphate of soda.

Useful Recipes for the Shop, the Household, and the Farm.

Water containing lime compounds—very common in country wells—may be rendered fit for use, for many purposes in the arts, by the addition of a little chloride of ammonium.

Glycerin added to paper stock increases the flexibility of the paper.

Copper and brass articles may be coated with zinc, by dipping them into a boiling concentrated solution of sal ammoniac containing finely divided zinc.

Platinum bronze, said to be entirely unoxidizable and especially adapted to the manufacture of cooking utensils, is made of nickel 100 parts; tin 10: platinum 1.

A mixture of 358 parts phosphate of soda and 124 parts boracic acid is mentioned as another good copper-welding compound.

Pure glycerin may be tested as follows: When treated slowly with sulphuric acid, it should not turn brown; with nitric acid and nitrate of silver, it should not become cloudy; and when rubbed between the fingers it does not emit a fatty smell.

Silicate of soda (water glass) stops fermentation.

Adulteration of soap by starch is shown by dissolving the soap in alcohol, which leaves the starch behind.

Anhydrous phosphoric acid is the most perfect known substance for drying gases.

Never allow drinking water to be drawn from a cistern supplying a water closet.

Extend pipes from water closet traps or one (larger) from the main waste pipe into the nearest chimneys. The pestilent gases will thus be carried off, instead of being allowed to escape into the house.

To make artificial veneer, soak the wood for 24 hours and boil for half an hour in a ten per cent solution of caustic soda. Then wash out the alkali, when the wood will be elastic, leather-like, and ready to absorb the desired color. After immersion in the color bath, dry between sheets of paper under sufficient pressure to preserve the shape.

Dry furnace heat, productive of throat and lung diseases, may be moistened by hanging a wet towel in front of the register, the lower edge of the towel being allowed to dip in a shallow vessel of water.

After taking up a carpet, sprinkle the floor with very dilute carbolic acid, before sweeping.

Avoid wearing heavy overcoats or furs for hours in succession; the tendency is to weaken the powers of resistance of the wearer leaving him liable to inflammation of the throat and lungs.

To cut india rubber, dip the knife blade in a solution of caustic potash.

A wall of soft burned bricks built up within a cistern makes an excellent filter.

Never store any articles of food or drink in old petroleum barrels. They are poisonous even after being cleaned.

To mold figures in paste, take the crumb of a new drawn white loaf, mold in a mass until the whole becomes as close as wax and very pliable. Then heat and roll with a rolling pin. Mold it to the required shape, and dry in a stove.

Frozen potatoes can be cured by soaking in water three days before cooking.

In drilling wrought iron, use one pound of soft soap mixed with a gallon of boiling water. This is a cheap lubricator, and insures clean cutting by the drill.

To cure scratches on horses, wash the legs with warm strong soap suds and then with beef brine.

To remove paint splashed upon window panes, use a hot solution of soda and soft flannel.

Frosted feet may be relieved of soreness by bathing in a weak solution of alum.

Never use glazed earthenware pipes for upward flues.

Effects of Copper and Brass on the Color of Vermillion.

It has often been observed that, when vermilion inks are employed for printing from copper plates or copper-faced types and electrotypes, the color changed to a dirty brown or black. In the manufacture of playing cards, it was impossible to use brass stencils without injury to the color. Karmarsch has been studying this subject for a number of years, and some of his experiments and results, having been made public, have been repeated by Heumann.

Karmarsch at once recognized the fact that the change of color was due to the formation of sulphide of copper, but he supposed that the sulphur necessary to produce this came from impurities in the vermilion. For, said he, it is highly improbable that the vermilion is decomposed at ordinary temperatures, and the text books in chemistry point to no such facts.

Heumann, of Darmstadt, however, has recently proved that this highly improbable decomposition does nevertheless take place. Karmarsch's proposition to boil the vermilion in a solution of purified potash seemed to Heumann rather useless, still he followed his plan. He took very pure vermilion, perfectly free from metallic mercury, which did not discolor the potash solution when boiled in it, nor could a trace of sulphur be detected in it. Nevertheless, when a strip of bright copper or brass foil was placed in it, it immediately became covered with a film of black sulphide of copper. When the vermilion, that had been boiled three times in fresh potash lye and washed, was rubbed on the strips of metal with a cork, they were blackened. Perfectly dry vermilion requires to be rubbed with some pressure; but when stirred up with a little water, it suffices to merely rub it on the metal with the finger. When rubbed quite hard with the cork, a part of the film separates from the metal, and, mixing with the vermilion, imparts to it an almost black color; while the copper, at the point where it was in contact with the vermilion, looks as if it had been amalgamated. It is even possible to write on copper and brass with a piece of sublimed vermilion; and after rinsing with hydrochloric acid, the writing appears in silver-colored characters.

The ease with which vermilion is decomposed is shown by this experiment, and, of course, that property cannot be removed by boiling with potash solution. Karmarsch, however, states that there are two ways of freeing commercial vermilion from those sulphur compounds which alone effect the formation of sulphide of copper: First, that already mentioned of boiling in potash, and second, mixing the vermilion to a paste with water, and putting in strips of copper, which take up all the free sulphur, and take away from the vermilion that property of blackening copper. This result can only be explained on the supposition that the vermilion employed for the experiment actually contained sulphur which could be removed, and by which the copper was changed, while the vermilion itself was not in sufficiently intimate contact to suffer decomposition.

Heumann, following Karmarsch's example, placed a bright copper coin for some time in a paste of vermilion and water, and found on rinsing the coin off that the metal had remained almost unaltered. Only on those spots which had accidentally been rubbed with a glass rod, used to stir up the precipitate, was the metal blackened. Wherever the copper coin lay against the side of the vessel beneath the paste, so that the metal came more intimately in contact with the vermilion, amalgamation and blackening took place at once.

The results obtained by Karmarsch are, according to this, only possible when the copper coin lay perfectly quiet in the pigment, and so was able to take up only the free or dissolved sulphur.

Since in printing with vermilion, or in rolling or brushing it through stencils, the contact is sufficiently intimate, in many places at least, to decompose the pigment, it is evident that boiling the vermilion in potash solution cannot prevent the injury to its color, although this may perhaps be reduced. Moreover, when rubbed up with oil, the pigment is not so strongly attacked as when dry or wet with water. Iron decomposes vermilion only at a high temperature, and hence may be rubbed with it without injury to the color. Zinc only decomposes it slightly when rubbed with the wet color; and as the sulphide of zinc produced is white, the change of shade is scarcely perceptible. Nickel, too, we believe, does not act upon vermilion, and hence the advantage of nickel-faced type over copper-faced for use with vermilion ink.

British Telegraphic Progress in 1874.

The most important telegraphic improvements in the British system of Telegraphy, consist in the extended use of American inventions, that have been employed here for years. For example, *Engineering* says:

An important change has been effected during the year by the more complete adoption of the "Sounder." This is a step in the right direction, and the "Sounder" will eventually become the principal instrument in use by the department. Its introduction will be slow and gradual, but unquestionably its use will be found attended with the greatest success. The Duplex system has been found to answer admirably, and where business had increased to such an extent as to require extra accommodation, it has been at once introduced to the improvement of the working. On short circuits the ordinary Duplex system has been used, but in longer circuits the system known as "Stearns'" has been adopted. At the present time the total mileage of wire working on the Duplex principle is over 12,000 miles, the largest circuit being 450 miles.

A Large Prize.

The King of Belgium has established an annual prize of $5,000 to be awarded for the best works or investigations upon certained determined subjects. The competition is confined exclusively to Belgians, except in every fourth year, when the citizens of any nation may compete. The first general concourse takes place in 1881, when the above mentioned sum will be awarded for the best work on methods of improving harbors on low and sandy coasts, similar to those of Belgium.

Gas Dangers.

Too much care cannot be exercised in seeing that leaks do not exist in the gas pipes or that burners in unoccupied rooms are not left partially turned on. Ordinary illuminating gas, when mixed in certain proportion with air, forms a dangerous explosive mixture, liable to blow up on contact with flame. A fearful explosion occurred almost under our windows recently, and three people were injured, through a girl entering, with a lighted lamp, an apartment which received the escape from a leak in the gas main.