even the humblest may be happy. Without it, the greatest genius will fail miserably. The man with a purpose is like a gallant steamer that drives straight on towards his harbor, in storm or calm, in darkness as well as in daylight. He who has no purpose is like a rudderless ship, drifting about the ocean of life, sometimes, by chance, reaching a port, but oftener foundering far out of sight of land.—*Phil. Ledger.*

Science.

A Survey of the Physical Sciences.

Concluded.

ASTRONOMY.

The ancients were early drawn to the study of the heavens. The Chaldeans and Egyptians excelled in celestial observations. They named the planets, noticed eclipses, marked the constellations of Orion, Pleiades, Hyades, and Bootes, and divided the day into twelve hours. Speculation naturally arose. It was fruitless. The stars appeared as so many brilliant points revolving in a moveable sphere.

Astronomy lay in this state till Europe awoke from the dead lethargy of the middle ages. It was the first science that fixed the awakening mind. Purbech and Regiomanus prepared the way for Copernicus, the herald of the true system. He gave his views to the world in 1543. Kepler, born in 1570, added much to astronomical knowledge. His observations and reasonings were profound. He discovered the *ellipticity* of the orbits of the planets, and laid down what is known as the *three laws of nature.* While Kepler was thus engaged in explaining the motions of the planets, Galileo, the martyr of astronomy, invented the telescope. The moon was observed, and a resemblance between the heavenly bodies and the earth indicated. The armed eye gazed upon new fixed stars, and the satellites of Jupiter and Saturn.

With *Newton* the study of astronomy commenced a new era. The time for establishing the true system on principles had arrived. The motion of the heavenly bodies was compared with the laws of motion as known upon the earth. The great law of attraction was discovered.

During the last fifty years, the progress of astronomy has been rapid. Instruments have been perfected, and their range enlarged. Lord Rosse's telescope has found a record in every daily sheet. Observatories are multiplied. The theory of comets has been explained. A single year's observations at Washington gives us 15,000 stars, most of which are unknown. New planets are added almost monthly to the records of worlds. In this progress, we must notice, in our country, the names of Walker, Bond, Mitchell and Kirkwood.

OPTICS.

The science of optics was long neglected. The subtle nature of light seems to have eluded the observations of the ancients. Euclid began its study.

In the eleventh century, Alhazen wrote a treatise on optics. He was acquainted with the anatomy of the eye. Bacon, in the seventeenth century, made some good remarks on the uses of lenses. Spectacles were invented by Amato, a Florentine, in 1313. In the fifteenth century, Maurolicus pointed out the crystalline lens of the eye, and explained in a good degree the nature of long and short-sighted eyes. Baptista Porth, a Neapolitan, invented the *Camera Obscura*, about the year 1560. It led Kepler to explain the action of the eye in vision. The rainbow was explained in 1610, by Dominis. In 1590, Janas, of Middleburgh, in Zealand, invented the telescope. The news of this was immediately communicated to Galileo, who constructed one and turned it to the heavens. From this time forward, the science of optics rose into notice. Descartes, Gregory, Barrow, Huggins and Newton labored to promote its growth. The theory of light proposed by Newton, for a long time commanded respect. It was the theory of *emission.* Light is thrown off from all luminous bodies. The theory of Huggins is now ascendant. It is the theory of *udulation.* Light is a subtle ether, pervading all space, and when thrown into a *vibratory* state, occasions vision.

ELECTRICITY.

This branch of physical science is wholly based on experiment. It was known to the ancients only in some natural phenomena. The Greeks were acquainted with the attractive and repulsive powers of *amber*, the mineral from which electricity takes its name.

In 1720, Stephen Gray made some discoveries. They respected conductors, non-conductors, and insulated bodies. Du Fay, in 1733, added to these discoveries. He regarded electricity as consisting of two kinds, and distinguished these by the names *vitreous* and *resinous.*

The first successful attempt to explain the facts of electricity was made by Dr. Franklin. With him, it took the form of a science, and, since his day, has risen to a proud rank through the labors of Coulomb, Volta, and Farady. The *telegraph* is the noblest instance of its application—the invention of Sydney Morse.

MAGNETISM.

Magnetism had its beginning in a knowledge of the loade-stone. The Chinese were first acquainted with it. There is no room to doubt but that the *compass* was brought from the East.

Gilbert, in the time of Elizabeth, is the first one who attempted to collect the phenomena of magnetism, and classify them. From that time observation has been adding valuable discoveries.

Columbus observed the declination of the needle in his great voyage of discovery. The *dip* was first noticed by Norma in 1576. Halley attempted to explain the declination. The earth was regarded by him as a magnet. The *daily variation* of the needle was discovered in 1722 by Graham. Oersted of Copenhagen discovered the effects of electric currents on the needle, and led the way to electro-magnetism. Faraday has done much for electricity. His discoveries are of the highest order. As a consequence of these inquiries, we now look upon *light, electricity*, and *magnetism* as different functions of the same principle. The magnetic poles of the earth and the sublime phenomena of the aurora borealis and australis are owing to electric currents.

CHEMISTRY.

Chemistry, as a science, was unknown to the ancients. It is based strictly on experiments, and has taken its true rank within the last century. Its progress has been a brilliant one, and is owing to the labors of such men as Davy, Beecher, Black, Cavendish, Dalton, Faraday.

Already it has reached a high degree of perfection and utility. The four elements of the ancients have been extended to sixty-one, the laws of chemical attraction explained, the nature of substances brought to view by analysis, and the results applied to manufactures, agriculture, and the arts.

Plastering Machine.

A machine for the purpose of superseding manual labor in the operation of plastering walls, has been invented by Isaac Hussey, of Harveysburgh, Ohio, who has taken measures to secure a patent. It consists of a moveable frame upon rollers that can be adjusted to suit any height, and of a smaller frame sliding within it. The latter serves to support a mortar box, containing the trowel, which is raised and lowered by means of a drum and endless chain. When in operation the trowel is supplied with motar by a rod and follower, which are worked by a lever, the quantity being regulated or shut off, as required, by a slide that covers the opening in the box. For plastering ceiling it is only requisite to raise the mortar box to the top of the frame, and for side walls it is adjusted accordingly by turning it to a proper position. For this last named operation the box is shifted by the sliding frame, which is moved back and forth for that purpose by means of the already-mentioned lever. There are also various cords and pulleys attached to the machine for facilitating the operations of the different parts, which are included in the invention and forming part of it.—*Sci. Am.*

The Management of the Finger Nails.

According to European fashion, they should be of an oval figure, transparent, without specks or ridges of any kind; the semilunar fold, or white half circle, should be fully developed, and the pellicle or cuticle which forms the configuration around the root of the nails, thin and well defined, and, when properly arranged, should represent, as nearly as possible, the shape of a half-filbert. The proper arrangement of the nails is to cut them of an oval shape, corresponding with the form of the fingers; they should not be allowed to grow too long, as it is difficult to keep them clean; nor too short, as it allows the ends of the fingers to become flattened and enlarged by being pressed upwards, against the nails, and gives them a clumsey appearance. The epidermis which forms the semicircle around, and adheres to the nail, requires particular attention, as it is frequently dragged on with its growth, drawing the skin below the nail so tense as to crack and separate into what are called agnails. This is easily remedied, by carefully separating the skin from the nail by a blunt, half round instrument. Many persons are in the habit of continually cutting this pellicle, in consequence of which it becomes exceedingly irregular, and often injurious to the growth of the nail. They also frequently pick under the nails with a pin, penknife, or the point of a sharp scissors, with the intention of keeping them clean, by doing which they often loosen them, and occasion considerable injury. The nails should be cleansed with a brush not too hard, and the semicircular skin should not be cut away, but only loosened, without touching the quick; the finger being afterwards dipped in tepid water, and the skin pushed back with a towel. This method, which should be practised daily, will keep the nails of a proper shape, prevent agnails, and the pellicles from thickening or becoming rugged, or ill-formed; the longitudinal ridges or fibres should be scraped and rubbed with lemon, afterwards rinsed in water, and well dried with the towel; but if the nails are very thin, no benefit will be derived by scraping; on the countrary, it might cause them to split. If the nails grow more to one side than to the other, they should be cut in such a manner as to make the point come as much as possible in the centre of the end of the fingers.—*Durlachor.*

The Farm.

From the Maine Farmer.

Drying Vegetables for Farm Use.

A friend says to us, that he has two or three hundred bushels of potatoes—that he has not hogs enough to eat them, and the distance that he lives from market will not allow of any profit, but a loss at the present prices, should he haul them there; and he asks what he shall do with them? Well, rather than have them rot, he had better give notice that he will give them away, to those who will come after them. After suffering the scourge of the potato rot so many years, and living *potatoless*, as many have, it is really refreshing to hear somebody complain, that he has more potatoes than he can use. It seems like old times, when, whatever might happen to other crops, we were sure of potatoes enough. The question, however, reminded us of a plan, which might be generally adopted by farmers, for the preservation of potatoes, turnips, apples, and such like perishable articles.

It is drying them. By going to a little expense for fixtures, the labor and trouble would not be much. We all know that our good housewives dry apples, pumpkins, huckleberries, &c., for domestic use. Well, suppose you adopt the same course for preservation of potatoes, turnips, apples, &c., for farm purposes? All that is absolutely necessary to do, to effect this, is to make clean, slice them, and expose them to artificial heat, in a kiln, or some close room, until the water is evaporated.

For domestic uses, we pare apples previous to drying, but for feeding stock, nothing more need be done than slicing them up. So of potatoes or turnips.

The plan of drying potatoes, may be new to some, but it is a thing that is done in some places, to a considerable profit, for navy and domestic uses. Dried potato is getting to be quite a valuable article. Some enterprising Vermonters at Hinesburg, have started a potato drying establishment, and we understand, are doing a good business.

The Burlington, (Vt.) Free Press, in an article on this subject says:

"The application of this method to *potatoes* at the Hinesburg factory is substantially as follows: Being thoroughly cleansed, deprived of the skins and properly prepared, fresh currents of air are moved in contact with the potato pulp by machinery. The air rapidly takes up and carries off the moisture. The material is made to take the shape of tubes, (maccaroni fashion,) and when perfectly dry, is broken in a proper mill into the form of what is called "samp" or "hominy." Indeed it might be easily mistaken for that article made from our common yellow Indian corn. By the same process it has lost nothing but *water.* But by that loss it is made to occupy but *one-sixth* of its original bulk, and what before weighed *four pounds*, now weighs but *one pound.* In that condition it can be packed tight casks or in tin canisters, and be transported just as easily as so much dry rice. Years of trial have proved the unchanging character of the preparation.

Now then for the use. For *one* pound of it take *three* pounds of boiling water, or (to speak cookery book fashion) put *one tea-spoonful* of it into about *four tea-spoonfuls* of boiling hot water. In ten minutes the water is entirely absorbed, and the result is a *well cooked dish of mashed potato*, ready to be salted and buttered, or dealt with as a like dish made from fresh potatoes might be. The taste differs but slightly from that of fresh potato prepared in the same manner. We speak advisedly, for we have *tried.* Though we think any one would prefer to crush for himself a fresh mealy potato, if he were in a condition to choose, we have often, within the last five years, had to be content with using potatoes tasting not a whit better than the article we are speaking of—hardly as good even.

It is difficult to comprehend at once the great importance of such a preparation of the potato. To a very large portion of the human family the potato is an article of prime necessity for daily food. All who have been accustomed to use it, feel the deprivation severely if placed beyond its reach for any considerable time. Yet the bulkiness and perishable nature of the tuber in its natural condition, make its transportation for great distances by either land or sea an impossibility. For the want of it, the health of crews on long voyages, and of soldiers or other persons occupied away from where it can be procured, is often greatly injured. In some districts too, where it is relied upon as the chief article of food, great distress is caused by the failure of a crop, because the want can not be supplied except at an insupportable expense. Let the preparation of this "imperishable potato" be made common, and all these evils are substantially done away with. Government ships, whaling vessels, merchant's ships, will all make it a part of their stores. It will not occupy near the room of ship biscuit, and can be kept in *store* with less risk of spoiling. We are informed that European vessels already make it regularly a part of their stores, when going on voyages across the tropics, and that the discovery ships under charge of Dr. Kane are supplied with it. Travellers across the continent, and inhabitants of those parts of our own country where the vegetable can not be raised succesfully find the prepared article a most convenient one for use.

Few persons have any conception of the amount of nutritive food which can be raised in the form of potatoes, where the soil and climate are favorable. Though, pound for pound, less nutrious than wheat or rye, as a whole, no other crop can equal it. Careful experiments have shown that from the same amount of suitable ground, where there could be raised, on the average, 3,400 lbs. of wheat, or 2,200 lbs. of peas, there could be raised 38,000 lbs. potatoes; or, reducing them all to the *absolutely dry* state, for 3,036 lbs. of wheat, or 2,080 lbs. of peas, there would be 9,500 lbs. of potato—more than *three times* the amount of food produced in the shape of wheat, and more than *four times* that in the form of peas. We quote this statement from Chemical Technology of Dr. Knapp, of Giessen—a recent work of very great authority. The practical results of some experimentalists, on the feeding of cattle with these different articles, place the relative value of the potato at a higher mark still."

White Sheep Skins for Door Mats.

Take two long-wooled sheep skins, and make up a strong lather of soap; the sign of proper strength is when the lather feels slippery between the fingers. When the lather is cold wash the skins carefully in it, squeezing them between the hands so as to take all the dirt out of the wool. When this is accomplished, lift out the skins and wash them in cold water until all the soap is extracted. Have a vessel of clean cold water ready, to which some alum and salt (about half a pound) which have been dissolved in a small quantity of hot water, are added, and the skins left to steep all night. They are taken out in the morning and hung over a pole to dry. When all the alum water has dripped off they are spread out on a board to dry, and carefully stretched with the hand from time to time. Before they are thoroughly dry, a composition of two table spoonfuls of alum, and the same of saltpetre, are ground to powder, in a mortar or otherwise, and sprinkled carefully on the flesh side of each skin. They are then placed the one on top of the other, leaving the wool outside, and hung upon a rack of salts, in a barn, shed, or dry, airy place, for about three days, or until they are dry—they should be turned every day. After this they are taken down and the flesh scraped with a blunt knife, and each skin trimmed for a mat. The flesh side may then be rubbed over with pipe clay, beat with a switch, and will then be found supple, of a beautiful white color, and fit for a door mat for a mechanic of prince.—*Sci. Am.*