

### Bursting Power of Ice.

Edward Hagenbach experimented during the past severe winter upon the bursting force exerted in the expansion of water when freezing. Two interesting experiments were made with cast iron grenades. The outer diameter was 5.9 inches, the inner diameter 5.94 inches. The shells were filled with water, closed with a screwed iron plug, and exposed to the cold. Both shells were broken, and a curved thread of ice was projected from the upper surface. One of the plugs was evidently thrown out with great violence, and to such a distance that it could not be found. The curvature in that case was upward.

Lardner says—This sudden expansion of water in freezing, is a phenomenon distinct from the expansion, which takes place as the temperature is lowered from 78°-8 to 32°. The latter expansion is gradual and regular, and is accompanied by a gradual and regular decrease of temperature; but on the other hand, the expansion which takes place when water passes from the state of liquid to the state of ice is sudden and even instantaneous, and is accompanied by no change of temperature, the solid ice having the temperature of 32°, and the liquid of which it is formed having had the same temperature just before congelation.

The most striking instance of sudden contraction in cooling is exhibited in the case of mercury. This was first observed in the case of a thermometer, which when exposed to a temperature of about 40° below zero, was observed to fall suddenly through a considerable range of the scale, and in some cases the mercury was precipitated into the bulb. It was observed that the thermometer exposed to a temperature lower than -40° the mercury gradually falls until it arrives at about 38°, and that then a great and sudden contraction takes place at the moment the metal is solidified. This contraction, however, must not be understood as indicating any real fall of temperature, as is the case with all the previous and regular contractions which take place before solidification of the metal.

This peculiar feature in mercury at low temperature accounts in all probability for the astounding reports we often see in the newspapers of thermometers registering 40°, 48° and even 50° below zero; whereas, the temperature in reality may not have fallen much below or not lower than 38° below, the point at which the mercury becomes irregular.

### Incidents of the Southern Floods.

Many incidents, of which some are pathetic, others thrilling, a few humorous and all interesting, may be found in the newspaper accounts of the Mississippi floods. Recently the back water became so threatening on the Trask plantation, near Helena, Ark., that William Ware and Wesley Hendricks started for a more secure abiding place. They were paddling leisurely along in an old dugout, when out of the water and into the boat sprung a gray wolf. The beast was a big fellow, and as the glaring green of his betokened, was ravenous for food. The occupants of the boat were taken aback so completely that they did not know which way to turn, but the wolf quickly made them act by springing at the throat of Hendricks. The latter's paddle fortunately came down upon the wolf's head, and it was well that the shock stunned the animal, which was thrown quivering into the water. But the blow overturned the boat also, and an exciting struggle to right the dugout before the wolf could recover, followed. This the men succeeded in doing, and, in the language of the Irish bull maker, before the wolf recovered his senses he lost them altogether. Having removed the slain, which was five feet from tip to tip, the men paddled without further adventure to Helena.

An Indian, who lives some fifty miles below Memphis, is mentioned by many people of the neighborhood as the hero of the occasion. One of his good acts was the rescue of a widow and her two little children near Commerce, Miss. The widow's house was a short way from a levee, which broke and let in a roaring flood. The occupants of the house succeeded in climbing to the roof, but they were not safe there, as the spectators on a wharf-boat not far off knew, for the current was strong enough to sweep the dwelling away. Several persons volunteered to go to what seemed almost certain death in an effort to rescue the family. One young man put out in a skiff, but the skiff was capsized and the bold adventurer drowned. Shortly afterwards the Indian came down the river in his boat. He saw the situation, and directing the skiff into the flood, and raising one oar to steer he managed to throw the boat against the house. The woman and children got in. As he pushed off the boat was whirled round and round in an eddy, but drifted into calm water and finally reached a place of safety.

As a rescuing party from Helena were rowing across the neighboring bottom lands, some Wednesday, they saw a large box moored to branches of a tree. When the boat had approached within earshot the gray wool of an old darkey popped into view. The rescuers said: "What are ye doin' heah, ole boss?" "I'se ole Noah, an' dis am de ark," was the reply: "the rain hab been a rallin' fur fo'ty days an' fo'ty nights, but de Lo'd sabel ole Noah." The rescuers thought that the darkey was joking. When they took him into the boat, however, they soon learned that the poor fellow was daft. Fear and exposure had over-turned a mind already weakened by age.

Little Lulu Stone died at New Madrid a few days ago. The streets of the town were submerged, but as the cemetery on a knoll was high and dry, it was decided to bury the child there. It was impossible to use carriages and therefore the friends of the family came to the house of mourning in boats. The funeral procession is described as the saddest sight ever witnessed in the town. The first skiff contained the casket, with Senator Morrison, the grandfather and an oarsman; in the second boat was the stricken mother and her other children, with a stout oarsman, and then came a long line of boats, loaded with friends and relatives. The procession moved slowly down Main street to Water street and thence to the knoll, where the little one was left.

### Agricultural Stations.

The readers of agricultural literature, as it comes to us from the other side of the water, hear much concerning "agricultural stations" as they exist in France, Germany and elsewhere. The character of these stations, and the nature of the work performed in connection with them, are not clearly understood. The first station established in Germany was in 1851, and is still in existence, and one of the best managed in the empire. Twelve more were established from 1851 to 1861, and since the latter date 26 have been founded, making 38 in all. In France the first station was founded in 1858. It was amalgamated with a school of forestry, and is in connection with a large university. In 1862 the first was founded in Belgium, and in 1872 also the first in Italy. There are now nine stations in the latter country. In Switzerland six have been established, and there they have stations devoted to milk, cheese and other milk products. The chemistry of these, the most important products of the district, is carefully studied. There are two in Sweden, and one has been founded in Holland.

Now, what are the objects of an agricultural station? It is rather difficult to arrange them,

because there are stations which have become limited to single objects. A station in a forest district devotes itself especially to the study of forestry. In the south of France and in Italy others are devoted to the treatment and manufacture of products derived from the vine, tobacco, silk etc. There are some ten or twelve stations which are entirely absorbed in the study of such products and of olives and olive-oil. The objects of an agricultural station may, however, be arranged as follows: (1) objects which are of a definite scientific character—experiments on vegetables, on earth and soil, and on treatment of products; (2) the development and feeding of animals, researches upon newly-discovered materials, the analysis of soils, of food and of waste products. One of the most important, because most practical, of the objects which the station has in view is (3) the control of the artificial manure manufacture. At one of the agricultural stations in Germany in 1867 the amount of manure analyzed for manufacturers in the neighborhood was in value \$675,000. That was the value of manure sold under the guarantee of the station. The manufacturer makes a contract with a station, by which the professors are allowed at any time to come to the warehouses and take any samples they like, to seal them up in the presence of witnesses, and to analyze them, and then, if found correct, they are sold under the guarantee of the station. The results are published by the authorities, so that the farmer has a public guarantee instead of a private one. The field experiments are not confined to the station alone, but the station is in correspondence with others all over the country, and similar experiments are carried out in many parts of the empire of Germany at the present time.

The fourth object of the station is the teaching department. In many cases the professors take a tour in the district and give lectures and hold conferences, and in this way they spread a knowledge of the facts gathered in the preceding year by the work of the station. The training of agricultural chemists is also practised, and they issue reports and publications which make known the progress made in scientific agriculture.

The fifth object of the station is meteorological observations. The weather, rain, temperature and wind are recorded, and conclusions are arrived at for the guidance of agriculture.

Agricultural stations in a modified form, if established in this country, would do a large amount of good. After twelve years spent in conducting farm experiments in a practical way, we have reached some conclusions regarding the best form of aiding agriculture by schools of instruction. Experiment stations are now being introduced into this country; the States of Connecticut, Massachusetts, New York and New Jersey each have one, and the good work should not stop until there is one in every State.

### Atmospheric Fertility.

Is there any, and if any, how much, fertile matter is there in the atmosphere, and how made available to vegetation? First, then, we will assert or assume that all the elements necessary to the production of all vegetation is found in the atmosphere. They are, to be sure, exceedingly minute, but still they are there. How often we have seen after a heavy thunder shower very fine particles of sulphur around the edges of little pools of water by the roadside! and where is the farmer who is willing to say there is no fertile matter in sulphur? Let us, then, at once admit there is fertile matter in the atmosphere, and proceed to securing it for our use.