RELIABLE RECIPES.

BOILED HAM WITH MADEIRA SAUCE.—Select a ham of about twenty pounds, not too large nor too lean; steep in cold water all night, and boil slowly for three hours; drain on a dish, take off the rind, sprinkle with granulated sugar, put in the oven with two glasses of Madeira wine, and glaze to a nice color, basting occasionally with the wine; trim the shank bone, ornament it with a fancifully cut paper ruffle, place on a dish; pour Madeira sauce round the ham, and serve the more sauce in a sauce-bowl. Madeira sauce—Put a quart of Spanish sauce in a saucepan with a pinch of red pepper, a ladleful of tomato sauce, and a gill of Madeira wine; stir steadily, and quickly for ten minutes; then press through a napkin.—[German Culinary Journal.

MUTTON BROTH.—The most famous broths of Scotland are those made of mutton, by the slow homely method of the cottage. The scrag end of neck of a well fed, plump sheep is chosen. The flesh is carefully cut off the bones and all fat removed. The bones are covered with about a pint of water and the lean meat is put in a large soup pot, with a small turnip, an onion, half a carrot, a stalk of celery, all minced fine with a tablespoonful of cup of barley. Pour about three pints of cold water over these ingredients, let the mixture come slowly to the boiling point and simmer at the back of the stove for two hours. At the end of this time, strain the water off the bones and add it to the soup. Add also a tablespoonful of flour, mixed with a tablespoonful of butter. Wet this with a little of the hot soup to prevent any possible lumping, and then stir it in. Add two or three sprigs of parsley, minced fine, and let the soup simmer half an hour longer. This is a thick broth in which meat and vegetables are served, and for this reason it is called in some parts of Scotland "hotch potch."

ROAST BEEF.—The ribs and sirloin are best for roasting, wipe the roast with a damp cloth; a rack with slats which fits in the dripping pan, can be procured at any hardware store, and meat is much nicer when laid on a rack than on the bottom of the pan; have the oven very hot when the roast is put in; in fifteen minutes pour a cupful of hot water into the pan, add a small spoonful of salt, baste well every fifteen minutes, keep the oven hot the first half hour, then lessen the heat, and let the meat cook slowly, turning it over when brown on one side; allow ten minutes for every pound of meat if you like it rare done, longer if well done; when done remove to a platter and set in a warming oven. Pour off all the grease you can, leaving all the brown substance for the gravy, add a little hot water; prepare one or two tablespoonfuls of flour wet with cold water, made smooth, set the dripping pan on top the stove when the gravy begins to boil, stir in the flour, not too much, or the gravy will get too thick; strain through a gravy strainer and it is ready to serve.

Hammer Snakes.

A letter from Doctor E. E. Brown says he and party have made a most wonderful discovery up in King's River canyon. In crossing a small creek they came to a beautiful canyon or basin of about three acres of level meadows, surrounded by perpendicular walls some 300 feet high. A fine stream of cold, clear water was flowing into the little meadow, but there seemed to be no outlet. There was no way of getting down into the valley, but quail and rabbits seemed to inhabit the little basin.

A pair of opera glasses brought to sight a number of snakes basking in the sun on the flat rock. They were one to three feet in length and had heads shaped exactly like a blacksmith's hammer. While the party were examining with the glass the maneuvers of a number of the snakes crawling through the grass a very large one was noticed making a sneak on a cotton-tail rabbit. When within about two feet of the rabbit the snake stiffened the front half of its body and bent into a right angle. Then his snakeship straightened out suddenly, bringing the rabbit a swinging blow on the side of its head which laid the bunny out completely.

Another snake was observed to creep into a quail sitting on a scrubby tree. This snake twisted about four inches of its tail along a limb of the tree and used all the rest of its body for a hammer and handle to whack the quail on the head such a stinging blow that it died without a flutter of its wings. The snake seemed to have the wonderful power of lengthening its body out nearly double its normal length and small as a whalebone whip, the heavier part being next to the part wrapped around the tree.

After killing the quail and rabbit the snake hammered the body into a pulp, bones and all, with its head, and then swallowed the whole business. The swallowing showed that the hammer part of the head could be laid back out of the way while the swallowing was done.

Every effort possible with the appliances they had with them was made to get one of the snakes, but they failed.—[Selma (Cal.) Irrigator.

How Water Freezes.

A scientific paper describes how the process of freezing is carried on in Nature's laboratory. By means of two thermometers it is first ascertained that the temperature of the water at the surface and at the bottom is respectively forty-eight and forty-five degrees. A cold wind sweeps over the surface of the water, so that the temperature is speedily reduced to forty-four degrees. By this reduction in temperature it contracts and becomes specifically heavier, sinking and displacing the warmer water below, which rises to the surface, becomes cooled below forty-four degrees, and immediately falls, displacing the warmer water at the bottom, which, in turn, rises, gets cooled and falls, its place being again supplied by lighter and warmer water. And so the cooling and sinking processes go on, the upper thermometer always indicating the higher temperature, when suddenly the magic point thirty-nine degrees is reached, when all movement at once ceases. The upper layer of water is still exposed to the cooling influence of the wind, and speedily falls in temperature, but still retains its place. The upper thermometer now shows that the water which surrounds it is being rapidly reduced in temperature, but the lower one can remain stationary at 39 degrees. At this temperature, water is heavier than at any other, and there, like a stone, it remains at the bottom, and as it is fully protected from outward influences by the mass of superincumbent water, its temperature remains very much at the same point. The water on the top, however, having nothing to protect it, gets cooler and lighter every moment. Down the thermometer goes to thirty-seven, thirty-five and thirty-two degrees, and then a slight breeze ripples the surface, and the next moment a thin sheet of ice spreads itself over all. The ice, however, is cooler and lighter than the water, so that it floats on the surface, and acts as a blanket, protecting the comparatively warm and heavy water below from being cooled. So that even during the severest winter only a comparatively thin superficial layer of ice is usually formed and the greater part of the water remains unfrozen at the bottom.—[Louisville Courier-Journal.

NAMES OF STATES.

Origin and Significance of the Various Appellations.

Alaska—"The Great Land."

Alabama—"Here We Rest" (Muscogee).

Arkansas—"Bow (Indians) on the Smoke Water."

Arizona—"Sand Hills."

California—"Hot Furnace."

Colorado—"Ruddy" (River).

Connecticut—"Long River."

Dakota—"Allied" (Indian tribes).

Delaware—In honor of Thomas West, Lord De La Warre, governor of Virginia, 1610. The estate La Warre (Warwick) was in Gloucestershire, England.

District of Columbia—Feminine of Columbus (dove).

Florida—"Flowery." Spanish for Easter Sunday, the day that Ponce de Leon discovered the land.

Georgia—Feminine of George (farmer), in honor of George II., who established a colony there, 1733.

Illinois—"Tribe of men."

Indiana—"Indian land," from Indus, Sanscrit, Sindhu, "river."

Iowa—"Drowsy ones" (Indian tribe).

Kansas—"Smoky water."

Kentucky—"At the head of the river."

Louisiana—In honor of Louis XIV. of France, Ludovicus, "bold warrior."

Maine—The mainland, as distinguished from neighboring insular parts.

Maryland—In honor of Henrietta Maria (bitter), daughter of Henry IV. of France and queen of Charles I. of England.

Massachusetts—"The Place of the Great Hills."

Michigan—"A Weir of Fish"—the lake resembling a fish trap.

Minnesota—"Muddy Water," Indian name of St. Peter's river.

Mississippi—"The Father of Waters."

Missouri—"Great Muddy" (river).

Montana—"Hilly Country"—a mountain.

Nebraska—"Shallow Water" (the Platte river).

Nevada—"Saw-toothed" (mountain range, Sierra Nevada).

New Hampshire—From Hampshire (Hants), England, by John Mason, governor of Plymouth, in Hampshire. Saxon Chronicle, 755. Las Hamtaureire.

New Jersey—From the Isle of Jersey. Cæarea (Cæsar, Latin, "Hairy"), one of the channel islands, defended by Sir George Cartaret against the Long Parliament.

New Mexico—From the Aztec god, "Mexitli," god of war.

New York—From the duke of York (afterward James II. of England), Eboracum, Cær Ebroc, or Ebroc Castle in British.

North Carolina—From Carolus (Little Darling), Charles IX. of France in whose reign the Huguenots planted the first colony.

Ohio—"Beautiful" (river).

Oklahoma—"[illegible] People" (Choctaw).

Oregon—From Oregano, Spanish name for wild sage, "artemisia," which grows on the shores of the Columbia river.

Pennsylvania—"Penn's woods," in honor of William Penn.

Rhode Island—From Isle of Rhodes (Roses) in the Mediterranean.

South Carolina—Separated from North Carolina in 1789.

Tennessee—River of the great bend.

Texas—"Friendly" (Indian tribe).

Utah—"Dwellers in the Mountains" (tribe of Indians). Proposed name Deseret, "honey bee."

Vermont—"Green Mountain."

Virginia—From Queen Elizabeth, in honor of her unmarried state.

Washington—In honor of George Washington, from Wessyngton, Durham, England.

West Virginia—Separated from Virginia, 1863.

Wisconsin—"Wild Rushing Channel" (river).

Wyoming—"Broad Plains."

An aerolite that is said to weigh 40,000 pounds fell near Jiminez, in Mexico, some months ago.

POPULAR SCIENCE NOTES.

THE PERSISTENT POWER OF WATER.—"A Southern Engineer" contributes a valuable article on "Geology and the Mississippi Problem" to the current number of the *Engineering Magazine*. In it he says: "We find in water the only tireless agent that works in the modification of continents; and, instead of being the great renovator of the land, as it is popularly conceived, it is the great destroyer. The destruction of ancient Rome has been attributed to time. But it was due simply to the moisture of the atmosphere working through chemical agencies. It was water, invisible but penetrating even the very stones of the wonderful city, that caused her to crumble into ruins, and gave to modern Rome a grade greatly elevated above her ancient grade. But it works not alone in the cities and towns. There is not a hill on earth that has not been shorn of something of its altitude by this subtle force, and there is not a mountain on earth, if not fitfully renewed by volcanic action, that has not been compelled to lower its peak before this universal leveler of the exalted. It may be a dreadful thought, indeed, but we do not know absolutely that we are dependent on the earthquake and the volcano for keeping our continental habitat above the level of the ocean; for water not only destroys, but it has the persistency and force to carry off to its burial place in the sea all that it has caused to perish. It may take a long time at its task; but working either in its gaseous, its liquid, or its solid form, it seems to be the most persistent thing on earth, never perishing, and, however divided and invisible at times, always ready to unite its forces for a supreme effort at the degradation of a continedt.

HOW THE OCEAN BECAME SALT.—Prof. Edward Hill read a paper before the Victoria Institute, London, recently, on "How the Waters of the Ocean Became Salt." From an inquiry into the character and affinities of the organic forms of past geological ages, the conclusion was justified that the waters of the ocean must have been salt from very early geological times, but it by no means followed that they were as fully saline as those of the present day. There were two ways by which they might account for the salinity of the ocean waters from very early periods of geological time. First, by supposing that the primeval waters were saturated with acid gases which were held in suspension in the vapor surrounding the incandescent globe; or, secondly, that the salinity resulted from a process resembling that by which salt lakes of the present day had been formed. He thought that they must concur with Dr. Sterry Hunt that from some cause or other chlorine largely abounded in the waters of the primeval ocean, as by far the greater proportion of the salts were chlorides, and chlorine was but very slightly represented in river waters at the present day. From the examples of closed lakes they could determine the process of salinification with the utmost certainty. Throughout greater or shorter periods these lakes had been receiving the waters of rivers bringing down both mechanically suspended sediments and chemically dissolved salts, silicates, and carbonates. The sediments were precipitated over the bottoms of the lakes, and the water being carried off into the atmosphere in the form of vapor as far as it entered, left behind the dissolved ingredients. These necessarily augmented in quantity, and ultimately the waters of the lakes became saturated with salts and carbonates, which were then deposited. The ocean was a closed lake of enormous magnitude, and they were thus brought to the conclusion that the saltness of the sea might have originated in very much the same way as had that of the Dead Sea, Lake Oroomiah, or the Great Salt Lake of Utah, and many others which possessed in common the characteristic of having no outlet. When the great envelope of vapor which surrounded the incandescent globe began to condense upon its cooling surface, the resulting waters, though containing, as Dr. Sterry Hunt supposed, acid gases, were destitute of saline ingredients. The process of salinification began with the first streams which entered the seas from the bordering uplands, and this process carried on throughout the long ages preceding the silurian period, brought the waters to a condition suited to sustain the life of forms of inhabitants representative of those which inhabited the ocean at the present day. These long ages might be supposed to include, not only the archæan and azoic periods, but that during which the first crust was in course of fomentation over the incandescent globe.

THE FORMATION OF COAL.—Nature is still making coal, though, unfortunately, not at a rate anything like fast enough to make up for the consumption of this product. The processes may be watched from beginning to end. For this purpose one must first go to a peat bed, which is simply an accumulation of the remains of plants that grew and decayed on the spot where they are now found. When the upper layer of this material is removed one finds peat with 52 to 66 per cent of carbon, and the deeper one goes the better in quality it gets. It may be cut in blocks with sharp spades, the water may be pressed from the blocks, and they may be stacked up, covered and dried and used for fuel. There is a certain kind of moss called "sphagnum," which in large part makes up the peat-producing vegetation. Its roots die out annually, but from the living top new roots are sent out each year. The workmen who dig peat understand that if this surface is destroyed the growth of the bed must stop; so commonly they remove the sod carefully, replacing it after they have taken out a stratum of peat. There is little doubt that if these beds of peat could be undisturbed and covered over through many ages they would take on all the characteristics of mineral coal. The substance of coal has been so compressed that the forms of the plants composing it cannot usually be seen. But when a piece of it is made so thin that it will transmit light, and is then subjected to a powerful microscope, its vegetable structure may readily be distinguished. Immediately under every separate seem of coal there is a stratum of what is known as fireclay. This stratum is always present and contains in great abundance the fossil impressions of roots and stems and twigs, showing that it was once the soil from which vegetation grew luxuriantly. It is common also to find fossil tree stems, lying mashed flat between the layers of black slate which form the roofs of coal mines as well as the impressions of the leaves, nuts and seeds which fell from these trees while they were living. In some beds of cannel coal whole trees have been found with roots, branches, leaves and seeds complete, and all converted into the same quality of coal as that by which they were surrounded. Geologists are of the opinion that bituminous and anthracite coals were formed during the same period and under like conditions. Originally they were all bituminous, but during the violent contortions and upheavals of the earth's crust at the close of the carboniferous age the bituminous coals involved in that disturbance were changed by heat and pressure and the consequent expulsion of volatile matter from bituminous to anthracite. Cannel coal is a variety of bituminous coal which burns with great freedom, the flame of it affording considerable light. It was called "candle coal" by the English people who first used it, as it often served as a substitute for candles. The name became corrupted to "cannel" and has since remained. It is more compact than ordinary bituminous coal and it can be wrought in a lathe and polished. A certain variety of it found in Yorkshire, England, is manufactured into a kind of jewelry known as "jet."

WORK OF FORECASTING.

How It Is Done in the United States Weather Office.

The work of forecasting is, I understand from foreigners who have visited our Washington weather bureau, more thoroughly and completely done here than in any other country. In the first place, American ingenuity has brought the principle of simultaneity, if I may use the term, in every detail of the work to the greatest perfection; but what is far more important in the matter of forecasts, no other country presents so vast a territory from ocean to ocean at which simultaneous observations can be taken at so many stations all under the control of one chief officer.

Of course, numerous complaints have been heard throughout the country of the unreliability of the weather forecasts, and yet a careful record shows that during the past ten months the weather has been accurately forecasted on an average of eighty-eight times out of 100. Naturally, however, the twelve times when the weather has varied from the forecasts they have attracted a great deal more attention than the eighty-eight times when the forecast has been fulfilled to the letter.

In the annual report of the Secretary of Agriculture for 1891, the record of the weather at principal points throughout the United States is given for every day in the year, by means of a diagram. Such a record for a series of years will, taken in conjunction with the condition of the various important crops, and of the plant diseases or insect pests by which they have been affected, undoubtedly form a most interesting study, as they indicate more and more surely to agriculturists the co-relation between meteorological conditions and the several vicissitudes by which our various agricultural products are affected.

In closing this brief sketch of one of the most interesting features of the meteorological works in the United States, it may be interesting to describe briefly one or two of the methods adopted for keeping an accurate record of meteorological conditions. One of these is the recording of sunshine automatically. An instrument has been devised which follows the course of the sun in such a manner as to reflect its rays upon a chemically prepared surface which gradually changes color whenever the sunshine strikes. Naturally, if the sun be completely overcast there is no change of color, while, if partially cloudy, the surface is blurred or the color changes fitfully, according as the sun shines or is obscured. The course of the sun from sunrise to sundown and the periods when the sun shines or is cloudy are thus accurately represented upon the surface of the machine.

Another ingenious device records automatically the force of the rainfall at different periods of the day, in addition to giving the total precipitation. The principle by which this is accomplished is very simple, the rain gauge containing a pan which tips over whenever it is full, depositing the contents in the rain gauge proper. The tilting of the pan is automatically recorded, and the quantity of what it contains being known, and the length of time taken for it to fill being shown, the rate of precipitation at any time of the day or night can be calculated very closely.

The total cost of running the weather service of the United States is a little under $900,000.

In 1418 a battle was fought near Milan in Italy, and so perfect was the armor of both armies that, though the conflict raged from 9 a. m. to 4 p. m., no one on either side was killed or wounded, though one man broke his collar-bone by falling off his horse.

NOTES AND COMMENTS.

THE discovery was made the other day that the only authentic copy of the coat-of-arms of the State of Pennsylvania had disappeared from the walls of Independence Hall. An investigation was made, and then it came out, although no one had noticed the omission, that the copy had been missing for several years from among the shields of the various States that may be seen hanging side by side. Capt. Hanson, a member of the Pennsylvania Board of World's Fair Managers, who wanted to have a duplicate made for use at Chicago, can explain the disappearance only in this way: "In 1874 or thereabouts the Legislature appropriated $300 for the express purpose of correcting certain defects which were said to exist in the coat-of-arms used on official seals. To accomplish this work a committee, consisting of the Governor, Attorney-General, and Secretary of State, was appointed and empowered to act. So far as I know or can discover this committee has never reported. It is possible that the Committee appointed by the Legislature removed it in 1875 to have copies made, and that it now lies hidden in some painter's shop or in some one's attic or cellar."

ACCORDING to a Belgian gentleman now in this country, the territory of Moresnet, lying between Belgium and Germany, is the smallest Government in the world. It has a population of nearly 2,000. The people are devoted entirely to the tin mining industry. There is no military service, and election days are things they never hear of. There is a Senate of ten members who are appointed by the Mayor. He gets a place by being appointed by two delegates, one from Germany and one from Belgium. The police force consists of one man. He is paid out of the annual revenue, which is about 1,200 francs; this also pays for the maintenance of the roads and the schools. The territory was made independent in 1815, to settle a dispute. Germany and Belgium both wanted it on account of its tin mines, but neither of them got it. The territory contains a trifle over two square miles of ground.

THERE are twenty well built towns in Kansas without a single inhabitant to waken the echoes of their deserted streets. Saratoga had a $30,000 opera house, a large brick hotel, a $20,000 school house, yet there is nobody even to claim a place to sleep. At Fargo a $20,000 school house stands on the side of the hill, a monument to the bond-voting craze. A herder and his family constitute the sole population of what was once an incorporated city. This is a sad commentary on unhealthy booms. Those Kansas towns, like Wichita, advertised themselves as phenomenal boom cities. For awhile everything was lovely, but at last they took hold of the boom towns and killed them.

THE rural prophets say that the yield of maple syrup will be unusually good this spring. According to one of them: "It is well known to those engaged in the business of sugar making that a good season always follows a severe winter. The maple-sap then furnishes a larger percentage of sugar. Not only that, but the trees yield a larger quantity of sap then than they do after a winter of frequent thaws. The snow in the interior counties is very deep, and unless remarkable warm weather should come it will be on the ground until well along in April. Sugar-making will not commence until late in the season, but when we get at it we shall make more of the toothsome sweet than we have made before in years."

THE experience of the man who recently sold his interest in a large manufacturing concern near Boston for over a million of dollars, a large part if not the whole of which he invested in Western lands and Nova Scotia gold mines, and who a few days ago found himself so much impoverished by his transactions that he was unable to meet a note for $702, and had to go to jail, should be a warning to other men who are not satisfied with the constant and legitimate profits of a good business, but who wish to wake up Goulds or Vanderbilts after the sleep of a single night.

THE cold has been excessive in St. Petersburg, and for weeks wood fires have been burned in the squares and streets of the city in an effort to make necessary outdoor business endurable. The streets have, however, been practically deserted. The double windows in the stores and houses are mostly iced over, and frozen up. From north and central Russia a temperature of thirty to thirty-nine degrees below zero is reported, which is twenty-seven degrees below the average. In Siberia it has fallen to forty-five degrees below zero.

THE Refuse Disposal Company, London, has lately published a pamphlet on the question as to the practical means by which the dust refuse of towns can be utilized for electric lighting purposes. The company claim that 20,000 tons of house dust, if treated as they suggest, and burnt in suitable boilers, might be made to produce as much as 5,600,000 indicated horse power working for 4,734 hours, for electric lighting.

PRESIDENTS seem to be born Nimrods. Harrison has relieved the tedium of official duties by knocking down sandsnipe and canvasbacks, while Cleveland has slaughtered ducks when the temperature necessitated a stove in the boat to keep the huntsmen warm. President Dias, of Mexico, has the same propensity for cannonading, and just the other day bowled over a bear, a wildcat and other beasts of prey that he happened to encounter.

HERR HABNICHT of Gotha has satisfied himself that there is a distinct connection between the number of icebergs carried into the Gulf Stream and the character of the subsequent weather experienced in Europe.