porary interruption of the vigorous functions of the tree, induced by defoliation, for instance, or by extreme climatic conditions, such as sudden changes of temperature, cold days followed by sudden warm weather, or droughts followed by rain.

"The absolute breadth of the annual ring depends on the length of the period of vegetation; also, the deeper and richer the soil, and the greater the influence of light upon the tree, the more of formative material can be produced by the tree, and the broader will be the annual ring.

"In coniferous wood the width of the autumn wood, with cells of thickened walls, is almost the same in width as in narrow annual rings, while the more porous spring wood changes in width with the general width of the annual ring. Consequently, on account of the more frequent occurrence of heavy autumn wood in a given volume of narrow-ringed wood than in that of wider-ringed wood, such wood is heavier, and, as a rule, narrow-ringed conifer wood is the better. And, with certain limitations, the opposite is true for broad-leaved trees which have their vessels chiefly in the spring wood, while those with the vessels distributed through the ring are less influenced in their weight and quality by the width of the annual ring. Slow-grown conifers and quickly-grown hard woods furnish, therefore, as a rule, the best quality.

"Besides the temperature of the atmosphere and the moisture conditions of the soil, it is the amount of light and consequent development of foliage which is perhaps the most powerful factor in wood-formations, other considerations not being unfavorable. In the proper use of this factor mainly has the forester the means of regulating the slower or quicker development, and consequently the quality of his crop."

Temperance-Instruction in the United States.

In the autumn of 1887 the Bureau of Education at Washington, desirous of obtaining a knowledge of the present status of temperance-instruction in the United States, addressed the following inquiry to the State superintendents: "Is the study of physiology and hygiene with special reference to the effects of stimulants and narcotics required by law, and in what grades?" From the replies it appears that instruction in physiology and hygiene with special reference to the effects of stimulants and narcotics is made compulsory by statute, in some part of their school-life, on all pupils in twenty-five out of the thirty-eight States; viz., Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, Pennsylvania, Delaware, Maryland, West Virginia, South Carolina, Florida, Alabama, Michigan, Wisconsin, Minnesota, Iowa, Nebraska, Kansas, Colorado, Nevada, Oregon, and California. The same compulsion exists in all the Territories and in the District of Columbia by United States statute. In Missouri the instruction under consideration is compulsory upon the demand of patrons of the public schools, and forbidden otherwise.

HEALTH MATTERS.

Seasickness.

NEW remedies for the prevention of seasickness continue to be brought forward. At a recent meeting of the Academy of Medicine of Paris, M. Bonnet presented the claims of antipyrine as a preventive. It was suggested, that as delegates from the academy to the meeting of the French Association for the Advancement of Science, to be held at Ivan, Algeria, were soon to sail for that place, an excellent opportunity to test the drug would thus be offered. M. Rollet, who went with the delegates, and who was exempt from seasickness, made a careful study of the subject, and contributes the results to the *Bulletin Médical*. The vessel sailed at four o'clock, and at six only four of the passengers remained at the table to finish dinner, although sixty had taken antipyrine, some of whom had begun the treatment three days before. He reports that antipyrine has no effect on seasickness.

In a previous number of *Science* we referred to another means to be adopted for the prevention of seasickness: to rub vigorously with the fingers the prominences behind the ears. An opportunity recently occurred to partially test this method. A party went for bluefish thirty miles off Sandy Hook. Two of them, at the first approach of the sickness, practised the rubbing and escaped; a third ridiculed it until thoroughly sick, and then gave it a trial, but without result; the others in the party were not sick, and of course had no occasion for the use of any preventive.

Still another remedy is oxalate of cerium. In a letter to the *New York Medical Record*, Dr. M. M. Waldron of Hampton, Va., writes, "The value of oxalate of cerium in seasickness has been known to me for years. Its application to this condition suggested itself from its supposed physiological action. . . . After repeated experiments on myself and others, I am satisfied that it will relieve more cases of seasickness than any remedy yet suggested. I have tested its efficacy both in coast and transatlantic voyages. Last summer I crossed the ocean with a party of friends. One of the number proved perverse, and would not take the remedy I offered. As the passage was somewhat rough, she was rewarded by being confined to her state-room during nearly the entire voyage. Another member of the party, hitherto a hopeless victim of seasickness, who had, in crossing the ocean fourteen times, made use of every known remedy without benefit, obtained decided relief from the oxalate of cerium. Two others, not 'good sailors,' took it regularly, from the time of going on board until the motion of the steamer ceased to be unpleasantly suggestive, and were kept from any serious symptoms, omitting, in all the passage, but one meal on a stormy night. The best results were obtained by fifteen-grain doses given every two hours. It can easily be taken dry on the tongue, and I belive this mode of administration is most effective."

Writing on this same subject to the same journal, Dr. W. H. Gardner, U.S.A., says, "I have been a traveller by land and water ever since I was able to toddle around, and have met many cases of seasickness, — in stages, ambulances, cars, boats, and ships, — and I can confidently assert that oxalate of cerium, administered in ten, fifteen, or twenty grain doses every two or three hours, in about one tablespoonful of water, will cure more cases than champagne, bromide of potassium, chloral, or any thing else I ever tried. I do not think I exaggerate when I state that it will cure, or materially relieve, seventy-five per cent of all cases that come up for treatment. . . . I have used the oxalate in hundreds of cases of sick-headache, and almost always with marked success; but it must be used in at least ten-grain doses for adults, to do any good. I have also found it very useful in relieving the cough of phthisis in these doses. I do not pretend to know its *modus operandi*, but believe it acts as a sedative to the pneumogastric and sympathetic system of nerves, and I have never seen any unpleasant effects from its administration in twenty-grain doses every three hours."

WARM AIR AT NIGHT. — Dr. Shepherd expresses in the *Lancet* the belief that consumption is due to a constant irritation of the air-passages, and that cold air breathed at night is one of the greatest irritants. Those who live most of the time in the open air are the least likely to suffer from phthisis, because their lungs are so accustomed to cold air as not to be irritated by it at night.

DISPOSAL OF GARBAGE IN BUFFALO. — A company has been incorporated at Buffalo for the purpose of manufacturing grease and fertilizers from the city refuse. The Vienna system has been adopted, and from twenty-five to fifty men besides teamsters will be employed. An ordinance requiring the separation of ashes and swill from garbage will be enforced, and the company will provide garbage-boxes, and collect, clean, and return them. The garbage will be removed in air-tight boxes and vehicles, and the factory is not expected to be in any way a nuisance.

CREMATION OF GARBAGE. — The Minneapolis Board of Health, after a study of the methods of garbage-disposal in Nashville, Chicago, and Milwaukee, has decided to construct a crematory for the burning of the garbage of that city. The furnace is expected to be smokeless, and to consume all solids and liquids. It is of a reverberatory construction, and receives the garbage on a grate some distance above an iron bottom plate that is intended to intercept and consume any falling material. The iron smoke-stack is to be one hundred feet high. The furnace is represented as no more of a nuisance on any street than a well-regulated livery-stable would be. In default of available municipal funds, the board of health has raised the necessary money among the citizens, and secured a remission of royalty upon the patent furnace. In connection with

the subject of garbage-cremation we note that the crematory at Milwaukee has been complained of as a nuisance, the odors from it being a cause of great annoyance.

COLOR-AUDITION. — Mr. J. A. Maloney, otacoustician, of Washington, D.C., communicates to the *New York Medical Journal* the results of some experiments which he has recently made with reference to the conductivity of sound-vibration by the bones of the skull. For this purpose the bone was clamped in a standard which was rigidly affixed to a base of iron weighing sixteen pounds. At one end of the bone was placed in light contact a button suspended upon a rod having a curved projection at its top to allow the button to swing clear of its support. The other end of the bone was gently struck with a small hard-rubber mallet, and the space through which the button was projected noted. The results upon different bones were as follows: frontal, very hard blow, slight disturbance of ball, without projection; occipital, the same; parietal, the same; ethmoid, less than the former; sphenoid, a very slight tap on one great wing gave great projection from the other wing, and scratching with or rolling of the mallet over the surface of one wing caused the button impinging upon the other to be agitated. The sphenoid was then made to communicate its vibrations to the diaphragm of a microphone in electric circuit with a telephone-receiver. In this test a very fine thread of silk, held at one end, was drawn lightly over the free wing, and the same could be heard distinctly in the receiving-telephone. Breathing gently through a tube against the wing would be heard in the receiver. The temporal bone was then substituted for the sphenoid; and the only point which gave results similar to that of the sphenoid was when the two tests were made upon that portion of the petrous or pyramidal process known as the jugular fossa. Mr. Maloney asks, May not color-audition, in view of the readiness with which the sphenoid bone takes up and delivers vibrations, be due to mechanical stimulation of the optic nerve by impingement of the same upon the sphenoid bone in its passage through the optic foramen? The phenomenon of color-audition was first brought to the attention of the scientific world by Dr. Nussbaumer of Vienna, who, when a child, was engaged with his brother one day in striking a fork against a glass to hear the ring, when he discovered that he saw colors at the same time that he perceived the sound; and so well did he perceive the color, that, when he stopped his ears, he could divine by it how loud a sound the fork had produced. Dr. Nussbaumer was afterward able to add to his own observations nearly identical ones made by a medical student in Zürich. Later on, M. Pedrono, an ophthalmologist of Nantes, observed the same peculiarities in a friend. In these cases musical sounds gave sensations varying the color according to the instrument played upon, thus showing the dependence of the phenomenon upon the timbre. For instance, the saxophone gave yellow sensations; the clarionet, red; the piano, blue. When numbers and words were used, the following results were obtained in cases mentioned in an article, 'Color of Words,' by E. A. Newell (*Popular Science Monthly* for December, 1887): 1, black; 2, light cream; 3, dark cream; 4, brownish red; 5, black; 6, tan-color or cream; 7, greenish black; 8, dark straw; 9, mud-color; 10, black; 11, black and straw; 12, light cream; 13, dark straw-color; 14, light brown. Following are some familiar names, and the color of each, and also the letters of the alphabet: Mary, dark red; Abbie, tan; Lucy, dark blue; Richard, light gray; Atlanta, steel-gray; Charlotte, light red; Claire, light blue; Newcomb, dark red; Lincoln, black; Morse, brown; A, light straw; B, gray; C, tan; D, blue; E, black; F, black; G, light straw; H, red; I and J, black; K, blue; L, black; M, brown; N, dark blue; O, light red; P, light green; Q, blue; R and S, light straw. Henri de Parville, in the *Popular Science Monthly* for August, 1883, and previously in *Le Monde de la Science et de l'Industrie*, says, "Popular expressions are often significant. 'I saw three dozen lights of all colors,' or some such expression, may frequently be heard from persons who have received violent blows on the head or face. Under the influence of shocks of this kind, the eye seems to see infinite numbers of sparks. Shocks of a certain class impressed upon the nervous system seem to have the faculty of producing phenomena of light. There are persons endowed with such sensibility that they cannot hear a sound without at the same time perceiving colors. Each sound to them has its peculiar color: this word corresponds with red, and that one with green; one note is blue, and another is yellow."

ETHNOLOGY.

Tattooing.

MISS A. W. BUCKLAND, in the *Journal of the Anthropological Institute* of Great Britain, publishes a study of the distribution of the custom of tattooing. Although her list of tribes who practise this custom might be considerably increased, some of the results of her study are of great interest. She distinguishes two methods of tattooing. In the one, cuts are made in such a manner as to leave a scar; in the other, patterns are pricked out, and coloring-matter is rubbed into the wounds. According to Miss Buckland, the former method, which she calls 'gashing,' is confined to Africa (excepting Egypt), some parts of southern Europe, and Australia, including a few of the neighboring islands. Tattooing, in the proper sense of the word, is practised in Polynesia and all over the American continent. The most beautiful patterns are found in New Zealand and among the lower classes of Japan. The author calls attention to the widespread custom of marking the chins of women as denoting marriage. The distribution of the custom of tattooing is more fully illustrated in Gerland's excellent ethnological maps, which are being published in Berghaus's 'Atlas of Physical Geography.' He distinguishes between tribes tattooing both sexes and those tattooing the women alone, which is most extensively practised by the natives of Arctic America and the east coast of Asia. The student of this problem will find material of the greatest value in W. Joest's work on tattooing, gashing (or, as he calls it, 'drawing by means of scars'), and painting the body. The plates, which form the most important part of the work, are beautifully done, and deserve the more praise, as they must be considered absolutely reliable. Joest emphasizes justly that it is necessary to take the most painstaking care in reproducing ornaments of this kind. It is necessary for the artist to understand the intentions of the native tattooer or draughtsman, in order to render his work correctly. As this precaution has frequently not been taken by travellers, many drawings of works of native art are mere caricatures. Fortunately the necessity of the greatest care in making collections of this kind is well understood at present. Joest arrives at the conclusion that tattooing has no connection whatever with the religion of the tribes who practise it, but that it is chiefly ornamental. Miss Buckland is of a similar opinion. She says that tattooing is generally ornamental, and that it seems to be in the men honorable, denoting bravery in battle. Tattoo-marks are, as a rule, geometric designs. There are only a few tribes known among whom conventionalized animal forms are used, denoting the totem of the bearer. Among these are the Haida of the Queen Charlotte Islands, the tattoo-marks of whom were first described by Swan. Several of their neighbors practise the same custom. Joest's book contains a partial bibliography of this subject. The etchings and plates which accompany his book refer principally to Melanesia and Polynesia; but, besides this, tattooing from Tunis, a beautiful specimen from Japan, and several from Central Africa and Burmah, are given.

A RECENT DISCOVERY IN EGYPT. — Prof. A. H. Sayce, in the August number of the *Contemporary Review*, describes an archæological discovery of great interest, made recently in upper Egypt, where a large collection of clay tablets, inscribed with cuneiform characters of a cursive Babylonian form and in the Babylonian language, have been found at Tel el-Amarna. They consist, for the most part, of letters and despatches sent by the governors and kings of Palestine, Syria, Mesopotamia, and Babylonia, to two Egyptian monarchs, Amenophis III. and Amenophis IV. Five of the letters are from Babylon, the date being about B.C. 1430, which approximately fixes the period to which the reign of Khu-en-Aten must be assigned; but the largest number refer to the mother of the latter, who was the daughter of the King of Naharina. This place is proved by the tablets to be situated on the eastern bank of the Euphrates. The unexpected revelation of active literary intercourse from one end of the civilized East to the other, in the century before the date assigned by Egyptologists to the Exodus, is likely to produce a revolution in our conceptions of ancient Oriental history. It