containing about two hundred octavo pages, will be issued each year. The contributors will be, for the most part, instructors in the university, or graduates of the same, but contributions of other scholars will not be absolutely excluded. Any correspondence respecting contributions should be addressed to Professor James B. Greenough, Professor John Williams White, or Professor F. D. Allen, Cambridge, Mass. Subscriptions (one dollar, four marks, or five francs a volume) may be sent to Otto Harrassowitz Leipzig, Germany; Ginn & Co., 57 & 59 Ludgate Hill, London E.C., England; or the latter firm at Boston, New York, or Chicago

— With the December number the *Magazine of American History* completes its twenty-second volume. The frontispiece to the current issue is a portrait of Lord Brougham; and the opening paper by the editor is a sketch of his early career during the infancy of our Republic, with pen-pictures of his contemporaries and surroundings, the establishment of the *Edinburgh Review*, and the marriage of its editor in New York City. The second illustrated paper is a "Tribute to Hooper C. Van Voorst," the late president of the Holland Society, by George W. Van Siclen. The third contribution is "The Story of Brave, Beautiful Margaret Schuyler," an historic ballad from the pen of Judge Charles C Nott of Washington. Curiously interesting is the article following, of R. W. Shufeldt, "The Drawings of a Navajo Artist," illustrated with the Indian pencil; as is also the "Acrostic by John Quincy Adams," in facsimile, from Ella M. M. Nave. "The Sciota Purchase in 1787," by Col. E. C. Dawes of Cincinnati, and the "Private Contract Provision in Ordinance of 1787," by Hon. W. P. Cutler, are important contributions to the number. These are ably written, and will doubtless serve to correct many errors in recent histories of Ohio. "Joseph Hawley, the Northampton Statesman," is the theme of a paper by Charles Lyman Shaw; "Fort Perrot, Wisconsin," is from T. H. Kirk; "First Editions of the Bible printed in America," from Clement Furgeson; and "Gen. Grant and the French," from Theodore Stanton of Paris. This magazine is steadily exerting an educational and healthful influence in all departments of literature and study.

LETTERS TO THE EDITOR.

***Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

The editor will be glad to publish any queries consonant with the character of the journal.

On request, twenty copies of the number containing his communication will be furnished free to any correspondent.

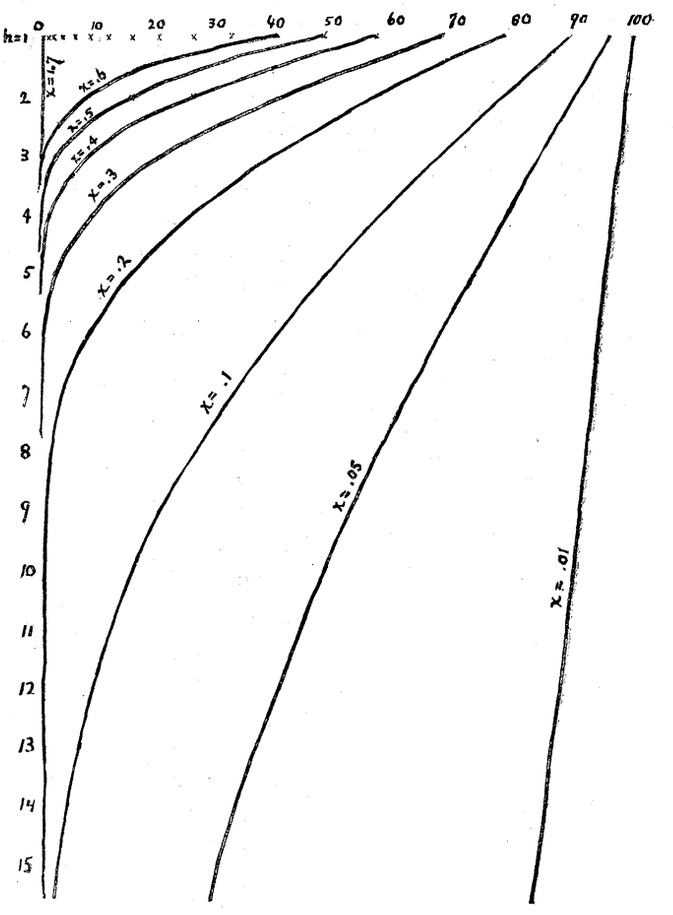
Intelligence of Ants.

I SEND you the following regarding ants, by Mr. W. E. Bosworth of this city, written out at my request, which seems to me an interesting and at the same time somewhat rare observation. It is almost exactly similar to the account by McCook of the sleeping of harvesting ants, of Texas, as quoted in G. J. Romanes' "Animal Intelligence," p. 84. I do not recall any other instance given of the sleeping of ants. "At different times, and for more than one season, I was favorably situated to see the movements of quite a large colony of small black ants, as they passed to and fro in their busy haste over a board floor, going, as I supposed, for their supply of water, which was in the direction of a small stream close by. While watching their quick, eager movements, there were several along the line that attracted my attention, as they remained in one place so long that I concluded they must be dead; and although they were directly on the line of march, and in the way of the others, these passed on, paying no attention to them whatever. At another time I noticed that one of the ants supposed to be dead got up, and walked off as lively as the rest; and, while watching this one, another one close by began to slow up, seemed to totter in his gait, and finally came to a dead halt. After seeing this, it occurred to me that the one had just waked up, and the other had just gone to sleep. In order to test the matter, and gratify my curiosity, I concluded to experiment on some of them. With a fine straw they were gently rubbed on the back. This mild treatment did not make the slightest impression on them; but a sharp push seemed to take them completely by surprise, and to fully arouse them. For an instant they seemed lost, circulating around, running up and down, but finally starting off with the rest. This was repeatedly tried with the same result. Their movements on being disturbed very forcibly reminded me of a child when suddenly waked out of sound sleep." JAS. LEWIS HOWE.

Louisville, Ky., Nov. 21.

Galton's Bodily Efficiency Diagram and the Marking System.

FRANCIS GALTON'S bodily efficiency diagrams (*Nature*, Oct. 31, 1889) can evidently be applied to the rating, on an arbitrary scale, of all sorts of things besides physical measurements and tests. For instance: the annexed diagram represents, by Galton's method, the rating of errors as the measure of precision gradually rises. The data were taken from the table on p. 12 of Merriman's "Least Squares" (first edition). The curves are drawn in general for values of x differing by .1; the ordinates in all cases being values of h, and the abscissas the rating on a scale of 100. The diagram shows at a glance how in all cases the rating of the same



error decreases as the measure of precision increases, but how, for very large and very small errors (see the curves $x = .01$ and $x = 1.7$), the measure of precision affects the rating little.

The rating of any errors which are distributed roughly according to the probability curve, as they are, for instance, in every school examination, ought to conform in general to these curves, and I think teachers usually strive to have it do so, either consciously or instinctively. If the error is flagrant, the question containing it is marked zero, or nearly so. The discrepancies in the marks of different teachers, or in the marks of the same teacher at different times, seem due to the different measures of precision mentally adopted. The curves show that these variations of the measure of precision affect most the rating of mediocre work, and this also accords with the experience of teachers. Now, of course the errors of each scholar have their own probability curve and their own value of h, which perhaps might be calculated from a long series of examination-papers. It would probably differ for different subjects. The custom, then, of marking good and poor scholars on different scales has a reason. The only question is, whether these scales can be so systematized as to be quite just, and whether it

would not be better to assume, in rating, the same measure of precision for all.

At any rate, the study of these curves cannot help being of interest to teachers. ARTHUR E. BOSTWICK.

Montclair, N.J., Nov. 22.

Cave-Air for Ventilation.

COL. CRUMP'S effort to utilize cave-air has a personal interest. I warm my dwelling with furnace-heat, and in place of taking in air through a basement window, as is usual, I placé an intake pipe or tube (I use stone pipe) under a porch upon the south side of the house, which passes under ground eight feet, around the building to the north side, beneath the cellar wall and below the cellar floor, to the furnace, — a length of about a hundred feet. The size of this pipe should be the same as the chimney. This must depend upon the size of the building to be warmed. My chimney is eighteen inches clear space. My house contains twelve rooms. This chimney is sufficient to ventilate the house, and carry off the smoke from the furnace. Sometimes it is necessary to build a small fire in the bottom of the chimney, where provision is made for such purpose. Ventilating-tubes are placed under the floor from the outside corners of the rooms, to draw off the cold air on the floor, which is constantly being replaced by the warmed air from the ceiling. Now, the advantage of this improvement in the use of cave-air is that in cold weather a modified air comes into the furnace. In hot weather, using the same apparatus to cool the air before coming into the house, the windows should be closed. The difference of temperature is from ten to fifteen degrees in the shade.

I have used it successfully for two summers, and I know of no system so satisfactory. W. H. LEONARD.

Minneapolis, Nov. 18.

INDUSTRIAL NOTES.

Elektron Manufacturing Company.

A FEW weeks ago fire destroyed the factory of the Elektron Manufacturing Company of Brooklyn, whose Perret motors and dynamos were described in *Science* recently. The company at once secured a larger factory, at 79 and 81 Washington Street, near the bridge, equipped it with a complete installation of special tools and machinery, and are doing their best to catch up with their orders, which had fallen far behind during their enforced idleness.

Electrical Accumulators.

IN the suit of The Electrical Accumulator Company *vs.* The Gibson Electric Company in the United States Circuit Court for the Southern District of New York, which was instituted in February last, the complainants have recently moved for a preliminary injunction, and Judge Lacombe on Friday last granted the motion, and the injunction issued. The complainants' testimony shows conclusively that the Gibson Company have continuously infringed the Faure patent, and that their various modifications are infringements.

CALENDAR OF SOCIETIES.

Biological Society, Washington.

Nov. 30. — Theobald Smith, Preliminary Observations on the Micro-organisms of Texas Fever; D. E. Salmon, General Remarks on Texas Fever, illustrated by Lantern-Slides; C. D. Walcott, Description of a New Genus and Species of Inarticulate Brachiopod from the Trenton Limestone; Frank Baker, An Undescribed Muscle of the Infraclavicular Region in Man.

Engineers' Club, Philadelphia.

Nov. 16. — Mr. William B. Spence exhibited a working model of the Rimmer oxidizer, a filtering-material, which he described, and for which he made various claims as to its utility in the purification of water by oxidation. He stated that the material used is an English invention, and that it is known as "magnetic carbide of iron." It consists of a mixture of granulated iron ore and carbon. The iron ore is said to be cleaned of all natural impurities by a patented process. It is then chemically treated at a certain temperature. It is claimed that this material will absorb and retain a large quantity of oxygen from the atmosphere. In use it is charged daily with atmospheric air, when, it is claimed, a re-action takes place with the impurities which have accumulated in the filtering material, and that the result passes off in the form of gas. It is claimed that metals in solution in the water will form insoluble oxides. The upper layer of the filtering plant consists of sand, for the removal of suspended matter by mechanical filtration, and the lower layer of the material above described for the chemical removal of impurities in solution. It is claimed that both vegetable and animal organic impurities and metallic contaminations are entirely removed by this process. The following tests were made in the presence of the meeting. The filtering materials were contained in a large glass funnel. Water, as muddy as that of the Schuylkill River during freshets, was made apparently perfectly clear. A solution of sulphate of iron in water was made, and a portion thereof passed through the filter. The unfiltered and filtered portions were then tested with ferrocyanide of potassium. The former showed a distinct blue tint, while the latter remained perfectly clear, showing the elimination of the iron. Lead and copper tests seemed to show the same results. To illustrate the destruction of organic matter, sulphide of ammonia, sulphide of iron, and acetate of lead were added to water, making a compound which was almost black, and of strong and unpleasant odor. After filtration, it was clear, and tests seemed to fail to discover any trace of the impurities. A mixture of copying-ink and water was passed through the filter with the same results.

Boston Society of Natural History.

Dec. 4. — R. T. Jackson, Certain Points in the Development of the Mollusca; J. Walter Fewkes, A Remarkable Instance of Rock Excavation by Sea-Urchins.

Engineers' Club, St. Louis.

Nov. 20. — Mr. Robert Moore addressed the club on the subject of "Railway Culverts." This question was usually given too little attention. The speaker described the various forms of culverts used, with the advantages and disadvantages of each, also stated the methods of determining the size and best mode of construction. He stated that sewer-pipe, while admirably adapted for small culverts, should not be used over fifteen inches in diameter. For larger sizes, cast-iron pipe answered well. Cast-iron pipe which had been condemned for heavy pressures was being largely used for this purpose. Mr. Moore also presented a diagram, based on Kutter's formula, using a value of 17 for n, bearing in mind that one inch of rainfall per hour is equivalent to one cubic foot per acre per second. In the discussion, Mr. Ferguson described a number of practical points of difficulty he had met with. The discussion was also participated in by Messrs. J. A. and W. L. Seddon, M. L. Holman, and A. W. Hubbard. Mr. Holman stated that iron pipe for this purpose was being made as large as six feet in diameter and ten feet long, being lighter and of poorer quality than the pipe used for water-service.