tract the attention from the outlines of those districts. However, the additional information contained in the profiles fully makes up for this disadvantage, particularly as the map is on a large scale, and intended for a special study of the hydrography of the Mississippi.

An advance copy of a geological map of the northern part of the Dominion of Canada, by George M. Dawson, has been received. It embraces arctic America from latitude 60° north, and the adjoining parts of British Columbia and Labrador. The geological coloring is based on the explorations of the geological survey of Canada and on other authorities. The geological structure of the district west of the Mackenzie is still unknown. The most interesting parts of the map are the carboniferous area of the Parry Archipelago, which stretches from the outlet of Robeson Channel into the Arctic Ocean to Banks Land; and the adjoining Devonian and Silurian belt, which stretches in a continuous line from the east coast of Kane Basin to Hayes Sound, North Devon, and the Mackenzie River. The close connection between the geological structure of Grinnell Land and Parry Archipelago is very interesting. Its existence makes the exploration of the unknown area between those islands very desirable. Every thing tends to show that it is probably occupied by a group of islands, and therefore it is probable that an exploration might be accomplished without great difficulty or danger. The field for arctic explorers is not to be looked for only in the extreme north: the unknown districts which are comparatively easily reached deserve as much attention. Another interesting point of the map is the Devonian or Silurian basin of Fox Channel and Baffin Land, and that of Hudson Bay. It would have been desirable to have what little there is known of the orography of arctic America in this map, as it would help to give a clearer idea of the geological character of those districts.

The boundary between Venezuela and Brazil was surveyed in the years 1880 to 1883. The report of the work of the joint commissions has been prepared by the chief of the Brazilian commission, Lieut.-Col. Francisco Xavier Lopez de Araujo, and is printed in the Brazilian parliamentary papers (Rio de Janeiro, 1884). The map which accompanies this report contains much new information. The exploration of the Maturaca revealed the fact that the Orinoco and Rio Negro are not connected by the Cassiquiare alone, but that a great number of bifurcations exist which form a large island that has been named 'Ilha Pedro II.' On the subsequent journeys the river Padauiry and the Serra Curupica were explored. The expedition did not visit the district inhabited by the Maracañas and Kirishanas, who do not allow the whites to enter their territory.

NOTES AND NEWS.

WE learn from *Modern language notes* that the English folk-lore society has invited Prof. T. F. Crane of Cornell university to edit for the society the *exempla*, or illustrative stories of Jacques de Vitry, bishop of Acre, and historian of the Crusades. This compliment to American scholarship is specially marked, because Professor Crane was intrusted with the work with no limitations whatsoever. The *Athenaeum* adds, that these stories are about three hundred in number, and are contained in the hitherto inedited manuscripts No. 17509, Bibliothéque nationale, Paris. They are of great value for the question as to the diffusion of popular tales. They contain every variety of story, from the jest to the *conte dévot*, and are especially rich in fables, among them the oldest European version of 'The milkmaid and the pot of milk.' Professor Crane's edition will consist of an introduction on the life of Jacques de Vitry and the use of *exempla* in mediaeval sermons, the Latin text, and a brief translation or analysis in English, with comparative notes. It will probably be ready by the end of the year.

— The dome for the Lick observatory is well under way at the Union iron-works in San Francisco. It is 70 feet in diameter, will weigh 90 tons, and is to be revolved with a pressure of 135 pounds. The cost of the dome is $56,800.

— The daily papers recently announced the startling discovery that the earth had been retarded in its daily revolution ten minutes and eleven seconds between Feb. 25 and March 3, 1886, and anxious inquiries were made as to the causes and effects of this slowing-down. We are a little surprised that this absurd story comes, not from a wild theorist with unbounded faith in the maxim that figures will not lie, but from a practical man, "taking observations of the sun in his business of regulating and adjusting chronometers for masters of vessels arriving at Wilmington"!

— Dr. Peters of the Hamilton college observatory has given the small planet, No. 264, which he discovered on the 17th of December, the name Libussa. No. 256, discovered by Dr. Palisa, has been named Walpurga. A new asteroid, 265, was discovered by Palisa at Vienna on Feb. 27.

— The lectures under the auspices of the philosophical, anthropological, and biological societies of Washington are announced as follows: March 12, Gen. A. W. Greely, U.S.A., Animals of the

arctic regions; March 19, Capt. C. E. Dutton, U.S.A., Earthquakes; March 23, W. J. McGee, The Charleston earthquake; March 26, Prof. Otis T. Mason, The natural history of human arts; April 2, Dr. B. E. Fernow, Our forestry problem; April 6, Thomas Wilson, Prehistoric man in western Europe.

— Prof. J. R. Dodge, statistician of the agricultural department, has been appointed an official delegate to the international statistical institute which is to meet in Rome, April 11.

— An account of the foundation and work of the Blue Hill meteorological observatory, near Boston, has lately been prepared by its proprietor, Mr. A. Lawrence Rotch. Its records were begun the last of January, 1885; and especially in the second year of their sequence, when the difficulties and interruptions characteristic of their beginning had decreased, they are remarkably elaborate and complete. Very few stations in the country possess so extensive a set of self-recording apparatus. Local weather-prediction has been successfully attempted, the data being in part local observation, in part general observations of the signal service. For the past month or two, the predictions issued from the Hill have been regularly published in some of the Boston papers. Such an experiment, giving opportunity of comparing predictions made at a local and at a central (Washington) office, are of value, and should be undertaken and published by observant meteorologists in other parts of the country. The observers at Blue Hill — Mr. W. P. Gerrish for the first year, and Mr. H. H. Clayton for the second — have had some rather severe experience. Perhaps the most severe spell of weather was in the latter days of February, 1886, during a persistent north-west gale. The wind maintained a velocity of seventy-three miles for an hour on the 28th; the pressure recorded during short gusts of wind indicated a temporary velocity at the rate of ninety-three miles an hour. The total wind-movement on the 28th was 1,467 miles; for the last three days of February it was 3,735 miles. The ice-storm of the end of January, 1886, incased the hill, trees, building, and external instruments in a heavy sheathing of ice: the telephone-wire had a girth of eight inches. At this time, frost-work, such as characterizes Mount Washington and the Brocken, attained a length of one or two inches.

— Prof. Ernst Haeckel of Jena has been studying the lower forms of aninal life in the Levant this winter.

— Prof. Alexander Agassiz, director of the museum of zoölogy at Harvard, has been made a D.Sc. by the University of Cambridge. In introducing him, the public orator referred to him as one of whose work it might be said, '*Merses profundo, pulchrior evenit.*' The allusion was to Professor Agassiz' investigations of the mysteries of the ocean.

— The first comptroller of the treasury has decided that the act establishing agricultural experiment-stations in connection with the agricultural colleges of the several states and territories makes no appropriation for the purpose of the act, but that such appropriation, according to the terms of the act, must be "specially provided for by congress in the appropriations from year to year." The operation of the act is therefore practically suspended until congress takes some further action.

— On Feb. 22, 1888, the birthday of Arthur Schopenhauer will be celebrated in Germany with much ceremony by the followers of the pessimistic philosophy.

— The *Athenaeum* reports that Professer Du-Bois-Reymond will celebrate this year the twentieth anniversary of his appointment as secretary of the Academy of sciences of Berlin. He has held the post since 1867, and it has fallen to his lot to introduce into the academy a succession of the famous representatives of the modern sciences; among others, Helmholtz, Virchow, and Siemens. On such occasions he has given proof of his great talent as an orator, and Du Bois-Reymond's 'Begrüssungsrede' has become the feature of the introductions. He is the oldest member of the physico-mathematical class of the academy. His patent is dated March 5, 1851. The venerable French chemist, Chevreul, is the only member of older standing. Chevreul was enrolled in 1834.

— Mr. Lancaster, meteorological inspector at the Royal observatory at Brussels, has prepared a well-planned and compact summary of the climate of Belgium in 1886, including annual and monthly tables, barometric and thermometric curves, and a somewhat detailed account of the months separately. The winter beginning in December, 1885, is shown to have been persistently cold, although without extremely low temperatures. February, 1886, was very dry, and, as Lancaster has found usual in such cases, was followed by a drought of several months. He quotes seven examples since 1833, in which the precipitation for February was less than half the normal mean, all of which were succeeded by dry periods of from two to six months' duration.

— A curious example of minute observation, carefully carried out, appears in a note in *Ciel et*

terre for Jan. 1. It is on the relation of the state of the weather to the distance at which church-bells may be heard, by P. J. DeRidder of Lebbeke in Belgium, who kept a record of the church-bells and the weather from 1870 to 1882. He finds that the sounds are heard farthest when the movement of the air is cyclonic, or, if calm, when the air is very moist: sometimes contrary winds make no obstacle to sound-transmission. Sounds are heard at the greatest distance between one and two o'clock in the morning. Certain clocks, situated six and eight kilometres south-west of Lebbeke, are called *waterklokken* by the country-folk, because a rainy period always sets in soon after they are heard.

— Dr. Bowditch reports a case of lead-poisoning in which the only discoverable source of the lead was the solder used in the kettle in which water was boiled.

— Messrs. Nicholls and Bailey recently contributed to *Nature* the results of a series of observations made by them to test the acuteness of smell in the different sexes and in different individuals. The sense of smell in the male was found to be more acute, on the average, than in the female sex. In some individuals it was so keen as to detect one part of prussic acid in two million parts of water. Several substances were experimented with, and the following is a summary of the results, the figures indicating the average limit of delicacy of perception: — Cloves: males, 1 in 88,-128; females, 1 in 50,667. Nitrite of amyl: males, 1 in 783,370; females, 1 in 311,330. Extract of garlic: males, 1 in 57,927; females, 1 in 43,900. Bromine: males, 1 in 49,254; females, 1 in 16,244. Prussic acid: males, 1 in 112,000; females, 1 in 18,000.

— At a recent meeting of the Paris biological society, M. Gréhaut read a paper on 'The prevention of accidents from suffocation while descending into wells.' After referring to the cause of the suffocation, namely, carbonic-acid gas, and the well-known expedient of first lowering an animal into the well, he gives the following directions for ventilation: a stove-pipe ten or twelve feet longer than the well is deep is to be secured by wires in the axis of the well; a grate on which a fire can be built is then to be placed around this pipe at the level of the ground; and a second pipe, larger than the first, is then to be placed upon the grate, with the first pipe inside; and on the grate, and between the two pipes, a fire is to be built. The inner pipe being heated, a current is created, resulting in the ascent of the impure air of the well, and its replacement by fresh air from without.

— The following course of lectures is now in progress at De Pauw university: March 8, 'The earth,' Pres. T. C. Mendenhall, Rose polytechnic institute; March 14, 'The germ-theory of disease,' Prof. J. M. Coulter, Wabash college; April 4, 'Glaciers, past and present,' Prof. O. P. Jenkins, DePauw university; April 11, 'Charles Darwin,' Pres. D. S. Jordan, Indiana university; April 18, 'A beam of light,' Prof. J. B. DeMotte, DePauw university; April 25, 'Spectrum analysis,' Prof. P. S. Baker, DePauw university; May 2, 'The sun,' Prof. J. P. D. John, DePauw university.

— Summer courses are offered by Harvard college in chemistry, physics, botany, and geology.

— A very interesting philosophical work, by Prof. George T. Ladd of Yale, will shortly be published. It is entitled 'Physiological psychology,' and will be especially important just at this time, because, if our understanding of its scope and method is correct, it will maintain a philosophical and psychological stand-point, while admitting to their proper place the conclusions reached by physiology respecting the nature and functions of the nervous system. President McCosh's book on the 'Motive powers' is also nearly ready.

— The Turkish government has under public examination and supervision a large school for living languages. The British government is considering the expediency of imitating the example of the Turk, and a plan for the establishment of such an institution is shortly to be brought before parliament.

— The council of the Geological society awarded the medals at the anniversary meeting of the society on the 18th of February as follows: the Wollaston gold medal to Mr. J. W. Hulke, F.R.S.; the Murchison medal to the Rev. P. B. Brodie; the Lyell medal to Mr. S. Allport; and the Bigsby gold medal to Prof. C. Lapworth. The balances of the funds at the disposal of the society are awarded as follows: the Wollaston fund to Mr. B. N. Peach; the Murchison fund to Mr. R. Kidston; and the Lyell fund to the Rev. Osmond Fisher.

— In noticing the tenth report of the Historical manuscripts commission, the *Athenaeum* reviewer says, "The latest publication of the manuscripts commission is an excellent example of the method of modern historical research. The national school of history which flourishes under the direction of the master of the rolls is notoriously engaged in the collection of every well-authenticated scrap of manuscript material that is capable of illustrating some epoch or incident of English history. In this respect it has, perhaps,

set an example which is being eagerly followed by the historical bodies of most European countries. Germany, indeed, is, as well as America, already ahead of us in scientific methods of collecting and editing the more modern and political materials which may be gleaned from the archives of every state-paper office in Europe; while France, Austria, Belgium, and Sweden tread closely on our heels. The objects of modern history, therefore, though professedly national, are in fact cosmopolitan, each country opening up at times unexpected manuscript treasures for the more particular advantage of the other. Hitherto we have been content to rely chiefly upon the resources of our unrivalled national records; but every year affords fresh evidence of the extent and value of the outlying manuscript material which it is the special mission of the Historical manuscripts commission to incorporate with the main stock."

— Our retinal insensibility to the ultra-violet and infra-red rays has been recently discussed by Drs. Fox and Gould in the *American journal of ophthalmology*. The sufficient reason for the perception of the so-called 'light' rays is because the eye has learned to react to the strongest and most constant stimulus, and to extinguish or exclude those vibrations that would only confuse by their weakness or inconstancy, or that would with difficulty be focused with the rest. As to the range of vision along the spectrum, the remarkable fact is, not its narrow limits, but its extension. The marvel is that we have learned to see the violet rays at all, when they are so weak. The limit at the red end of the series is thought to be determined by the great absorption gap in the spectrum that separates the visible from the infra-red rays. It is then asked, how are the invisible rays excluded from stimulating the nerves? and although no satisfactory or final answer can be given, based on experiment, it is made at least probable that they are absorbed by the media of the eye before they reach the retina.

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.*

A sensitive wind-vane.

AN interesting discussion of this question has recently been initiated, and it may be well to give a portion of this and a few considerations bearing on the problem. I have seen it stated that a flat vane is always in a neutral line, and a sensitive one is made by fastening two plates together at an angle of about ten degrees. This statement has always appeared chimerical to me, for the reason that such a vane as described would have twice the weight and friction of a flat vane, and hence could not be as sensitive as the latter. We should gain, at the outset, a clear definition of what is meant by a sensitive vane. A very light structure, like a feather attached to a cord or balanced near one end, while tossed hither and yon by every breath, and exceedingly sensitive, could hardly be what is meant. I would say, as a first idea, that a sensitive vane is one that most readily assumes the wind-direction.

Professor Ferrel has discussed this question, from a mathematical stand-point, in the February number of the *American meteorological journal*. He assumes that the gyratory force (gy) of the wind upon a double-tailed vane varies as the square of the sine of one-half the angle between the tails, and gives the following expressions for the gyratory force. Let i = one-half the angle of tails, e = angle of deviation of wind, and F = wind-force upon unit surface of vane: then we shall have, with $i > e$, $gy = F \sin 2i \sin 2e$; with $i < e$, $gy = F \sin^2 (i + e)$ in the case of a double-tailed vane, and $gy = F \sin^2 e$ with a flat vane. Professor Ferrel finds, that, with $2i = 90°$, there is a maximum sensitiveness of the vane. Without entering upon a discussion of the theory developed by Professor Ferrel, it may be suggested that we cannot neglect the great pressure that the tails at an angle of 90° would have to bear in a high wind, and which would come upon the axis. This amounts to ten pounds per square foot in a wind, forty miles per hour, impinging normally upon a surface. The angle of the sides being 45°, the total pressure would be somewhat less, but would still be sufficient to prevent all free action of the vane.

Mr. G. E. Curtis has also very recently given a theoretical discussion of the question before the Washington philosophical society, and in this he differs very materially from the one just given. He assumes that the action of the wind varies as the sine of its deviation angle. He gives for vane with double tails, $gy = F \sin (i + e)$ when $i > e$, and $gy = 2F \sin i \cos e$ when $i < e$; for a flat vane, $gy = F \sin i$. In the original formula F is omitted; but I have supplied it, as it seems necessary. The notation is the same as in the previous case. There is a remarkable variance in these theoretical results, and it is a little difficult to state which is the more satisfactory. I hardly think that either can be accepted by the working meteorologist; but probably Professor Ferrel's is the more satisfactory, certainly for light winds.

No attention is paid in either of these discussions to the weight or friction of the vanes, yet it would seem as though either one of these is a far more important element than a single or double tail. In the discussion by Mr. Curtis we may very readily take these factors into account by placing the two tails of his double-tailed vane one above the other, edge to edge. We now have a flat vane whose weight, friction, and all other essentials are the same practically as those of the double-tailed vane; in fact, simply a transformation of the latter, without alteration except in the matter of surface. In fact, both vanes are directly comparable, while they were not before. We have, however, just doubled the surface of the flat vane, so that $gy = 2F \sin i$. Now, it is very easy to see that this expression has a greater value than $F \sin (i + e)$ when $i > e$, and also greater than $2F \sin i \cos e$ when $i < e$. This theoretical discussion, then, by Mr. Curtis, shows conclusively that the flat vane is the more sensitive. When we consider that Professor Ferrel regards the flat vane as much the steadier of the two, also that the