an ex-asylum superintendent, who claimed five cases of insanity due to the weed. Dr. Shiels believes there must have been some error of diagnosis here, and beyond a doubt the large majority of asylum physicians would, if canvassed, sustain him in his scepticism. It is only in a remote and subsidiary sense that the tobacco habit can be considered a factor in the production of insanity. Its opponents urge that it promotes nervousness. This depends on the individual and the amount indulged in. They also claim that it weakens moral fibre, impairs nutrition, fritters away a man's time, and induces a host of other evils. But it is not upon the brain that the penalties of its immoderate use are visited: the organs more likely to suffer are the heart, stomach, and throat.

THE ETIOLOGY OF GOITRE. — Dr. Th. Kocher of Berne, Switzerland, first of all determined accurately in what parts of his own canton goitre was common. On comparing the water of these regions with that of goitre-free neighborhoods, says the London *Lancet*, he finds that the one striking difference is that where goitre is abundant the water contains a considerable quantity of organic or organized material, and he concludes that it is this factor which determines the prevalence of goitre in any district. He finds that in certain goitrous parts particular families who have access to special water-supplies in which there is not this quantity of organic matter remain free from goitre, although breathing the same air, living on the same soil, engaging in the same occupations, and eating the same food, as their very goitrous neighbors. On comparing the chemical composition of goitrous and non-goitrous water in the Berne canton, the only other difference he found was that the quantity of sulphate of lime was less in the goitrous; but, as it is well known that goitre is often found in those who drink water richly laden with this salt, this difference cannot explain the great pathological fact. Dr. Tovel has found that the water in goitre-free parts contains a very minute quantity of micro-organisms; and it has further been shown that if goitrous water is injected into rabits the thyroid gland is very prone to swell, although in dogs the injections have no effect. Kocher's investigations do not certainly completely clear up this difficult subject, but they throw some light upon it, and as such are to be heartily welcomed.

NOTES AND NEWS.

THE corner-stone of the new building of the New York Academy of Medicine, in West 43d Street, near Fifth Avenue, was laid with appropriate ceremonies on the afternoon of Oct. 2.

— The Brussels correspondent of the London *Times* points out that the number of foreign students at the German technical high schools is steadily increasing, especially at Berlin, where last year there were thirteen English students preparing for the professions of mechanical and mining engineers, architects, and chemists.

— The Durban correspondent of the London *Times* telegraphs that the Cape Government has decided to adopt Professor Seeley's proposal for a geological survey under his charge. He believes that other eruptive diamond-bearing tracts like Kimberley exist elsewhere.

— In a paper recently published in the "Transactions of the St. Louis Academy of Science," Nipher has shown that the average rate of rainfall on the State of Missouri during the ten years ending Dec. 31, 1887, was 196,000 cubic feet per second. During the same interval, the average river-discharge of the Mississippi River at St. Louis was 191,000 cubic feet per second.

— Speaking lately at the meeting of the British Association, Sir Lowthian Bell said, "If technical education means, as is sometimes alleged, a system by which, along with scientific instruction, manual dexterity in the use of tools, or a practical knowledge of various manufacturing processes, has to be acquired, I confess I am not sanguine as to the results. Certain I am, that if foreign workmen are more skilful in their trade, which as a rule I doubt, and which in the iron trade I deny, this superiority is not due to scientific training in the manner proposed; for in this they possess, so far as I have seen, no advantage over our own workmen. My objection to the whole system is the impossibility of any thing approaching a general application being practicable. I have not a word to say against the rudiments of science being taught wherever this is possible. The knowledge so obtained may often give the future workman a more intelligent interest in the employment than he at present possesses; but I think they who expect much good to attend such a thin veneer of chemistry or physics do not take sufficient account of the extent of the knowledge already possessed by more highly educated men, who are now directing the great workshops of the world. It is by extending and enlarging this that substantial aid has to be afforded to industry and science, and not by teaching a mere smattering in our primary or any other schools."

— At St. Petersburg, on Sept. 7, several Pulkova astronomers and geodesists took advantage of the ascent of a balloon belonging to the Technical Society to test the accuracy of barometrical measurements. According to *Nature*, the aëronauts, who reached a height of 1,800 metres, took with them, besides chronometers and various meteorological instruments, a barometer, a barograph, and an aneroid; and they obtained, in addition to the curve of the barograph, the various heights at which the balloon stood during its ascent and descent for twenty-eight different moments. The heights obtained from these measurements will be compared with those found by geodetical angular measurements, which were made at five different places as far distant from one another as Cronstadt, the St. Petersburg University, Kolpino, and Pargolovo; that is, at distances of more than thirty miles between the extreme stations. The geodetical measurements thus secured are now being calculated.

— A botanical garden has been established in the Alps of Valais at an elevation of more than 5,600 feet above the level of the sea. It is situated on a cone-shaped knoll, which is about 200 feet high, and composed of a number of natural terraces, planted with *Pinus cembra* and larch, and faces north, east, and west. On the summit is a plateau facing the south, on which will be a little *châlet*, containing the library and herbarium of the garden. The Association for the Protection of Plants has bought the land, and converted it into an alpine garden for plants from all the alpine regions of the globe. Representatives of the floras of the Himalayas, of the American mountains, of New Zealand, of the Antarctic regions, of the Caucasus, of Siberia, of the Pyrenees, the Alps, the Carpathians, and the Ural, will be separated, and each cultivated in a special division. Naturally, M. H. Correvon was named director of this new trial-garden, in which he had already planted several thousand mountain plants. This garden is at so high an elevation that interesting observations can be made concerning the floras of all the alpine regions of the globe, on the relations of plants with insects, their acclimatization, variability, etc. Already consignments of plants have been sent to M. Correvon; and a German botanist who is travelling in the East, and is continuing the work of Boissier (M. Bornmüller), has promised some interesting specimens. Other parcels are expected from Canada, Greenland, and New Zealand. The *Gardeners' Chronicle*, from which we take these facts, invites all who are in suitable latitudes to send to M. Correvon seeds or bulbs from the northern regions in which they are travelling, for the garden of Bourg St. Pierre, which will necessarily serve later on for the temporary reception of plants from high altitudes which cannot be acclimatized directly with us, but require to be subjected to an intermediate temperature first. In this way, M. Correvon is going to try to acclimatize the celebrated but fragile *Calypso borealis*, which he hopes to introduce into cultivation by accustoming it to this intermediate position.

— The Ceylon papers announce the death of an elephant named Sella, which had served the Public Works Department for over sixty-five years. Originally, we learn from *Nature*, Sella belonged to the last of the Kings of Kandy, Sri Wickrema Raja Singha, and was one of about one hundred elephants which passed to the British Government in 1815, when the Kandyan dynasty was overthrown and the whole island passed under British rule. It was supposed at that time that Sella was fifteen years of age, but this was uncertain. In 1880 it was decided that all the elephants belonging to the Public Works Department should be sold, and Sella fell to a well-known resident of Colombo, Mr. de Soysa. The animal aided in several *keddah* operations for the capture and taming

of wild elephants, but became totally blind about three years ago. He continued, however, to work at the plough until within a short time of his death. After death the tusks were removed, and measured five feet in length. Sella himself was eight feet high.

— Of the various orders of the fungi, the *Uredineæ*, or what are commonly known as the rust parasites, are of present interest to the scientist, in that, in their as yet comparatively unknown life-history, development, and relations to other life, many facts lie still unearthed, and to the agriculturist and horticulturist because the destructive capabilities of these pests are becoming more and more a matter of financial importance. Upon passing through fields of ripening wheat or other of the small grains, one may often be not a little surprised to find that his clothes have become quite thickly besprinkled by a yellowish-brown dust which has fallen from the plants. This is an aggregation of the spores of one of the special forms of what the farmer designates as rust. Whether he regards it as a distinct thing in itself, or as simply a diseased condition of the plant-tissues arising from the evil effects of bad drainage, want of proper light, or what not, none feels to a greater extent than he its destructive effects upon the yield of the crop. The rusts of the agriculturists, however, are but representatives of a great order, embracing more than twelve hundred species, of which it is the province of a paper on "The Heterœcismal Pucciniæ," by Henry L. Bolley of Lafayette, Ind. (published in the *American Microscopical Journal*, vol. x.), to give an outline of the structural development and life-history of a few species.

— Charles R. Williams, in a letter to *The Evening Post*, writes, "Apropos of the frequent discovery in the Far West of fossils of horses with toes, has it ever been recalled that Julius Cæsar had such a horse? Suetonius, in his "Life of Cæsar," sixty-first section, says, 'Cæsar made use of a remarkable horse, with feet almost human, and hoofs divided in the manner of toes' (*Utebatur equo insigni, pedibus prope humanis et in modum digitorum ungulis fissis*). The whole passage is interesting. The horse, it appears, was foaled in Cæsar's stud. The soothsayers at once proclaimed that it betokened for its master the dominion of the world, whereupon Cæsar had it reared with the utmost care, and was the first to mount it. Indeed, it would never suffer anybody else upon its back. Later he sat up an image of the horse in front of the Temple of Venus Genetrix. Was not this an instance of what evolutionists call 'reversion'?"

— The vexed question of obtaining some recognition of physical as well as intellectual powers in competitions for the public service was well put before the British Association by Mr. Francis Galton, in his paper, "On the Advisability of Assigning Marks for Bodily Efficiency in the Examinations of Candidates for the Public Service." The curious and hardly accountable disregard of bodily efficiency in those examinations through which youths are selected to fill posts in which exceptional bodily gifts happen to be peculiarly desirable, must, he said, strike the attention of anthropologists with especial force. The reform now asked for is to give additional marks to those youths who, being fit for service, are at the same time exceptionally well fit so far as bodily efficiency is concerned. There has been a vast amount of lax assertion in reference to this matter, some saying that high intellect is often associated with stunted and weakly frame, and others pointing to instances in which high mental and high physical powers have been connected; but it is only very recently that we have secured a firm and sufficiently large basis of facts. These are the various measures of Cambridge students made during the last two or three years, and discussed by Dr. Venn, F.R.S., in an excellent memoir recently published in the *Journal of the Anthropological Institute*. "The number of those who were measured is 1,095, and they were divided into three classes: (1) high-honor men; (2) low-honor men; and (3) poll men, that is to say, those who did not compete for honors, but took an ordinary pass degree. The result was that the physical efficiency of the three classes proved to be almost exactly the same, except that there appeared to be a slight deficiency in eyesight among the high-honor men. Otherwise they were alike throughout, — alike in their average bodily efficiency, and alike in the frequency with which different degrees of bodily efficiency were distributed among them. Therefore the fact that a man had succeeded in a literary examination does not give the slightest clew to the character of his physical powers; and an opinion that the present literary examinations are indirect tests of bodily efficiency must be considered erroneous. The intellectual differences are usually small between the candidates who are placed, through the present literary examinations, near to the dividing line between success and failure. But their physical differences are, as we have just seen, as great as among an equal number of the other candidates taken at random. It seems, then, to be most reasonable, whenever two candidates are almost on a par intellectually, though one is far superior physically, that the latter should be preferred. This is practically all I propose."

— The Emperor of Brazil has announced by telegram to the Paris Academy of Sciences an observation of globular lightning on Sept. 16.

— In the laboratory of the State Mining Bureau in San Francisco, according to the *Engineering and Mining Journal*, a discovery was made recently which is highly prized. In working a specimen of sulphide or blende ore sent from a mine in Shasta County, Cal., a small piece of native metallic zinc was secured. This is the first piece of the character named ever known to have been secured in this country. Late works on metallurgy note the existence in the mines of Victoria, Australia, of the only native metallic zinc known. The Mining Bureau will endeavor to secure other specimens from Shasta County.

— In the well-known method employed by Regnault for determining the density or specific gravity of air, oxygen, nitrogen, hydrogen, and carbonic acid, we deal primarily with tares, of which the weights to be determined are the differences. The glass balloon which holds the gas is tared by a similar balloon of exactly the same volume, and of nearly equal weight, suspended from the opposite pan of the balance. The small difference of weight required to establish perfect equilibrium is alone measured with standard brass or platinum weights. Whatever may be the form of the subsequent calculation, the primary object is to obtain the tare of the empty balloon when absolutely vacuous. This known, the differences between such tare and the tare of the balloon filled with various aeriform substances, gives the weights of equal volumes of these substances under the temperatures and pressures at which the balloon was filled. The volume of the counterpoise is exactly adjusted to that of the balloon by the aid of a small subsidiary glass bulb; and by sealing up more or less mercury in this bulb it is easy to make the difference of weight such that the standard weights required to complete the equilibrium will measure the differences of tare to be determined, and no more. In the method of Regnault the tare of the empty balloon, or what was equivalent to it, was found by exhausting the balloon with an air-pump and weighing it after measuring the tension of the residual gas while the glass was surrounded by ice. But it has been shown by Agamennone and Lord Rayleigh that the results thus obtained are vitiated to a small extent by the circumstance that when the balloon is exhausted the pressure of the atmosphere determines a slight shrinkage of the external volume, which naturally disturbs the exactness of the compensation between the buoyancy of the air on the balloon and on its counterpoise. Although this shrinkage can be readily measured, as was done by Dr. T. W. Richards under Professor J. P. Cooke's direction, and still more recently by Professor Crafts, who experimented on the balloon used by Regnault, which fortunately has been preserved, it seemed desirable to develop a method by which this correction could be avoided: for, even if the new method should lead to no more accurate results than before obtained, it might serve to confirm the validity of the correction in question, and at least would give additional data towards establishing the value of important physical constants. The new method Professor Cooke has devised for the purpose consists in first taring the balloon when filled with carbonic-acid gas, and then drawing the gas through absorption tubes and determining its weight, as in the well-known method of organic analysis. This weight known, the tare of the empty balloon is obviously the difference between the first tare and the weight in question. The practical problem here presented is, however, far more difficult than that of organic analysis. In the last we expect to determine

the weight of only a few decigrams of carbonic acid within a few tenths of a milligram, while in the problem now before us we must weigh at least nine or ten grams of carbonic acid, not simply to a proportional, but to an equal, degree of accuracy. Professor Cooke only succeeded in securing such accuracy after many trials and a careful study of all the conditions involved; and the primary object in a paper published in the "Proceedings of the American Academy" (vol. xxiv.) is to describe the precautions which are essential to the success of the new experimental method. Incidentally it will appear that the results confirm in a most striking manner the high value of the specific gravity of hydrogen found by Lord Rayleigh, and the low value of of the atomic weight of oxygen found by Professor Cooke at the Harvard Chemical Laboratory.

— Mr. A. J. Field, in a letter to the editor of *Knowledge*, on the question whether the female viper swallows its young for their protection, says, "Unfortunately the common adder (or viper) when in captivity is usually a very sullen reptile, and I am afraid that it would give the naturalist but little opportunity for observing its maternal affection, even if a female with young should be obtained without injuriously disturbing or killing the mother. I have kept adders several times, and now have two healthy pairs; but, although I once succeeded in taming a male adder, I have never succeeded in making a female forget that it was a prisoner. Among vipers, the females are certainly more sulky and bad-tempered than the males; so that the question will always remain an open one if we must wait until we see the young swallowed by their mothers in captivity. My illustration showing the adder with its fangs erect (referred to by Pen-y-Pan) is quite correct. Two fangs are erected when the adder prepares to strike, no more. The other teeth are merely in readiness should one or both the fangs be lost. The largest adder I have seen was three feet four inches in length." In reply to this letter, the editor of *Knowledge* writes as follows: "Dr. William Duncan, in a recently published paper on the 'fer-de-lance,' one of the *Crotalidæ*, or pit vipers, of the West Indian Islands, says that the female fer-de-lance devours her young in very wholesale fashion. This dangerous serpent is very prolific, and sometimes brings forth as many as two hundred young at a birth, seldom less than one hundred. Dr. Duncan says the female fer-de-lance, when about to bring forth her young, 'generally selects a fairly open or cleared space, a mountain footpath being a favorite spot. Along this she crawls slowly, dropping her young one by one on the way. As soon as the last has been brought forth, the faint and hungry mother turns and devours the first of her brood that meets her sight, and continues this unnatural course until satiated with her repast, or she finds no more of her offspring to glut her rapacity. Naturally many of them, three-fourths at least, escape, and these the strongest, — a clear case of the survival of the fittest. This has been observed by several planters in St. Lucia, and has been mentioned to me independently by Mr. E. S. Gordon, Mr. A. R. Marucheau, and Mr. Marius Devaux, and others of the colony.'"

— The opinion expressed by *Engineering* the other day, that the oil-deposits of Burmah really were enormous, in spite of the pessimist report of Dr. Noetling, the paleontologist appointed by the Indian Government to examine the petroleum-fields of Yenangyoung, has been justified by events. The Indian press has attacked the report so vigorously in support of Mr. Marvin's views, that Dr. Noetling has been compelled to explain matters in the columns of the *Pioneer*. According to this, since he made his actual survey his opinion has totally changed, and he now agrees that the petroleum-deposits are of the immense character insisted on by the author of the "Coming Oil Age." "Since I wrote my report," states Dr. Noetling, "the oil-bearing strata have been traced over a large area, only a very small part of which has hitherto been exploited, and that in a most unscientific way. I, in my report, calculated, that, under a reasonable system of working, one square mile could produce not less than 1,440,000 litres per diem. This estimate may be a little too high; but admitting only half of the estimated production, say 500,000 litres per diem per square mile of the Burmah oil fields, the production would be something enormous, as the oil-bearing strata are now known to extend, roughly speaking, over an area of not less than 100 square miles, — a fact which was not known to me at the time I wrote my report." Here there is convincing testimony that the area of the Burmese oil-fields is very large; and the assumption is fair, that, if suitable engineering methods of exploitation be introduced, the industry can be put on a footing that will compete with, and perhaps in course of time even beat, the American oil-trade.

— At the recent meeting of the British Association, a paper by Mr. J. Spiller, on "An Experiment on Color-Blindness," was read. Mr. Spiller has had so much experience in comparing coal-tar colors and testing for color-blindness, that he thought there could be no question as to his own sight being normal. He made himself color-blind on purpose by taking, on Aug. 29, a dose of a grain and a half of santonine, the acting principle of the flowers of *Artemisia santonina*. Within less than five minutes afterwards the white tablecloth appeared of a delicate pale bluish tint, and every thing else as if regarded by spectacles of that color; ultramarine looked normal; violet and pink were good; green turned slate-color. The spectrum was visible, unbroken, but with hardly any variations. There was nothing particular in the green, which appeared fine and normal; and he could not discover the neutral gray band in the green, for which he was particularly searching. Mr. Spiller warned his audience against any repetition of this experiment, which, after all, did not reduce him to ordinary color-blindness, and the results are extremely disagreeable.

— "A Bibliography of Geodesy," by J. Howard Gore, B.S., Ph.D., has been issued as Appendix No. 16 of the report for 1887, of the United States Coast and Geodetic Survey. Although the restricted popular demand for a work peculiarly designed for the uses of the student and scientist rarely induces its author or compiler to forego its preparation, it is nevertheless likely to be a matter of serious consideration in connection with the question of publication by private enterprise. It is especially the case, that, beyond the gratification of his own scientific tastes and the undemonstrative approbation of the worthy few who appreciate the value of appliances which lessen the labor of learning, the compiler of so complete and exhaustive a bibliography of geodesy as that of Professor Gore can have had little to inspire his zeal and sustain his prolonged labor in an undertaking which at the outset involved the thorough exploration, in person, of thirty-four of the principal libraries of America and Europe, the exploration of the minor libraries by proxy, and, in addition, a searching inquiry by correspondence with all the geodesists or mathematicians of both continents. That Professor Gore has not lacked, during the preparation of his work, such inspiration as was derivable from the approbation of the competent, is attested by the generous overtures from various institutions, among them being the International Geodetic Association at Berlin, offering to undertake the publication of his book, — a most gratifying recognition of his fitness for the work, and of its anticipated value. The reason for the preparation of this work was the need of it felt by the compiler. He began in 1885 a history of geodesy, but before proceeding far it was found very difficult at any time to be sure that the literature regarding the operations of a given period had been exhausted. It was at once deemed best to collect titles as well as the works themselves. The excellent library facilities in the various technical departments in Washington emphasized the feasibility of such an undertaking. The number of titles collected for this purpose only, so far exceeded the special lists as given in the various bibliographies of mathematics, that many persons suggested an extension of the original plan, so as to make the compilation useful to others. In response to this proposition, the various libraries in Washington were carefully searched, and during two trips to Europe nearly every library facility there has been exhausted. In order to procure titles of such recent works of living authors as might escape notice, owing to delay in obtaining a place in the library catalogues, a circular letter was sent to every mathematician whose address could be obtained. Each circular had appended to it the titles of all of the known works of the recipient, with a request that omissions be supplied. This alone was the labor of several months, but was fully repaid in the gratifying assurances from many that nothing could be added, as well as in the few additional titles which tend towards making this work complete.