practising American engineers if in a more familiar language.

As stated in the preface, "der ingenieur muss geologische kenntnisse besitzen, aber braucht kein specialist zu sein." His eye should be trained to observe those phenomena which are of importance in determining the structure of rocks; but in special problems he must expect to consult the expert geologist, who will be able to deduce conclusions from data given him by the engineer.

MARTIN'S ELEMENTARY HUMAN PHYSIOLOGY.

AMONG the numerous recently published works of its class, the volume before us easily takes a very high rank. From the pen of a thoroughly trained instructor in biology, it is characterized by great clearness and precision of statement, and, being prepared with the co-operation of an experienced teacher of young pupils, the subject is presented in a simple and attractive way that cannot fail to interest the youthful reader. As an example of the way in which difficult points in anatomy and physiology are elucidated by reference to familiar facts, the following illustration of the protection which the skull affords the brain may be quoted: —

"If you turned upside down a thin china teacup, wrapped round it a covering of raw cotton, and over this put a thin casing of tough wood, any thing placed under the cup would be protected from blows, jars, and piercing, much as your brain is protected inside the skull."

The enactment in several states, of laws providing that the teaching of hygiene in the public schools shall include instruction in regard to the action of stimulants and narcotics, makes it incumbent upon all authors of text-books of hygiene to devote several chapters to this subject. Professor Martin has, upon the whole, accomplished this portion of his task in a very satisfactory manner, though some of his remarks will probably be read with surprise by practitioners of medicine. Thus we are told that 'the bromide is just as dangerous as the opiate,'—a statement which, however well adapted to accomplish the object of the author in discouraging the use of the drug without a physician's prescription, can hardly be regarded as a strictly accurate therapeutic guide.

The human body: a beginner's text-book of anatomy, physiology, and hygiene. By H. NEWELL MARTIN, D.Sc., M.A., M.D., professor of biology in the Johns Hopkins university, and HETTY CARY MARTIN. New York, *Holt*, 1884. 4+261 p., illustr. 8°.

The long list of diseases which may affect every organ and tissue of the body as the result of alcoholic indulgence is well calculated to strike terror to the heart of the toper, and rather tends to give this portion of the book the character of a temperance tract.

The illustrations are taken from Professor Martin's larger text-book of physiology, also entitled 'The human body,' and are therefore not always perfectly in harmony with the elementary character of the smaller work.

This defect is not, however, of any great importance, and does not prevent the work from being, upon the whole, the best English text-book for beginners in the sciences of which it treats.

NOTES AND NEWS.

THE annual stated session of the National academy of sciences will be held at the national museum in Washington, commencing Tuesday, April 21, 1885, at eleven A.M.

— The island of Formosa, which has recently been the scene of Franco-Chinese conflict, is stated, in Dr. S. Wells Williams's valuable work on China, to have been unknown to the Chinese before the year 1403, about the beginning of the Ming dynasty. As the mountains of Formosa are visible from the Chinese mainland in favorable weather, this appears due to some misconception, which is explained by Réné Allain. It appears, according to this author, who has recently published a work on Formosa, that, before the conquest of China by the Mongols (202 B.C.–226 A.D.), Formosa was already known, but under another name, to the Chinese historians, who counted its people among the 'Manti,' or southern barbarians. It was visited by the Chinese in the year 602, and was known as Liéu-Kiéu, or the Great Loo-Choo. Chinese colonies were established there in the fourteenth century. For two hundred years it took the name of Taï-wan, which it still bears in Chinese literature. In 1624 it was ceded by China to the Dutch, who were driven out in 1662 by a celebrated Chinese pirate known to Europeans as Koxinga, who maintained himself there for some twenty years. His successors made submission to the Chinese government, which subsequently made permanent colonies on the island. Formosa is about two hundred and forty-five miles long, with a greatest width of seventy-six miles. It has an area of some fifteen thousand square miles, and is separated from the mainland by a strait nowhere less than sixty miles wide. It is characterized by possessing a range of mountains of remarkable uniformity in height, and attaining a very exceptional altitude, the peaks ranging between eleven thousand and thirteen thousand feet. There are no good harbors, except for vessels of light draught, as far as known; and the land appears to be rising at a remarkable rate. The Dutch fort of 1624, originally built on an islet at some distance

from the shore, now forms part of Formosa, and under its ruins the water is so shallow that passengers land with much difficulty where was formerly deep water. The old harbor is now dry land, converted for miles into a plain, where was formerly the fine port of Taiwanfu. The island is very unhealthy for Europeans, and subject to earthquakes, but contains no active volcanoes.

— The veteran zoölogists of Cuba — Professor Felipe Poey, who is now nearly eighty-six years old, and Dr. Juan Gundlach, who has completed his seventy-fourth year — are still engaged industriously in studying the fauna of that tropical island. Dr. Gundlach has been publishing his contributions to the fauna of Porto Rico in the Annals of the Spanish society of natural history. The vertebrates (including fishes by Poey) have all appeared, and recently the fresh-water marine mollusca have been issued. Gundlach has been publishing every month eight octavo pages in the Annals of the Havana academy of sciences, — a contribution to the mammals, birds, and reptiles of Cuba, — and is now at work upon the insects, of which the Lepidoptera are almost completed, and occupy already nearly four hundred pages. Poey has published the fishes of the island in the Annals of the Spanish society of natural history, and Arango has discussed the mollusks. It is to be hoped that these still vigorous naturalists will live to see the completion of the work they have undertaken with so much zeal.

— The report of the librarian of Harvard university gives this year a fuller account than we have had before of Ebeling's collection of maps, which is known to be one of the most valuable collections in this country, especially for early maps of America. These maps have now been arranged with the others belonging to the university; and the whole series will occupy at least nine hundred portfolios, of which about three hundred and sixty pertain to America, counting in this seventy-two which hold the coast-survey maps. About one hundred volumes will be collected of maps which may be classed together for binding; and, when these are eliminated, there will still remain about fifteen thousand maps. The Ebeling maps belong principally to the seventeenth and eighteenth centuries, and were collected previous to 1817. The re-arranging will be completed early in the coming year. Meanwhile considerable progress has been made in a descriptive catalogue, written on slips which are kept in drawers near the cases of portfolios. These entries have been completed for the maps of Great Britain, France, Spain, Italy, and Scandinavia. When this catalogue is finished, an historical and topographical index is proposed. The maps in atlases will be eventually included, and perhaps important maps in geographical serials and other books. With this extent of catalogue and index service, it is not probable that questions of historical geography can be settled so well anywhere in this country as in the Harvard library.

— The death of Col. Roudaire of the French army, known so widely in connection with the project of an inland sea, to be artificially formed by flooding the depressed area of the 'chotts' in Algeria and Tunis, will not affect the continuation of the investigations relating to that enterprise. Col. Landas, professor of topography in the military school of St. Cyr, has volunteered to take the place of Roudaire. The latter, who had devoted himself with great energy to the scheme for twelve years, received no pecuniary reward for his labors, and leaves a mother, for whose support those interested have subscribed a little annuity.

— 'Melanic variation in Lepidoptera' was the subject of Lord Walsingham's presidential address before the Yorkshire naturalists' union on the 3d of this month. He calls attention to the prevalence of dark varieties of butterflies and moths at great elevations and high altitudes, and attempts to explain it on the theory of natural selection. He points out, that, while vertebrates living through the winter require to retain in their bodies a sufficient amount of heat to enable them to maintain their existence in the severest climates, insects require rapidly to take advantage of transient gleams of sunshine. "Those males," he says, "whose color enabled them to absorb the heat most rapidly would naturally be the first to harden their wings, and to acquire a degree of vitality sufficient to enable them to commence their flight. If we imagine the emergence of a pale and a dark variety side by side at the same moment, it is more than probable that the paler specimen would remain inactive among the herbage, when his darker companion had already commenced his flight. In unfavorable weather the degree of warmth sufficient to arouse even the darkest varieties might be of very short duration; and, if this were so, the less favored males might be wholly deprived of the degree of energy necessary to enable them to find their females. The shorter the continuance of passing gleams of sunshine, the greater would be the influences brought to bear against them; and each separate instance, however infrequent such instances might be, in which they were thus placed at a disadvantage, would have its effect in diminishing their numbers, promoting the survival of only the fittest forms. If this is so, it is sufficiently obvious that the first males on the wing have the best chance of transmitting their color by an hereditary process to the succeeding generation; and, if these males were always or usually the darkest of the brood, their progeny would also be for the most part dark." In order to test certain questions which would arise in connection with this, he placed several dark and light colored insects on the snow, and found a marked difference in the amount of absorption of heat from the sun, and in the rapidity with which they would make impressions upon the snow.

— The opening of the Antwerp exhibition, fixed for May 3, will have to be deferred, as the applications for space have been so numerous and extensive that the proposed area is insufficient.

— The following is a translation of the text of the regulations respecting vivisection issued by the Ger-

man government. 1°. Experiments on living animals must only be performed in serious investigations, or for purposes of instruction. 2°. In public lectures such experiments must not be performed, unless they are necessary for the full elucidation of the subject. 3°. The preparations, as a rule, must be made before the lectures begin, and not in the presence of the audience. 4°. The experiments must only be performed by qualified professors, or by their assistants on their responsibility. 5°. Experiments which will be equally satisfactory if performed on the lower species of animals must not be performed on the higher species. 6°. In all cases where the experiment can be performed without inconvenience under anaesthetics, anaesthetics must be administered.

— *Nature* states, that, in a paper read before the Statistical society on Feb. 17, Sir Richard Temple endeavored to check the various official returns of the population of China by applying the results obtained from the population statistics of British India. The various statements made by the Chinese government as to the numbers of people under its rule show violent fluctuations, those of the last century and a half varying between 436,000,000 and 363,000,000. These returns, as Professor Douglas pointed out, varied with the purposes for which the enumerations were made. China proper, and India, said Sir Richard Temple, have about the same area, — a million and a half of square miles. Both countries are under similar conditions, physical, technical, climatic, geographical. In both there is a strong tendency to multiplication of the race. In both the population loved to congregate in favored districts, to settle down and multiply there till the land could scarcely sustain the growing multitudes, and to leave the less favored districts with a scanty though hardy population. The average population of the whole of India is 184 to the square mile, and, if this average be applied to China (exclusive of the central plateau), it gives a population of 282,191,600 souls. The writer then compared, one by one, the eighteen provinces of China proper with the districts in India corresponding nearly in physical characteristics and cultivable area; and, summarizing these computations, he found, that, over a total area of 1,500,650 square miles, the population, according to this estimate from the Indian averages, would be 282,161,923, or, say, 183 persons to the square mile, while the latest official returns obtained from China show 349,885,386, or 227 inhabitants to the square mile. The general conclusion, he said, might be that the latest Chinese returns, though probably in excess of the reality, did not seem to be extravagant or incredible, on the whole, if tested by the known averages of the Indian census.

— Lebasteur has invented an ingenious process for determining the thickness of iron plates in boilers, or places where they cannot otherwise be measured without cutting them, which process is described in *Le génie civil.* He spreads upon the plate the thickness of which he desires to find, and also upon a piece of sheet-iron of known thickness, a layer of tallow about a hundredth of an inch thick. He then applies to each, for the same length of time, a small object, such as a surgeon's cauterizing instrument, heated as nearly as possible to a constant temperature. The tallow melts: and as in the thicker plate the heat of the cautery is conducted away more rapidly, while in the thin plate the heat is less freely conducted away, and the tallow is consequently melted over a larger area, the diameters of the circles of bare metal around the heated point, bounded after cooling by a little ridge of tallow, will be to each other inversely as the thickness of the plates. The process is stated to have given, in the inventor's hands, results of great accuracy.

— The approaching publication in Holland of a Dutch work on New Guinea by the former Dutch resident at Ternate, Mr. Van Braam-Morris, is announced. The work is to be edited by Mr. Robidée Van der Aa, who is himself an authority on the subject, and will be accompanied by a map. Mr. Van Braam-Morris succeeded in penetrating considerably to the south during an official tour on the Amberno or Rochussen rivers.

— At the February meeting of the Russian geographical society, Gen. Meyer read a paper on the transcaspian province, Merv, or Akhal-Téké. The paper did not mention any new facts, but dwelt on the barrenness of the country, and on its poor resources for trade, etc. The secretary mentioned the return of Poliakoff, who was present at the meeting, and the further progress of Potanin, who has traversed Ordoz, the country in the great bend of the Yellow River, China, and has found numerous ruins which testify that the country was formerly occupied by an agricultural people. The discussion of the Novaia Zemlia magnetic observations has been intrusted to Mr. Trautvetter, formerly director of the Pavlovsk observatory.

— Arrangements are in progress for a collection of live specimens of tropical fishes at the Indian and colonial exhibition of 1886. This scheme will involve the erection of tanks for the maintenance of water at far higher temperature than that suitable for fishes of the temperate zone.

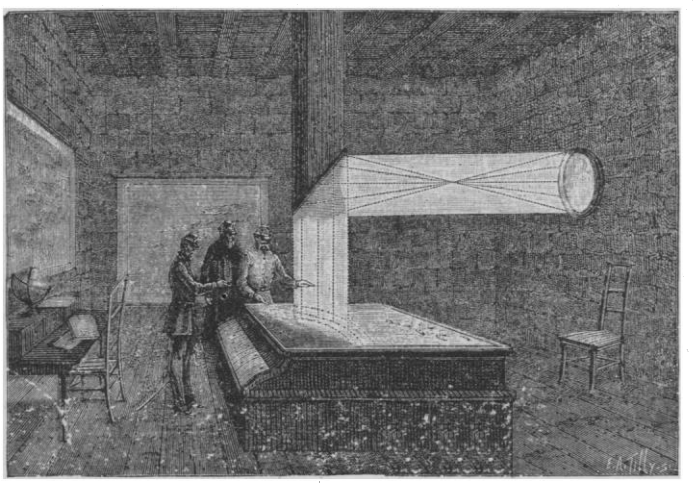
— The largest block of aluminum ever cast is made from American ore, and forms the apex of the Washington monument. It is nine inches and a half high, and measures five inches and a half on each side of the base, but weighs only one hundred ounces. The surface is whiter than silver, and is so highly polished that it reflects like a plate-glass mirror.

— There has recently been considerable agitation in Germany upon the smoke question; and some have suggested that government interfere, and establish 'stoker schools,' through which the stokers of all manufactories shall be obliged to pass before receiving a position. Besides this, it is urged that these manufactories be obliged to build high chimneys. *Engineering*, in a recent number, very sensibly remarks that such a system would be absurd, and further adds that there is no necessity for such action, for, as soon as the difficulties in the way of the introduction of electric lights into dwelling-houses are removed, the gas companies will be forced to reduce

their price; and then the system of gas-heating, which is now being agitated, will be introduced into houses, and finally, without doubt, into factories; and thus the system of pouring out immense quantities of smoke into the air of our cities will cease.

— Dr. Wiese, the German agricultural chemist, recently employed by the government to study suitable vegetables for cultivation in the sandy soil of East Prussia, left Berlin for the Cameroon coast during March. The object of his journey is to study the plants of the country, with a view to their cultivation in Germany.

— During the Austro-Italian war of 1866, in order to protect their ports from the attack of Italian ships, the Austrians placed torpedoes in many concentric circles near the mouths of the harbors. Each torpedo had a separate number, and was connected by a wire with the room represented in the accompanying illustration from *La Nature*, and each wire had a separately numbered key in this chamber. The building in which the chamber was situated was placed on the side of a hill, so as to overlook the port. The chamber was lighted only by a lens, which had a field covering the harbor. The rays of light coming from outside were then reflected into a prism which directed them down upon an unpolished glass plate placed horizontally upon a table, where an image of the harbor was formed. The black marks in the figure point out the exact place of each torpedo, and bear numbers corresponding to those on the keys. An employee watched the plate constantly, and observed every motion of approaching ships. By pressing a button he could at any time explode the corresponding torpedo.



AN AUSTRIAN PLAN FOR WATCHING THE MOVEMENTS OF VESSELS.

— The municipality of Paris has at last approved the suggestion of a grant of land for the new central laboratory of electricity, to be built out of the profits of the Paris electrical exhibition of 1881. These profits amounted to no less than $65,000.

— Among recent deaths we note the following: Mr. John Francis Campbell of Islay, in his sixty-fifth year; Mr. Thomas C. Archer, curator of the museum of science and art, Edinburgh; Mr. Poydessau, French engineer, at Panama, Jan. 7; Louis Godard, aeronaut; Rodolphe Meyer-Dur of Zurich, entomologist, March 2, in his seventy-fourth year; Dr. Julius Münter, director of the botanic garden of Greifswald, Feb. 2; Dr. J. C. G. Lucae, anatomist and anthropologist, at Frankfort a.-M., Feb. 3; H. W. Blair, assistant in the U. S. coast and geodetic survey, at Nashville, Tenn., Dec. 15.

— The Dollfus prize of the Entomological society of France was awarded, on Feb. 25, to Mr. Léon Fairmaire, for his work on the Hemiptera of France.

— The first number of *Mind in nature*, which is 'to furnish in a popular manner information regarding psychical questions,' appeared this month. Those who are willing to accept the marvellous on the slightest evidence will take pleasure in reading the article on metaphysics, by Bishop Samuel Fellows, and that on Christian science, by Dr. S. J. Avery. The article on presentiments is of the same unconvincing character. A paper by Oliver J. Lodge, on experiments in thought-transference, with one or two by Edmund Gurney and others, are reprinted from the Proceedings of the English society for psychical research.

— In No. 180 of the *Zoologischer anzeiger* there are some interesting notes upon spiders by F. Dahl. He claims that their sight is imperfect, except at very short distances; and, in consequence of this, their sense of touch is so well developed, that, when an object falls into their net, they can tell upon exactly which radius the object has fallen, though to ascertain this they must first go to the centre of the web, even though the object may have fallen near their original position. Their smell and hearing are also excellent, the former so much so that they can distinguish odors. The remarkable instinct possessed by the geometrical spiders is shown by the fact that the first web made by the young is perfectly geometrical. That they reflect, is proved by the fact that they despise certain kinds of tough, chitinous insects, which they have unsuccessfully attacked before. This reflection is to be distinguished from the instinctive dread which they have for bee-like flies.

— Prof. S. P. Langley sailed on Wednesday for England, to lecture before the Royal institution.