in and chemically united, it forms a solid tint all the way through the mass; so that slight abrasions, like cutting it off with a knife, still show the same color. Half of this combing has been varnished, which you see produces a somewhat darker and a satin or leather like effect. This varnished work is washable, and is as easily cleaned as any varnish. The centre is simply bronze in the varnish. The upper portion, or decorated frieze, has less body on, and was made by dipping each corner of a wide brush in the two different tints, which easily produced the blended or soft shaded effect. The ribbon was put on with a thin coat of the material through a paper stencil, and the vine in the same way. The flowers were put on with oil-color. The other side has at the bottom what is called heavy stippling, and a slight representation of bas-relief, that is sunk below the surface. The frieze above is ornamented in what is called flat relief, to imitate solid or high relief. The blended grounds of the frieze have been stippled; that is, pounced with the ends of a brush or with a covered block, to give it a slightly roughened effect. These effects are admitted, even by paper-dealers, to be finer than it is possible to produce with the finest papers, and will make a blended tint or whitened wall, on which borders, leaves, etc., can be applied with stencils, and keep within bounds of the expense of papering.

Here we have a plain tinting on large sheets of paper with what is called a combination stencil border. The background of the border was put on with one paper stencil, and the other or main stencil was used over it. This plain tint has the same stencil border on with one tint, which can be done as easily and as cheaply as the cheapest wall-papering. Here we represent a wall blended from top to bottom in two shades. The manufacturers will show any painter so that he can do this blending easily, and usually with one coat. This and the relief-work is done with a late make of this material, made for this kind of work. When it is necessary to renew alabastine, you have no old paper or kalsomine to take off, but simply to repeat the process. I should add, it will be seen, as this forms a stone cement that hardens with age, it precludes any possibility of the colors being liberated to float around the room, as they do from paper and kalsomine, even if they were poisonous. Some claim that a wall should be impervious instead of porous. This might do very well with perfect ventilation, if it were possible to have such a wall; but one partially so is only strangled, and gives a better chance for matter behind to ferment and the germs to propagate. Now, we show here sections of this work varnished, which is nearer impervious than any wall I have ever seen, as the varnish combines with the outer part of the porous stone surface by penetrating into it; also there is nothing behind but the pure stone cement of a cold nature, the air has access to the back of the varnish, and there is absolutely no chance behind for fermentation or decay. However, for plain work, it is as well, and as cheap in the end, without varnish (as it will stand some cleaning, with care, to remove spots); and the surface can be recoated almost as cheaply as the wall can be washed. Then you have a choice of new tints; and any broken places in the plaster, which always occur, are filled and cemented by brushing on this cement again with a brush.

NOTES AND NEWS.

THE senior class this year at Harvard numbers 210, and is the smallest class in the university.

— It looks as though California would have the largest crop of grapes in the history of the State. Manager Clarence Wetmore of the Viticultural Commission says, "There are some localities where, from present appearances, the Zinfandel will not yield as heavy as last year. White grapes in most localities are settling for a full crop, and, if nothing unfavorable happens from now till vintage time, we ought to produce from 20,000,000 to 35,000,000 gallons of wine. The raisin-crop will be a heavy one, even with the loss of several thousand acres of vines in Los Angeles County by disease. The State will probably produce 1,000,000 boxes. The outlook for the wine-market is not very good. At least half of the 1888 vintage is in the hands of producers, who will not sell at the ruling low prices. On this account there will not be sufficient cooperage to handle all the wine grapes that will be thrown on the market. As a consequence, most varieties of wine grapes will bring low figures. There is great need of distilleries in this State to convert low-priced grapes into brandy, for which there is a steady demand."

— Below is the speech in which Professor Taylor of the University of Edinburgh proposed the name of Professor Whitney of Yale for the honorary degree of LL.D., which was conferred: "I have now to ask your lordship to confer the degree in absence on William Dwight Whitney, professor of Sanscrit and comparative philology in Yale College. After studying Sanscrit at Berlin and Tübingen for three years, Professor Whitney was appointed to the chair of Sanscrit and comparative philology in Yale College in 1854. In 1856, in conjunction with Professor Von Roth, he edited the Sanscrit text of the Atharva-Veda. During the last thirty years he has been one of the master spirits of the American Oriental Society, having been for several years its corresponding secretary, and latterly its president; and in the journal of that society he has published a translation of an astronomical work termed the "Surya Siddharta," the text and a translation of two Vedic grammatical works, an Index Verborum to the Atharva-Veda, and other important works. He is also the author of an excellent Sanscrit grammar, treating of the language in its historical development, and supplemented by an important catalogue of all genuine Sanscrit roots. Among his other works must be mentioned the "Language and the Study of Languages," the "Life and Growth of Language," the "Essentials of English Grammar," and his collected "Oriental and Linguistic Studies." Nor has he disdained less recondite subjects; for he has also published a German grammar and German reader, two admirable works of their kind. It is mainly to Professor Whitney's unwearying labors as a teacher and an author that America is indebted for the flourishing school of Oriental philology, in which he is *facile princeps*, and on those grounds he was invited to become one of our tercentenary honorary graduates. I have now the honor of requesting that the degree be conferred upon him in absence."

— At the Eiffel Tower, on May 29, Thomas E. Brown, jun., the engineer of Otis Brothers & Co., subjected the Otis lift to a final test before handing it over for public use. The lift, the car of which consists of two compartments, one above the other, weighs 11,000 kilos (24,000 pounds), and, loaded with 3,000 kilos (7,000 pounds) of lead, — that is to say, weighing 14,000 kilos (31,000 pounds), — was raised to a considerable height. There, according to *The Engineer*, it was fastened with ordinary ropes, and, this done, it was detached from the cables of steel wire with which it is worked. What was to be done was to cut the ropes, and allow the lift to fall, so as to ascertain whether, if the steel cables were to give way, the brakes would work properly and support the lift. Two carpenters, armed with great hatchets, had ascended to the lift, and were ready to cut the cables. At a given signal a blow cut the rope. The enormous machine began to fall. Every one was startled; but in its downward course the lift began to move more slowly, it swayed for a moment from left to right, stuck on the brake, and stopped. There was a general cheering. Not a pane of glass in the lift had been broken or cracked, and the car stopped without shock at a height of ten metres (33 feet) above the ground.

— In the Pearson process of manufacturing aluminium, as stated in the *Journal of the Society of Chemical Industry*, one hundred parts by weight of cryolite are mixed with fifty parts of bauxite, kaolin, or aluminium hydrate, fifty parts of calcium chloride, oxide, or carbonate, and fifty parts of coke or anthracite, all being in powder. The resulting mass is heated to incipient fusion in a furnace or in a crucible made of, containing, or lined with, carbon, in which case, the carbon may be omitted from the mixture. The heating is continued for two hours, at the end of which time it is alleged that the aluminium is reduced, and exists disseminated in minute globules throughout the mass. A mixture of twenty-five parts each of potassium and sodium chlorides is then added, and the temperature raised to bright redness: the aluminium collects at the bottom of the crucible. A better separation is, however, effected by powdering, washing, and drying the melt, and adding it to fused zinc, which alloys with the aluminium, and can afterwards be removed by distillation. If copper be used instead of zinc in this process, aluminium bronze is obtained. Other fluxes than those mentioned may be employed.

— A submarine bridge is proposed between Sweden and Copenhagen by a Swedish engineer, Mr. Rudolph Littlejegrist. The distance, according to *The Engineering and Mining Journal*, is two and a half miles, and the proposed structure would join Elsinore to Helsingborg by a bridge made up of one hundred feet spans, carrying a single line of rails. It is to be submerged sufficiently to allow ships to pass over it. The bridge would be incased in a double tube, with an outer skin of iron and an inner one of steel, and the space between the shells filled with concrete. It is foreseen that the outer shell might rust away in time; but it is believed that the concrete would remain intact, and protect the steel. The piers would be ordinary caissons, filled with concrete, and placed one hundred feet apart. The tubes would rest on these piers, and the girders would take a bearing on blocks inside the tube immediately over the piers. The tube would be floated out in one hundred feet lengths and lowered to place, and a massive collar of concrete put over the joints. Pontoons, with legs at each corner, worked by hydraulic rams, so as to give a stable platform, would be used in sinking the tubes. The estimated cost of the submerged work is about $3,500,000, not including the approaches.

— According to the *Moniteur de la Céramique et de la Verrerie*, a method of electroplating glass and porcelain has been devised by M. Hansen. The chief difficulty hitherto experienced has been to obtain a conducting surface which would not prevent the proper adherence of the metallic coating. M. Hansen uses chloride of gold or of platinum dissolved in sulphuric ether, to which sulphur dissolved in some heavy oil is added. This compound, after having been slightly heated, possesses sufficient consistency to allow of a film being laid on the glass with a brush. The object treated in this way is then moderately heated in a muffle until the sulphur and chlorine are completely volatilized, the gold or platinum adhering firmly to the surface. The best copper bath is two parts of sulphate of copper to three of distilled water. In silver-plating, seventeen parts of nitrate of silver and thirteen parts of cyanide of potassium, dissolved in three hundred parts of water, are used. For gold-plating, seven parts of gold are used, which are preferably dissolved in *aqua regia*, and precipitated by means of ammonia. This precipitate, while still wet, is then placed in a warm solution, consisting of nine parts of cyanide of potassium and ninety parts of water.

— We recently published an extract from *Engineering*, descriptive of the use of the water-jet in sinking the wooden piles used in the construction of the Calais harbor-works, in which the remark was made, "We believe [the water-jet] had never been previously used in this particular manner." In response to this, Mr. L. Y. Schermerhorn, in a letter to *The Engineering and Building Record*, says that in 1881 he compiled a paper giving, as far as known, the history of the water-jet as an aid in engineering construction, which was published by the Engineering Department of the United States Army. From this paper it is clearly established that the use of the water-jet in sinking both wooden bearing and sheet piles had been applied in this country long previous to 1877, the date of its use at Calais. In 1852, Lieut. George B. McClellan used the water-jet for sinking piles in the government wharf at Decrows Point, Matagorda Bay, Texas. In 1854, Lieut. W. H. Stevens made a similar use of the water-jet in sinking sheet and bearing piles in the construction of a jetty for the protection of Fort Livingston, La., and for the foundations for lighthouses in the vicinity. In 1862, Mr. J. W. Glenn placed five thousand wooden piles across the channel to Mobile harbor, to prevent the entrance of the Federal fleet, by pumping them down with a water-jet. In 1867–69, O. Chanute, chief engineer of the Kansas City Bridge, used the water-jet for sinking bearing piles. In 1868, T. J. Whitman, chief engineer of the St. Louis water-works, applied the water-jet for sinking sheet piles for the coffer-dam about the foundation of the engines. In 1872, Major P. C. Hains used the water-jet in sinking piles for lighthouse foundations. In 1873, C. C. Martin, superintending engineer New York and Brooklyn Bridge, sunk sheet piles by aid of the water-jet. From the foregoing, it is evident that the water-jet had been used in this country by engineers for sinking bearing and sheet piles nearly a quarter of a century previous to its use at Calais.

— According to the *Japan Weekly Mail*, an earthquake of a most unusual character was recorded at 2h. 7m. 41s. P.M., on Thursday, April 18, in the Seismological Observatory of the Imperial University, Tokio. The peculiarity lies, not in its violence, but in the extreme slowness of its oscillations. The beginning of the shock had all the characteristics of the ordinary earthquake; but gradually the motion augmented, until at a certain stage of the shock it reached seventeen millimetres, but the ground swayed so gently that the house did not vibrate visibly, nor were the senses alive to it. It took from four to seven seconds to complete one oscillation, — a most unusual phenomenon, and one never before noted in the observatory. The motion was almost entirely confined to the horizontal plane, and mostly south to north, but there were a few vertical motions of equally slow periods. This state of things lasted for ten minutes thirty-six seconds. Professor West of the Engineering College observed the water in a small pond to oscillate gently from north to south. At one time the water-level fell about two inches on one side of the pond, and exposed the bank, while a few seconds later the water immersed it nearly to the same depth, exposing the opposite bank; and this process continued for a quarter of an hour. "Slow oscillations of this nature have been called 'earth-pulsations,' and these usually take place where there is a destructive earthquake or a submarine disturbance going on at a great distance. Earth-pulsations are known to have caused slow oscillations of the water in lakes. From this fact it may not be unreasonable to conjecture that a terrestrial or submarine agitation of unusual magnitude has taken place somewhere. The authorities of the Science College have sent to the Hydrographical Bureau of the Naval Department, asking for information as to the state of the tide and seas. It may be as well to remark that it is not certain whether the maximum motion of seventeen millimetres, as given by the seismograph, is perfectly accurate, as it is very difficult to measure slow oscillation like this with absolute certainty." It is now known as a fact that Vries Island, outside Yokohama Bay, and possibly sixty miles off, was in a state of violent volcanic eruption.

— Naphtha is now much used as fuel in middle Russia. Last year, 880,000 tons of it were sent up the Volga for fuel purposes; and it is expected that the export for the same purpose will this year reach no less than one million tons.

— The province of St. Petersburg is very rich in marshes covered with a thick carpet of vegetation, which conceals water to the depth of several feet, — sometimes twenty-five feet and more. Small lakes and branches of rivers are continually being transformed into such marshes; and M. Tanfilieff, who has studied the way in which the transformation goes on, comes to the following conclusions (*Mémoires of the St. Petersburg Society of Naturalists*, vol. xix.), which are given in *Nature*: "The pioneers of the transformation of a lake into a marsh invariably are flowering plants, such as *Menyanthes, Comarum, Cicuta, Equisetum, Carices*, and the like. Their roots and underground stems make a thickly woven floating carpet, which soon totally conceals the water. The *Sphagnum* invades this floating carpet, while the water beneath becomes filled with *débris* of decaying plants, transformed later on into peat-bog. In shallow basins the transformation goes on at a much speedier rate, as their bottoms are invaded by plants, like *Phragmites* and *Scirpus lacustris*, which reach a considerable height, and thus supply, after their decay, a good deal of additional material for the filling-up of the basin. A mass of smaller plants, such as *Lemna, Hydrocharis, Callitriche, Utricularia, Hypnum fluitans*, and several others, usually grow also amidst the rushes. Of course, the streamlets which flow into the basin contribute also to fill it up by bringing in sand and loam. As soon as the floating carpet has reached a certain thickness, and the *Sphagnum* has still more increased its bulk, various plants, such as *Drosera, Vaccinium, Eriophorum*, the dwarf birch, and other bushes, begin to grow upon it, although the space beneath still remains filled with water. As the *Sphagnum* does not grow upon ponds containing a chalky water, its place in such ponds is mostly taken by the

Hypnum; and in these cases a variety of other plants, such as *Typha*, *Stratiotes*, *Butomus*, *Ranunculus divaricatus*, and *Chara fragilis*, make their appearance. As to the *Sphagnum*, it invades wet meadows as well."

— Dr. F. Nansen, at a recent meeting of the Geographical Society of Copenhagen, delivered an interesting lecture, in which he sketched the scientific results of his Greenland expedition. The ice on the east coast, he said, is difficult to pass, because it is intersected by deep fissures. The opinion that the summits which emerge from the inland ice make travelling difficult, must be abandoned. On the contrary, they make the ice more level, and retard its motion. Future expeditions will have to take advantage of this fact. On the plateau the ice is similar to a shining sea. Its surface is covered with loose snow, which is kept in motion by a continuous wind. In the interior there is nothing but ice and snow. There is no point on which the eye can rest, and the traveller has to be guided by the compass, as on the open sea. The snow does not melt, and the snow-fall is very heavy, while there is no rain. It is impossible to cross the interior without the use of snow-shoes. Reindeer might be used, but the difficulty of carrying a sufficient amount of provisions would be enormous. Notwithstanding the low temperature and the heavy snow-falls, the thickness of the ice does not increase, as the glaciers carry enormous quantities into the sea, and as the heat of the interior of the earth is not without influence upon the ice-cap. The temperature of the inland ice increases with increasing depth, and at the point where it rests on the rocks it is undoubtedly melting. The cold on the plateau is intense: the breath of the travellers froze as it left their mouths. On the whole, Dr. Nansen said, the scientific results of the expedition may not have been as great as many had expected, but his expedition had shown that the ice is not impassable, and future journeys would give better results.

— Columbia College makes an announcement of the course in electrical engineering in the School of Mines department. The officers of instruction and government, besides Henry Drisler, LL.D., acting president of Columbia College, are, William P. Trowbridge, Ph.D., LL.D., professor of engineering; Francis B. Crocker, E.M., instructor in electrical engineering; Michael Pupin, A.B., assistant teacher in electrical engineering; and George F. Fisher, registrar. This course in electrical engineering has been established in the School of Mines, open to graduates of that school and of other institutions of like grade and standing. The full course will occupy two years: there is a partial course which can be completed in one year. The course of instruction will comprise: 1. General principles of electricity; 2. Principal phenomena of electricity; 3. Simple applications of electricity; 4. Theory of the dynamo and motor, dynamo and motor regulation, transmission and distribution of power, electric-railway systems and locomotives, telegraph systems (duplex, multiplex, printing, autographic, and submarine), telephone systems, electro-chemistry (including theory of primary and secondary batteries), electro-metallurgy (plating, reduction, separation of metals), electricity applied to mining, torpedoes (stationary and movable). In addition to the lectures and study of standard electrical text-books, there will be examinations and explanations of practical electrical machines and models; examinations and reports of visits to electrical stations, factories, and plants; workshop practice in actual construction of electrical apparatus and machines; designing and drawing of electrical machines and apparatus for construction; design, drawing, and preparing specifications for electrical plants; practical work in setting up and use of instruments for testing; a study of the mathematical relations of electricity, light, heat, magnetism, and mechanical energy; the mathematical determination of electrical laws, units, and constants; and the mathematical theory of flow and action of intermittent and alternating currents. Graduates of the School of Mines, and of other institutions of like grade and standing, will be admitted to the course without examination; but, in cases where there may be any doubt of the proficiency of such graduates, they may be required to pass such examinations as shall be prescribed by the faculty. For particulars as to the course of instruction, etc., in electrical engineering, apply to Professor W. P. Trowbridge, and for general information and circulars, to George F. Fisher, both at the School of Mines, Columbia College, 49th Street, corner Fourth Avenue, New York.

— This year, according to the *Botanical Gazette*, is the centennial of the introduction of the chrysanthemum into Europe, and of the dahlia into England.

— In a communication to the North London Photographic Society, Mr. J. Jackson stated that he had succeeded in developing gelatino-bromide paper in a dark-room lighted by a gas-jet whose only protection was a globe of ground-glass covered with a thin sheet of yellow paper. Although we should not advise a repetition of this experiment, we desire to call the attention of our readers to it, because it is instructive in showing how unnecessary it is to try the eyes with deep ruby-colored light in the developing-room. It is in this point — namely, the practicability of safely using yellow rather than red light — that the statement of Mr. Jackson is valuable. He claims that his success was largely due to the amount of actinic light kept back by the ground-glass. This is also quite true; and the estimate has been made that ground-glass absorbs fully one-tenth of the light passing through it. The use of yellow light in the developing-room, when properly managed, is not only safe, but actually better than red light. The sensitive-film need not be exposed to the yellow light for any long time, and, if necessary, the developing-pan may be covered with some opaque substance.

— The question is sometimes asked, "What forms of vessel are best for washing paper prints, and of what material is it advisable to make them?" For amateurs who work on a small scale, and who can give constant attention to their prints, an ordinary deep porcelain tray of large size is as good as any thing. The water may be admitted through a rubber tube long enough to curl on the bottom, and thus give a circular impulse to the flow of water and at the same time keep the prints from sinking to the bottom. A stout glass rod (or, better, a slip cut from a long piece of glass) is laid across each corner of the tray, so that when the prints are floated upward they may not escape. Neither iron nor tin should ever be used. Zinc, however, may be made to serve a useful purpose for the final washings of silver prints, if a good coating of some waterproof varnish be first applied. Black asphaltum or heavy shellac repeatedly laid on would answer. Wood is a safe material so far as any effect upon the prints is concerned. It should be well dried before being made up, and plenty of pure paraffine melted into its pores by means of a hot flat-iron. The only trouble with these wooden trays is that they generally split apart or open at the seams if laid away out of use for a time.

— Madison University, Hamilton, N.Y., will be known, as soon as legal preliminaries can be effected, as Colgate University. The change found many advocates, and naturally some opponents; but at a joint session of the boards of the university and executive society a free and satisfactory discussion of the reasons for the change showed a vast preponderance of opinion in favor of it. The move for selecting the name "Colgate" is to recognize the eminent services of the Colgate family of New York of the generations past and present, in behalf of the university and its interests. The reasons for dropping "Madison" are the many serious and annoying mistakes made by confounding the New York institution with the University of Wisconsin at Madison, frequently spoken of as "Madison University."

— Among recent deaths of English scientific men reported in *Nature*, we note that of Mr. John Frederick La Trobe Bateman, F.R.S., who died at Moor Park, Farnham, at the age of seventy-nine, after a severe illness (Mr. Bateman was well known as the engineer who supplied Glasgow with water from Loch Katrine); of Eugen Ferdinand von Homeyer, the eminent ornithologist, who was born at Herdin, near Anklam, in 1809, and died at Stolp, in Prussia, on June 1 (he had been president of the Ornithological Society at Berlin, was the author of several works, and possessed the largest existing collection of European birds); of Dr. Bernhard Weissenborn, the zoölogist to the German Kamerun Expedition, from a fever contracted through the hardships of the work and the bad climate; and of Dr. C. Jessen, the naturalist, formerly professor at Greifswald, and lately at the Berlin University.