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Contents.

(Illustrated articles are marked with an asterisk.)

Alarm attachment for clocks.....	35	Hydrophane.....	35
Amalgam, liquid.....	33	Inventions, engineering.....	43
Apprentices of past and present days.....	32	Inventions, miscellaneous.....	43
Balfour Stewart.....	33	Ivy poisoning and its cure.....	37
Boats, torpedo, concealment of.....	33	Japanese laborers.....	36
Books and publications, new.....	43	Locomotive, road, high speed.....	38
Box, car axle, improved.....	35	Mantel, sheet metal, improved.....	35
Brick, improved apparatus for handling.....	35	Mastodon giganteus.....	39
Bridge building on Pennsylvania Railroad.....	36	Metal, Babbitt.....	39
Buoy, self-luminous.....	34	Notes and queries.....	43
Business and personal.....	43	Paper making, new process of.....	43
Cement to mend iron pots and pans.....	35	Patent bill, Indiana.....	32
Chart, music, improved.....	34	Petroleum, origin of, theory as to the.....	42
Decision, trade mark.....	30	Phenomena, geological, curious.....	32
Dynamo of S. S. Victoria.....	41	Power of small streams, how to concentrate.....	34
Eggs, value of, for food.....	33	Projectiles, steel armor piercing.....	33
Electrical litigation.....	40	Railway line to the city of Mexico.....	35
Electric energy from carbon without heat.....	32	Rifle, military, modern.....	42
Electric light at the Victoria and Britannia.....	41	Stewart, Balfour.....	33
Engine of S. S. Victoria.....	41	Strip, weather, improved.....	35
Fish, live, preservation of.....	37	Tapeworm, new remedy for.....	37
Floods in China.....	36	Tea, sensitiveness of.....	42
Forging machine, Abbe.....	38	Telescope, million dollar, success of.....	32
Gas, natural.....	39	Toledo boat, submarine, Nordenfeli.....	36
Gold fields, new, of South Australia.....	40	Trade marks in English patent office.....	33
Government meddlesomeness.....	42	Tricycles, improved.....	34
Guns, new 36-pounder.....	35	Wages and living forty years ago.....	40
		Well, driven, case, and amendments to the patent laws.....	37

TABLE OF CONTENTS OF SCIENTIFIC AMERICAN SUPPLEMENT No. 629.

For the Week Ending January 21, 1888.

Price 10 cents. For sale by all newsdealers.

I. AGRICULTURE.—Improved Hay Press.—A simple hay press recently exhibited in England.—1 illustration.....	10041
II. ASTRONOMY.—Telescopes: Their History and the Discoveries Made with them.—The development of the instrument from the days of Galileo to the present age: the Lick telescope and its future.....	10047
III. BOTANY.—The Great Alpine Rock-foil.—A valuable flower for garden culture.—1 illustration.....	10054
IV. CHEMISTRY.—Estimation of Metallic Iron in Slag.—A very simple and rapid volumetric estimation.—1 illustration.....	10053
Orsat's Apparatus.—An improvement in the copper holding tubes.—1 illustration.....	10053
Preparation of Nitrogen and Analysis of Air by Nitric Oxide.—By T. O'CONNOR SLOANE, Ph.D.—A new, simple and rapid method for analyzing air, especially suited for purposes of lecture illustration.....	10050
V. ELECTRICITY.—Electric Energy from Carbon without Heat.—By WILLARD E. CASE.—A most interesting investigation into the action of a new battery combination.....	10049
Electrical Telephone Boxes.—Some most interesting evidence presented in the Cushman telephone suit in Boston.—Cushman's early telephones of 1852.—3 illustrations.....	10050
Hughes' Induction Balance.—By J. COOK.—A new use for this instrument suggested.....	10049
Zinc-Copper and Tin-Copper Alloys.—By A. P. LAURIE.—Investigation of the action of alloys in the Daniell battery.....	10054
VI. MEDICINE AND HYGIENE.—Etiology of Scarlet Fever.—By Dr. E. KLEIN, F.R.S.—The full paper describing the production of zymotic diseases by milk, which has attracted so much attention recently.....	10040
VII. METALLURGY.—Zinc-Copper and Tin-Copper Alloys.—By A. P. LAURIE.....	10054
VIII. MISCELLANEOUS.—Asbestos Theater Curtains.—The fire-proof curtain recently put in place in Terry's Theater, London, described and illustrated.—2 illustrations.....	10041
Composition for Softening and Purifying Water.....	10044
Sanitary Trains.—The system of ambulance cars for railways, now under experimental trial in France.—An important addition to military service.—3 illustrations.....	10039
Snow Hall of Natural History at Lawrence, Kan.—New natural history building of the Kansas University.—1 illustration and full plans.....	10050
The Primitive Serpents of the Aryans.—By Canon ISAAC TAYLOR.—Recent theories of origin and possible identity of the Aryan and Finnish families.....	10054
IX. PHOTOGRAPHY.—A New Platinotype Process.—An improvement in the Pizzighelli process, with full formulae and details.....	10046
Photo-Wrinkles.—By ALEXANDER KELLAR.—An interesting series of practical notes in photographic manipulation.—6 illustrations.....	10046
X. PHYSICS.—A Thermostat.—By L. RUGGHEIMER.—A simple apparatus for maintaining an even temperature.—1 illustration.....	10053
The Galioscope.—A simple apparatus for illustrating the principle of Foucault's experiment with the pendulum.—1 illustration.....	10047
Universal Optical Apparatus.—By V. L. ROSENBERG, of St. Petersburg.—An interesting and simply constructed apparatus for illustrating the refraction and reflection of light by different objects.—3 illustrations.....	10048
XI. TECHNOLOGY.—Chemical and Allied Industries.—By WATSON SMITH.—Continuation of this important paper.....	10051
Distilling and Maturing Alcohols.—Improved apparatus for the above purpose described.—1 illustration.....	10053
Eli Terry and the First Wooden Clocks.—By CHARLES S. CROSSMAN.—A very interesting notice of the founder of the famous New England industry.....	10044
Polishing Metals and Polishing Agents.—A practical treatment of this interesting subject.—The effects and processes of burnishing and buffing compared.....	10046
The Development of the Mercurial Air Pump.—By Professor SILVANUS P. THOMPSON.—First illustration of a most interesting lecture on this subject.—The pump of Swedenborg, the Florence tube, and other early apparatus described, with full historical data.—12 illustrations.....	10042
Wool Hat Making.—The third installment of this valuable paper, carrying the process down to the final operation.—8 illustrations.....	10045
Writing Apparatus for Engraving Small Figures.—By A. REPSOLD and SOHNE.—An ingenious pantograph for microscopic writing.—1 illustration.....	10041

THE INDIANA PATENT BILL.

Hon. Mr. Holman, of Indiana, has introduced the following bill in the House of Representatives, No. 1344:

"A BILL TO SECURE TO THE PUBLIC THE USE OF PATENTED INVENTIONS.

"Be it enacted by the Senate and House of Representatives of the United States of America, in Congress assembled, That all persons or corporations, whether owners or licensees of patents granted by the United States, are prohibited from withdrawing any machine or process from public use because of any regulation of the tariff of charges by the legislature of any State or Territory wherein such machine or process is being used, without the consent of such legislature."

The same bill was introduced at the last session of Congress by the same member, but failed to pass, and we earnestly hope this renewed attempt will share the same fate.

If this bill should pass, it would be within the power of any State or Territorial legislature to subject citizens to the most serious losses. Among the first to suffer would be widows and orphans. All who hold investments in patented properties would be liable to be robbed of their incomes, the same as already has happened in Indiana with the telephone owners.

The Supreme Court of the United States decided long ago that all State laws for regulating the sale or disposition of patented inventions were unconstitutional and void, for the reason that the exclusive authority in such matters is by the Constitution exclusively vested in the Congress.

For some unexplained reason, the authorities of the State of Indiana have for years treated the Supreme Court decisions with contempt, and there are to-day among the Indiana statutes several laws relating to patents that are at variance with the paramount authority of the United States. The most recent Indian effort in this line is the State law that regulates the price at which patented telephones may be sold. The law specifies that no telephone company shall charge more than \$3 a month for use of same; thus taking entirely away from the patentee all voice in or control of his invention. The validity of this law has been sustained by the highest tribunal of the State of Indiana, and is now in force there. The result is that the Bell telephone companies in several of the cities of the State were obliged to withdraw their instruments from use, as the amount allowed by the local law was not sufficient to pay them any profit.

Indiana has profited vastly, in common with all of the States, from the many new industries and manufactures which inventive genius has created and given the country. The industrial prosperity of the State is largely based upon the wealth which has been brought in to her by the use of new improvements and inventions. If they are to be withdrawn or discouraged, property values must necessarily decline, and manufacturing industries must be removed to more congenial places.

ELECTRIC ENERGY FROM CARBON WITHOUT HEAT.

IN SUPPLEMENT, No. 629, issued this week, we print a paper with the above title by the well known electrician, Mr. Willard E. Case. It gives the details of an investigation of a platinum-carbon battery. Carbon in various forms was experimented with as a positive plate of a voltaic couple, while platinum was used as the negative element. An oxidizing solution, formed by mixing chlorate of potash and sulphuric acid, was used as exciter and solvent for the carbon, and a current was obtained. The active agent in the solution was ascertained to be ClO_2 , or peroxide of chlorine.

Various changes in the carbon electrode and in the solution gave different electromotive forces, a range from .08 to 1.25 volt being obtained. These results were obtained without any heat, and in them the investigator sees a possibility of evading the second law of thermodynamics. As the carbon is burned without heat, and the energy set free is converted directly into mechanical energy, he hopes to obtain a far higher return for carbon consumed than is possible with the steam or heat engine and dynamo, where, at most, but fifteen per cent of the heat of the carbon can be converted into mechanical energy, and where a further loss is encountered in the conversion of this into electric energy.

So far the investigation has not assumed a practical form, but it will be a triumph of theory if we are able to effect this direct conversion of the heat energy of carbon combining with oxygen into electricity. Many points are not touched upon by the author. He does not say whether his platinum was completely protected by the carbon, or whether bubbles of carbonic acid gas escaped from the dissolving carbon. The investigation indicates a most interesting line of experiment and one which we can but hope will be carried out to some result that will have a bearing on practice. The solutions used are too expensive to give the present experiments more than a scientific interest. But at least they open a door for future work that may yet produce a carbon-consuming battery that will supplant the present type.

Incidentally another point is strongly brought out. It is that the expense of working a battery is not only due to the consumption of the positive element, which is generally zinc, but that the cost of the solution may have just as much to do with it. It shows that there is room for vast improvements on primary batteries. Electricians may yet find themselves wrong in so generally considering the subject of the economical use of primary batteries in competition with dynamos a wild and impracticable theme for work and study.

SUCCESS OF THE MILLION-DOLLAR TELESCOPE.

The great refracting telescope of the Lick Observatory, Mount Hamilton, Cal., is now in place, and had its first "official" trial on the evening of the 7th inst. The sky was clear and the weather cool. The big telescope was at first pointed at the nebula in the constellation Orion, which appeared to Messrs. Clark, Swazy, Keeler, and Floyd more magnificent than ever before. About 12 o'clock Saturn was also observed, with satisfaction. Only medium power was used, and the observation closed about midnight.

The size of the object glass is 36 inches. It is the most powerful telescope in the world. A magnifying power of 2,000 diameters, it is expected, can be employed on suitable objects. Applied to the moon, it is believed the new telescope will show almost anything that has a bulk of say 300 feet square. If there are any such buildings on the moon as the capitol of the United States, or such works as the Brooklyn bridge, rivers or oceans with large vessels upon them, the great telescope will reveal the fact. But unless all previous observations are greatly at fault, no water, no atmosphere, no people, exist on the moon like those of our globe. Much new and interesting knowledge may, however, be hoped for in respect to the moon and the heavenly bodies when the new instrument is fully worked.

A dispatch to the *N. Y. Herald* says that on the night of the 10th inst. at the Lick Observatory the cold was so intense as to freeze the dome of the observatory and prevent easy observation. However, several short trials were made. The most important was by Captain Floyd and Professor Keeler, who saw the eight rings of Saturn clearly divided. Professor Keeler had an unexcelled view of a division of the outer ring of Saturn on the night of the 7th.

A few nights ago Captain Floyd and others were looking at the constellation Orion, when he detected a little star in the trapezium which is in the sword of Orion. Mr. Clark, on looking, also said he saw the star. No star has ever before been seen in the trapezium.

Saturn and Neptune are the only planets that have been so far viewed, the other principal planets having not yet been in good position at a comfortable hour.

Apprentices of Past and Present Days.

The *Carriage Monthly* thus contrasts the apprentice of former times to those of the present:

Apprentices of the present generation are ignorant of the hardships and misfortunes of the boys in by-gone days. The latter were members of the master's family, boarding and sleeping with them. Part of his business was to mind the children, if there was any, run all the errands for the household and shop from 5 o'clock in the morning until 7 o'clock in the evening, and sometimes even later than that. Many of the boys of the present day do not believe this, but it is nevertheless true. The boy had to stay as long as the agreement made called for, and if he ran away he was considered an outcast. If the parents of the boy could raise a certain sum, the term of the apprenticeship was shortened according to the amount of money paid. In time these boys became good mechanics, obtaining a thorough knowledge of their trade.

The apprentice of to-day is considered equal in standing with the mechanic. He commences work at 7 o'clock in the morning and quits at 6 in the evening, in some cases earlier, and is never kept over his regular time. The employer treats him the same as he does his workmen, sometimes better, and he is paid either by agreement or what he is worth. There are many who still would like to see the old apprenticeship system of fifty years ago in force again.

Curious Geological Phenomena.

The Cordillera of the Andes has for some time been exhibiting a curious phenomenon. It results from observations made upon the altitudes of the most important points, that their height is gradually diminishing.

Quito, which in 1745 was 9,596 feet above the level of the sea, was only 9,570 feet in 1803, 9,567 in 1831, and scarcely 9,520 in 1867. The altitude of Quito has therefore diminished by 76 feet in the space of 122 years. Another peak, the Pichincha, has diminished by 218 feet during the same period, and its crater has descended 425 feet in the last 25 years. That of Antisana has sunk 165 feet in 64 years.—*La Gazette Geographique*.

Trade Marks in the English Patent Office.

In England they have a Comptroller-General of Patents, Designs, and Trade Marks, an official who corresponds to our Commissioner of Patents. He and his staff of civil service officials appear disposed to deal as erratically with the subject of trade marks as does our less be-titled official and his subordinates. We have received from a correspondent in London a most amusing tale of the persistent but unsuccessful attempt of one of the leading patent attorneys in England to have the word "Yum-Yum" registered as a trade mark for whisky, etc. As a preliminary illustration of the inconsistency of its rulings as to non-descriptive words ("fancy words") is the characterization of the British Trade Mark Act), our correspondent cites the following instances: "Cook's Best Friend" has been refused, and "Housekeeper's Friend," "Housewife's Friend," and "Carver's Friend," have been accepted. "Sunlight Soaps" has, he understands, been registered for one firm, and "Suaviter," also for soap, has been rejected for another. To return to "Yum-Yum." This seems a "fancy word." Yet the "Tite Barnacles," as our correspondent terms the patent office people, after Dickens, paused and asked for information concerning the word before passing or refusing it. The meaning of the word was asked for. The applicant's attorneys answered in a facetious yet carefully worded letter, expressing doubt as to any fixed meaning attaching to "Yum-Yum," except that it meant substantially, "how nice," and was credited to savages as expressive of their satisfaction coupled with a desire for more. A reference to the opera "Mikado," with appropriate quotations, etc., was included in the letter. In response, the solemn official letter came, asking whether "Yum-Yum" was a Japanese word or name, stating that in the prosecution of a previous application it had been found that "Ko-Ko," the name of a well known character of the same opera, had been shown to be a Japanese name. This letter was answered, the agents saying that they knew no instance of a Japanese bearing such name, and intimating that they did not see what Japan had to do with the matter. The last official letter, closing the correspondence, was a definite rejection. It was based on the admission by the attorneys that the word was an exclamation of delight. Hence, it was declared not a subject for registry. The point taken by the office seems to have been that it was not a "word," or if it is, it conveys, according to the attorneys' letter, a descriptive meaning. In an oral hearing, the same decision was rendered. We regret that we are unable to give the full correspondence. It shows much humor on the agents' part, that is in excellent contrast with the solemnity of the official letters. The whole affair shows that we are not the only nation suffering by inconsistent rulings in the patent office.

Value of Eggs for Food.

Many of our best farmers have arrived at the conclusion that poultry raising is the most profitable thing they can engage in. Of the egg alone the London Standard, after stating of what it is composed, mentions the various purposes for which it is used.

Every element, the writer says, that is necessary to the support of man is contained within the limits of an egg shell, in the best proportions and in the most palatable form. Plain boiled, they are wholesome. The masters of French cookery, however, affirm that it is easy to dress them in more than 500 different ways, each method not only economical, but salutary in the highest degree. No honest appetite ever yet rejected an egg in some guise. It is nutriment in the most portable form and in the most concentrated shape. Whole nations of mankind rarely touch any other animal food. Kings eat them plain as readily as do the humble tradesmen. After the victory of Muhlendorf, when the Kaiser Ludwig sat at a meal with his burggrafs and great captains, he determined on a piece of luxury—"one egg to every man, and two to the excellently valiant Schwepperman." Far more than fish—for it is watery diet—eggs are the scholar's fare. They contain phosphorus, which is brain food, and sulphur, which performs a variety of functions in the economy. And they are the best of nutriment for children, for, in a compact form, they contain everything that is necessary for the growth of the youthful frame. Eggs are, however, not only food—they are medicine also. The white is the most efficacious of remedies for burns, and the oil extractable from the yolk is regarded by the Russians as an almost miraculous salve for cuts, bruises, and scratches.

A raw egg, if swallowed in time, will effectually detach a fish bone fastened in the throat, and the white of two eggs will render the deadly corrosive sublimate as harmless as a dose of calomel. They strengthen the consumptive, invigorate the feeble, and render the most susceptible all but proof against jaundice in its more malignant phase. They can also be drunk in the shape of that "egg flip" which sustains the oratorical efforts of modern statesmen. The merits of eggs do not even end here. In France alone the wine clarifiers use more than 80,000,000 a year, and the Alsations consume fully 38,000,000 in calico printing and for dressing

the leather used in making the finest of French kid gloves. Finally, not to mention various other employments for eggs in the arts, they may, of course, almost without trouble on the farmer's part, be converted into fowls, which, in any shape, are profitable to the seller and welcome to the buyer. Even egg shells are valuable, for allopath and homeopath alike agree in regarding them as the purest of carbonate of lime.

New Process of Paper Making.

The object of this invention is so to arrange the various machines or apparatus for treating esparto, straw, etc., that a continuous process can be carried on direct from the fiber boilers to the paper making machine without the materials being handled by the workmen as hitherto.

In the first place the boilers are emptied and their contents placed upon an arrangement of endless traveling lattices, which carry it to the breaking and washing engines. It is then conveyed into the chests to supply the half-stuff or cleaning machine, after which it is run into a store chest to supply the bleaching engines. After bleaching it passes into a chest to supply the beaters, from whence it is finally conveyed to the paper making machine.

The advantage of this process is that the fiber is maintained in a wet condition throughout the entire process of manufacture, and therefore contributes largely to the saving of both material and time in moving from one process to another. This can readily be done automatically in buildings where the various machinery is subdivided and arranged upon different floors, but in any case where this advantage does not exist, pumps and small stock chests are so arranged that no difficulty presents itself. This system will dispense with the making of the stuff into a solid at the *presse pate* machine.—*Paper Making*.

Liquid Amalgam.

An interesting account of a series of experiments upon the so-called alloy between the metals sodium and potassium is given by M. Joannis in the current number of the *Annales de Chimie et Physique*. For some years it has been known that, although in many respects so similar, these two metals possess a certain affinity for each other, and unite under suitable circumstances to form a liquid amalgam-like substance. M. Joannis has at length shown that a definite compound, NaK₂, is formed with considerable evolution of heat when the fused metals are brought together in the right proportion. In order to prove this fact, thermo-chemical methods were resorted to, liquid mixtures of the composition Na₂K, NaK, NaK₂, and NaK₃ being successively introduced into the calorimeter.

The hydrogen liberated by decomposition of the water in the calorimeter was caused to pass first through a perforated platinum plate, and afterward through a long thin-walled glass spiral, eventually escaping in minute bubbles through the water itself, after becoming reduced to the temperature of the calorimeter. The liquid mixture of metals was gradually introduced by means of an ingenious apparatus consisting of a drawn-out delivery tube containing the alloy between two layers of protecting naphtha, and which, by means of a valve, could be placed in communication with a reservoir of compressed air, so that, by regulating the valve, a gentle stream of the liquid could be forced out as required. When the calorimetrical experiments were concluded, the amount of alkali was determined in an aliquot part of the water in the calorimeter, and thus the amount of metal used could be arrived at.

From the data afforded by these experiments, M. Joannis appears to have conclusively shown that the only stable compound is NaK₂, all others being mixtures of this with excess of one or other of the two metals. It is very satisfactory that a reliable method has at last been found of distinguishing between true compounds and physical mixtures of metals, and rather remarkable that one of the earlier analyses of the most stable combination of sodium and potassium gave as the percentage of potassium 76.5, a number which closely approximates to that required for NaK₂.—*Nature*.

Balfour Stewart.

We regret to announce the somewhat sudden death of Professor Balfour Stewart, M.A., LL.D., F.R.S. Mr. Balfour Stewart, who had only just completed his 59th year, was educated at the Universities of St. Andrews and Edinburgh. In 1859 he was appointed to the directorship of the Kew Observatory, and in 1867 to the secretaryship of the Meteorological Committee, which last appointment he resigned on his promotion to the professor's chair of natural philosophy in Owen's College, Manchester, in the year 1870, a post which he held until his death.

Two years before this distinction was conferred upon him he had been awarded the Rumford medal by the Royal Society for his discovery of the law of equality between the absorptive and radiative powers of bodies. Together with Messrs. De la Rue and Loewy he wrote

"Researches on Solar Physics," and he and Professor Tait published their researches on "Heating Produced by Rotation in Vacuo." Besides these, he wrote a number of treatises especially on the subjects of meteorology and magnetism. The article in the "Encyclopædia Britannica" on "Terrestrial Magnetism" is from Professor Balfour Stewart's pen. Among the many works of which he was sole or joint author may be mentioned the "Elementary Treatise on Heat," "Lessons in Elementary Physics" (1871), "Physics" (1872), "The Conservation of Energy" (1874), and "Practical Physics" (1885). Most of these are text books on the subjects of which they treat. He and Professor Tait also produced the "Unseen Universe," a work of which twelve editions have been published. At the time of his death he was president of the Physical Society, and was a member of the committee appointed to advise the government on solar physics. Professor Balfour Stewart died on Monday, Dec. 19, at Ballymagarvey, Balrath, in the county of Meath.—*Electrical Review*.

Steel Armor-Piercing Projectiles.

Passing events in connection with the development of our artillery are constantly reminding us that the battle of the guns and plates is not yet ended. At the present time, however, it is not so much the guns as the projectiles that are pitted against the plates and are making their mark—and a pretty deep one, too! We are reminded of this by some successful trials that have recently taken place at Shoeburyness with steel projectiles made by the Hadfield Steel Company, of Sheffield. The first trial was that of a 6 inch projectile against a Cammell compound plate 9 inches thick by 4 feet square, 3 inches of the plate, that is, the front part, being of very hard steel. This plate, which had 12 feet of oak backing, was a new one, and had never been weakened by any previous rounds. The Hadfield projectile successfully penetrated the plate and passed 5 feet into the wood backing. It was found broken into only three pieces, which could be fitted together, showing how well the projectile had stood this severe test. To show its severity, it may be mentioned that the present service Palliser chilled projectile fired at a similar plate would only have made an indent 3 or 4 inches deep, or barely through the steel face. In fact, this 6 inch breech loading gun, comparatively a very small one, fired with a Hadfield steel projectile of the high quality just described, would penetrate armor on all but our heaviest armored ships, which also speaks well for the improvement in the power of our guns. A Hadfield projectile 9.2 inches diameter (say 9½ inches) has, at Shoeburyness, gone through a 16 inch wrought iron plate, 6 feet of wood, and 8½ inches into a second plate behind. This gives a total penetration of over 2 feet, and yet the projectile was but little injured. The trial of the Hadfield 12 inch projectile, weighing nearly half a ton, was conducted against a 16 inch Brown compound plate. The velocity was about 1,900 feet per second at 100 yards range. The projectile passed through this plate and some distance into the wood backing behind. It was there found, and although fractured, it had arched the plate in addition to penetrating it. These results are still more noticeable as being the first English projectiles to successfully pierce compound plates. If encouraged in the way foreign governments encourage their projectile manufacturers, the Hadfield Steel Company would, doubtless, still further improve their projectiles; and it must be borne in mind that while some special foreign projectiles have penetrated compound plates without breaking up, this is not the rule.—*Iron*.

Concealment of Torpedo Boats.

One well known drawback in torpedo boats is the visibility of the flame and smoke when within a distance of 2,500 to 3,000 yards of the object to be attacked. Experiments at the Rochefort Arsenal and on the Seine with an apparatus invented by an engineer of the name of Oriollo, of Nantes, as is reported, have demonstrated that his arrangement is capable at night of quite obscuring the torpedo boat. The flame and sparks disappear, the smoke, which is reduced in temperature from 100 degrees to 30 or 40 degrees, spreads itself out in a horizontal layer over the surface of the water, becomes inhalable, and envelops the boat in an impenetrable vapor, which defies the electric search light to discover the boat. A notable point in the application of the arrangement is that it in no way whatever interferes with the proper working of the engines or the boat. The steam pressure and the speed remain undiminished. The improvement is confined exclusively to the funnel, and the extra weight which it adds to the boat is insignificant. France is engaged in applying this improvement, and Spain and Italy will, probably, shortly introduce it to their navies.

COL. AUCHMUTY, founder of the New York Trade Schools, which were illustrated and described in these columns some time ago, says: "There are 150 young men in the evening plumbing class, and in the day plumbing class there are 35. They come from various parts of the United States."