beatifully-polished marble, which at present is entirely inaccessible. The country traversed was barren beyond description, and is pronounced by Colonel Powell as not susceptible of cultivation, even by irrigation.

Correspondence.

The Editors are not responsible for the Opinions expressed by their Correspondents.

The Assimilation of Inorganic Substances in the Animal Economy.

Messrs. Editors:—In criticising some remarks on phosphatic bread, which appeared in the Scientific American of September 11th, you ask for the writer's authority for the statement there made, that inorganic matter cannot be assimilated by the animal organism. After a more thorough examination for authority, we are willing to admit that the proposition in question might have been submitted with greater caution.

The "ordinary facts" to which you advert, relating to common salt in food and to preparations of iron administered by physicians to chlorotic patients, if facts, are by no means universally admitted by chemists and physiologists.

Dr. Bellows (late Professor of Chemistry, Physiology, and Hygiene) says of salt, "It is not in any sense nutriment as it does not furnish support to any organ or function, and does nothing toward sustaining life, as has often been proved in the case of the famished sailor who only increases his sufferings by taking salt water in very small quantities." He also says: "There is enough salt in common natural food to account for all the salt actually incorporated into the system."

Frederick William Headland, of the Royal College of Physicians, in London, in a standard work on the action of medicines, in attempting to prove that the iron from the shops does enter into the blood as a part of it says: "In some cases of chlorosis the blood was analyzed before giving iron, and after it had been given for a few weeks, and was found to contain more of red globules after taking the iron than before." But says Dr. Bellows, "scores of cases can be brought where under a different treatment the results were the same and even more striking, without a particle of iron, and my explanation is, that the effect of the iron was that of a mere stimulant promoting sanguification from food taken in the meantime containing iron." Joseph R. Parks.

Muscatine, Iowa.

[Would it not be well for our correspondent to extend his reading to some other author than Dr. Bellows? This brilliant meteor of science has not yet flashed across our horizon; we do not find his name enrolled on any list of standard authorities in our possession. There is evidently some confusion in the minds of some of our correspondents on the constituents of animal and vegetable tissue, and as to what ought to be regarded as organic and inorganic substances. We will, when convenient endeavor to set them right on these points. —Eds.

Spectrum Lines of Aurora.

Messrs. Editors:—During these times of auroral abundance our Canadian skies frequently present interesting scenes. Shortly after midnight on the morning of Sept. 3d, aurora borealis hung over us, waving like luminous canvas floating in the breeze, and forming a brilliant corona near the star Scheat, in Pegasus. The light seemed to flow in two currents, the uppermost remaining quiet, and the lower current changing with great rapidity.

On this occasion I submitted the aurora to careful spectrum analysis, and am happy to report an observation made with the spectroscope, which may help to settle the question of the nature of polar light. I succeeded in obtaining a distinct spectrum, consisting of one very bright line in the yellow and one faint line in the green. The bright line was close to the sodium line D, and coincident with an air line in the solar spectrum. The dim line in the green I could not identify as belonging to any known substance.

The conclusions resulting from the identification of the bright line in the spectrum of aurora are important, showing that polar light is principally incandescent oxygen gas.

The presence of this gas in excess, in regions traversed by aurora, may result from the decomposition of water. The electric currents effecting the separation and rendering the oxygen luminous. The re-union of oxygen and hydrogen form water again, which is visible as a turbid atmosphere, noticeable during auroral displays. But it may be asked, Why do not the lines of hydrogen appear in the spectrum of aurora? The answer is, because its temperature is not sufficiently high to render the gas incandescent. In a partial vacuum oxygen is luminous at a lower temperature than hydrogen, because of its density, which is sixteen times greater, and still increased by the continuous passage of electric currents.

Another question that may arise is this, Why does the air line in the spectrum of aurora appear bright, while the same line in the solar spectrum is black? An explanation is found in the fact that there is no sufficient absorbing medium, between the aurora light or luminous oxygen, and the earth, while the solar line is seen after absorption by its passage through a deep luminous stratum of the earth's atmosphere.

Toronto, C. W. D. K. Winder.

Cutters on Reaping Machines.

Messrs. Editors:—Your correspondent in No. 11, current volume. is very much in error in some of his statements, in his criticism of one or two former communications on the subject of cutters for reaping machines: While I fully agree with him that the serrated sections are best, I see no reason for his great "surprise that any one should advocate smooth edges"; in as much as the fact that a great majority of machines have smooth cutters, will abundantly prove that your former correspondent is well sustained. In the second place, it is a great mistake to suppose that "the serrated sections are as hard as it is possible to make steel;" for in that case they would be nearly valueless, as they could neither be straightened nor sharpened; and a long experience with reaping machines in a rough country, has taught me that the bending and battering of these sections are of daily occurrence, and that they can be straightened and ground with impunity. John Milton.

Hillsboro, Va.

The Scientific American Under a Corner Stone.

Messrs. Editors:—Please send me a copy of the Scientific American for September 8, 1869. On the occasion of the laying of the corner stone of the Wesleyan church at this place, my copy of the above date arrived just in time for me to inclose it with the other papers and documents, which, in a hermetically sealed metallic box, were deposited in their (probably) long resting place beneath the corner stone.

I thought that possibly in the far future, the contents of that box might see the light once more, and that no paper on this continent could convey to future generations so correct an idea of the civilization and materal condition of the world in the latter half of the nineteenth century as a copy of the Scientific American.

I thought too, of the "good time" the printers, engravers, inventors, and scientists of that (future) age would have over the resurrection of a well-preserved copy of the Scientifc American of September 18, 1869.

Perhaps, long after your able efforts are ended, and your dust has mingled with mother earth, some future editor of the Scientific American will be permitted to see this embodiment of the invention, art, and science of the present day, and write a splendid leader on "Wonderful results of Invention: The Nineteenth Century and the Present Age," or some other theme which so pregnant a sheet would suggest.

Meantime be it mine to thank you for the pleasure and instruction which your journal always affords me.

James Stimson, M. D.

St. George, Brant Co., Ontario.

The Hartford Steam Boiler Inspection and Insurance Company.

This company make the following report for the month of August, 1869:

During the month 390 visits of inspection have been made, 584 boilers examined, 579 externally, and 156 internally, and 45 tested by hydrostatic pressure. The number of defects discovered, 403—of which 20 were especially dangerous. These defects were as follows: Furnaces out of shape, 17—1 dangerous; fractures in all, 196; burned plates, 25—1 dangerous; blistered plates, 38—1 dangerous; cases of incrustation and scale, 57—2 dangerous; cases of external corrosion, 26—5 dangerous; cases of internal corrosion, 1; cases of internal grooving, 1; water gages out of order, 8; blow out apparatus out of order, 6; safety valve overloaded, 15—6 dangerous; pressure gages out of order, 39—1 dangerous; boilers without gages, 5; cases of deficiency of water, 5; boilers without blow-out apparatus, 1—dangerous; boilers condemned as unfit for use, 2—both dangerous.

In commenting upon the above record, we can say but little that has not already been said. A marked improvement in one respect, however, will be noticed. And that is, that there are less dangerous defects than are usuallly noticed in our monthly reports, and as the business of the company increases, this improvement in the condition of boilers under its care will be more and more apparent, for when defects are discovered by the inspectors' periodical visits, they are pointed out and at once repaired. The expense is comparatively small, little time is required, and the boiler or boilers are thus kept in good condition.

When boilers are left for months or years without careful examination, they become badly corroded, incrusted, or burned, so that when they are overhauled for repairs, they are often found not worth repairing, or if repaired, at a cost nearly equaling the expense of new ones. It is an old adage that "a stitch in time saves nine," and this is as true in the case of steam boilers, as in the case of the good housewife who "sews tares while the husbandman sleeps."

Fractures, which are too numerous, are the result, either of faulty construction or poor management. Mr. Henry Hiller, chief engineer of the National Boiler Insurance Co., of Manchester, England, in his annual report, says of this difficulty. "The fractures at the seams and over the furnaces of externally fired boilers, some of which were of a most dangerous character, were due to various causes; viz., faulty arrangements of feed pipes, sedimentary water, or irregular working and firing. When the feed water contains much sediment, frequent cleaning of the interior of this class of boiler is especially necessary."

External corrosion is a serious evil, and one to which careful attention should be given. Boilers that are bricked in, are especially liable to this difficulty. A slight leak at the seams, goes on wearing away the plates until they are reduced to a very dangerous thinness. We have in our collection several specimens showing the insidious work of this evil. One specimen of plate is reduced to the thinness of paper, and the day before our inspector discovered it, 80-pounds pressure was used on the boiler. We copy from the report of Mr. Edward B. Marten, chief engineer of the Midland Boiler Inspection and Assurance Co., Stourbridge, England, with whose report we have recently been favored.

"In one or two cases frequent warnings as to damage going on from leaking fittings have been disregarded, until absolute danger has been reported, and when the boilers have been cleaned off and examined, those in charge have been dismayed at the extent of the corrosion in a short time. All leaking in the brick work around boilers should be entirely stopped if they are to last their proper time and work in safety." The over-loading of safety valves is still a prevalent evil, and one the steam users should be more particular in guarding against. The safety valve should be frequently raised, but this should be gently done. Never raise it suddenly, nor let it drop heavily upon its seat, for, by so doing the spindle may be bent, thus making its seating imperfect.

One of our inspectors reports 2 safety valves with corroded seats, and rusted fast. Now it is evident that an inoperative safety valve is worse than none, for while there is the appearance of safety, there is positive danger.

It will be noticed that 2 boilers have been condemned as unfit for use. The searching investigation which is given to boilers will discover weak points, if such there are, and we presume that many boilers in use would be at once condemned if they were thorough inspected by competent men.

We could extend these comments on all the defects and defective attachments of boilers, but space forbids. We shall take up other points in future.

Obituary.—Thomas Graham Chemist.

A cable dispatch from London reports the death in that city of Thomas Graham, the celebrated chemist and Master of the Mint. He was born in Glasgow, Scotland, on the 21st of December, 1805—his father being a merchant and manufacturer in that city. Mr. Graham was educated at Glasgow School, and subsequently at the University of Glasgow, where he graduated, taking the degree of M.A., in 1826. He then moved to Edinburgh, but at the end of two years, returned to his native place and established a laboratory for the practical study of chemistry. He also lectured at the Mechanics' Institute, and was elected Andersonian Professor at Glasgow. This office he held until 1837, when he resigned for the purpose of accepting the Professorship of Chemistry in the London University, to which he had been appointed. In 1855 Sir John Herschel retired from the Mastership of the Mint, and Mr. Graham was appointed to fill the vacancy, holding the position with credit until his death.

There has probably been no chemist in Great Britain of equal ability to Mr. Graham during the past quarter of a century. His study of the sciences was complete, and his discoveries and works have been of great scientific importance to the world. His most remarkable discoveries were the law of the diffusion of gases, the diffusion of liquids, and the new method of separation known as dialysis. For the first named discovery he received the Kieth prize of the Royal Society of Edinburgh in 1834, and for the last, the Copley medal of the Royal Society in 1862. Of his literary productions, the most important and best known, is "Elements of Chemistry," which has been extensively circulated and read in Great Britain and Germany, and is also a familiar work to scientific students in the United States and other parts of the world. Mr. Graham was elected a Fellow of the Royal Society in 1836, a corresponding member of the Academy of Sciences of the Institute of France in 1848, and was created an honorary D.C.L. by Oxford University in 1855.

The readers of the Scientific American will remember the account given on page 244, of our last volume, of the discoveries made by Mr. Graham respecting the properties of hydrogen.

Gas for Lighthouses.

A series of letters and reports sent to the Commissioners of Lighthouses and the Board of Trade has resulted in a request being made to Professor Tyndall, by the latter body, that he would report upon the proposal to substitute gas for oil as an illuminating power for lighthouses, as illustrated in the lighthouses of Howth Baily and Wicklow Head. Various experiments were made at Howth Baily, and Professor Tyndall says that the superiority of the gas over the oil flame is rendered very conspicuous by these experiments. The 28-jet burner possesses 2½ times, the 48-jet burner 4¼ times, the 68-jet burner 7¼ times, the 88-jet burner 9¾ times, and the 108-jet burner 13 times the illuminating power of the four-wick flame. The oil lamp with which the gas flame was compared was the most perfect one employed by the Commissioners of Irish Lights. Further experiments were also made, and it appeared that the whole of the gas-lighting apparatus was entirely under the control of the keeper, and that no damage was likely to arise from it. The 28-jet gas burner, when seen from a position some miles off, appeared to be very nearly upon an equality with the oil lamps, but when muffled to represent a fog it had a slight advantage. Of course with the brighter jet burners a great improvement was apparent, and before the 108-jet burner the oil lamp grew quite pale. By the adoption of a system of gas lighting a great saving in cost would be effected; but such a system would not be possible on rock lighthouses. Professor Tyndall recommends the encouragement of this system of illumination in Ireland.

To kill cockroaches take carbolic acid and powdered camphor in equal parts; put them in a bottle; they will become fluid. With a painter's brush of the size called a sash tool, put the mixture on the cracks or places where the "critters" hide; they will come out at once. It is wonderful to see the heroism with which they move to certain death. Nothing more sublime in history; the extirpation is certain and complete. While on this theme I would add that a mixture of carbolic acid with water—one-fourth acid three-fourths water—put on a dog, will kill fleas at once. I have seen it tried.

G. W. B.

Darwinism and Design.

(From the Student.)

Darwinism is only one of several branches of a kind of philosophy long known to students of the historical developments of human thought. The Darwinian apparatus consists in a multitude of facts collected from an immense field of research, and pointing to particular methods by which hereditary changes in the organic world may lead to the preservation or extinction of particular forms. That offspring sometimes vary from the parent type is beyond dispute; that such variations are sometimes hereditary, is equally beyond dispute, nor can any one deny that when a modification arises which gives a group of creatures more power to fight their battle of life, they will be benefited thereby, and may multiply and flourish in situations where creatures not so modified would die out.

The extent to which Darwin's "Natural Selection" is sufficient to account for the changes that have occurred, is open to question. Laws and principles of which we have as yet no cognizance, may assume an importance we are not prepared for; but no fresh discovery can invalidate the facts on which Darwin and his followers rely. No one who has weeded a garden can doubt the reality of the "battle of life" which he portrays, and no one who has watched insects attacking plants, birds assailing insects, and climate with its fluctuations, frequently fighting against all, can doubt that the natural world does present a scene of struggle, in which the strongest and the best protected prevail, while the weaker and less protected have to give way.

Of course, such terms as "strong" and "weak" must be understood in a wide sense—a delicately-organized plant, for example, may be characterized by the former epithet, when compared with a much more robust vegetable, if it surpasses the latter in power of extracting nutriment from a particular soil, or in withstanding prolonged drought, excess of moisture, or extremes of temperature. But the natural world is not made up of contention and strife any more than those elements constitute the sum of human society. Natural adaptations of the most varied and wonderful kinds abound, none being more remarkable than those which the Darwinians adduce. What can be more amazing than the dependence of a flower upon an insect, so that the butterfly, moth, or humble bee is made the carrier of pollen from one corolla to another, and an animal thus provides for the perpetuation of a vegetable race. What savors more of design than the "mimicry" which has been frequently illustrated in our pages, a plan by which a defenseless creature assumes the aspect of a strong one, a delicate creature the appearance of a tough one, or a butterfly when perching on a twig becomes indistinguishable from a dead leaf, and in each case enemies are deceived, and security obtained?

If a new writer desired to compile the most elaborate and convincing series of design arguments, he would have recourse to the Darwinian armory for the most striking of recently ascertained facts. Why, then, is Darwinism in many quarters contrasted with and opposed to design? The answer may be found in the defects of the older forms of the design argument, rather than in any conclusion that logically follows from Darwinian speculations.

Many of the older comparative anatomists contented themselves with regarding animal or vegetable organization simply from what is called the teleological point of view. They saw, or fancied they saw, the final cause, or reason why, everything was done. They collected together a great mass of information concerning special adaptations, and it was assumed that no organ, or portion of an animal, not deformed, was without its special use to that particular creature; but plain and palpable facts did not sustain the universal application of this theory. Animals were found with rudimentary parts—bones, for example, which, if developed, might have supported a kangaroo-like pouch—to which no function could be assigned, and in these cases, which are very numerous, the doctrine of special application broke down. Then came theories of "types," and if anything appeared in a creature that was not of any use to it, the explanation was that the creature in question belonged to a group all formed according to "type," and the rudimentary, or useless part, was put in to make it conform to the typical idea, something like the procedure of the old gardener, who had a particular "type" of uniformity so strongly in his mind, that, having put a naughty boy in one corner, he put a good boy in the opposite one not to damage the design. Further knowledge left the "types" high and dry on the shores of metaphysical abstraction, and introduced the notion of descent with variations, according to which the occurrence of non-essential, useless, or rudimentary points admits of easy explanation.

That certain animals see because they have eyes, and that birds fly because they have wings, are statements not inconsistent with the doctrines of final causes, though it is easy to place them in opposition to the common assertion that the animals in question were endowed with eyes in order that they might see, and that the birds were gifted with wings in order that they might fly. To perfect the design argument when it is applied to elucidate a system of descent with modifications, struggles with life conditions, and the survival of the fittest, we have to show reasons for believing that the changes which occur in the organic world, follow a law, or set of laws, indicative of intelligence, and capable of working out beneficial results. At present, the physiological laws which determine the condition under which offspring faithfully transmit or depart from the peculiarities of the parental type are unknown, and it is only a very small portion of the natural plan that comes within cognizance. So that we cannot expect to have clear information as to either purposes or conclusions. Darwin observes, "however much we may wish it, we cannot blindly follow Professor Asa Grey in his belief, that variation has been led 'along certain beneficial lines like a stream along definite and useful lines of irrigation.' If we assume that each particular variation was from the beginning of all time preordained, the plasticity of organization which leads to many injurious deviations of structure, as well as that redundant power of reproduction which invariably leads to a struggle for existence, and as a consequence to the selection or survival of the fittest, must appear to us superfluous laws of nature."

We cited this passage and remarked upon it when it was first published in Mr. Darwin's "Plants and Animals under Domestication." His argument simply reminds us of a difficulty not at all peculiar to natural history or physiology, but which encounters us in all directions. Evidently it is not the design of nature to reach what we call good ends, without what look like breaks, interruptions, and failures. If speculations on the modifications of organic beings according to the principles of Mr. Darwin, bring us into contact with many fresh puzzles and perplexities of this description, they also supply a fresh store of facts, which tend to increase our belief that the system is conformable to our religious instincts and moral nature. No natural theologian can affirm that any theory yet propounded, supplies a satisfactory explanation of all the moral difficulties, or intellectual difficulties which stand in the way or a perfect comprehension of the character of the great plan. Why it is obviously benevolent in a thousand directions, and apparently harsh in a thousand others, we do not *know*, any more from Darwin than we did from Paley, but we certainly are not left in a denser mist; and as modern researches have enabled us to catch glimpses of a far wider, more complicated, and comprehensive plan than the older thinkers had any conception of, we may, while lamenting the limitations of our mental vision, take comfort in the belief that in the vast regions of the yet unknown, there lie ample satisfaction for all our hopes, and ample resolution of all our doubt.

How to Preserve Pencil Drawings.

An ingenious means of effecting this has been invented by M. E. Rouget, of Paris. This invention consists in obtaining the fixation of such drawings, tracings, or sketches, by directly projecting on these latter any suitable adhesive liquid reduced ty a fine spray, or in what is commonly called the atomized or pulverized state, by causing the liquid to pass rapidly under pressure through one or more capilliary tubes or openings. By this method the defects of the transudation process are entirely done away with, besides which the operation is executed in less time, and may be performed at once by the artist without the slightest difficulty. As for the fixation liquid, any colorless, or nearly colorless, liquid which allows of being atomized, and which, after becoming dry, causes the particles of the charcoal, or other drawing materials made use of, to adhere sufficiently firmly to the paper or other drawing surface, may serve for the purpose. Thus, for instance, a liquid, which has given the patentee the most satisfactory results, is obtained by adding to a solution of three ounces of white sugar candy and two ounces of white shellac in about two pints of spirits of wine, a decoction of about one ounce of fucus crispus in one pint of distilled water.

Extraordinary Phenomenon.

On the evening of the 30th May the inhabitants of Greiffenberg, Germany, and the neighboring villages, for more than a German mile in circuit, were the witnesses of an extraordinary natural phenomenon. Between nine and ten o'clock thunder clouds seemed to be gathering around the Iser and Risengebirge, to the south, while the rest of the sky appeared to be covered only by light clouds. Now and then a few flashes of lightning were seen in the far distance. Suddenly all eyes were blinded by a fall of fire, differing both in form and color from common lightning, which was followed in four or five seconds by a deep and terrific report, like a loud peal of thunder. All the windows rattled and the houses seemed shaken to their foundations. Those who were in the open air say that they seemed to be wrapped in fire and deprived of air some instants. A mild and moderate rain, without thunder or lightning, followed. Opinions differ as to whether the above appearances are to be attributed to a meteor or to a sudden discharge of electricity.

Radiation of Heat from the Moon.

The Earl of Rosse is making a series of experiments by means of a thermo-pile of four elements and a 3-foot telescope, to determine, if possible, what proportion of the moon's heat consists of: 1. That coming from the interior of the moon, which will not vary with the phase; 2. That which falls from the sun on the moon's surface, and is at once reflected regularly and irregularly; 3. That which falling from the sun on the moon's surface is absorbed, raises the temperature of the moon's surface, and is afterwards radiated as heat of low refrangibility. The chief result arrived at up to the present moment is, that (the radiating power of the moon being taken as equal to lampblack, and the earth's atmosphere supposed not to affect the result) a deviation of 90° for full moon appears to indicate an elevation of temperature =500° Fah. The relative amount of solar and lunar radiation was found=89819 : 1.

Pepsine.

After taking food, a fluid, called "gastric juice," flows into the stomach. This liquid contains an active principle which chemical philosophers term pepsine. This body possesses a remarkable property, namely, that of converting all those substances which are known as food from the solid to the fluid state; a condition clearly necessary for its assimilation or digestion before it can enter the tissues of the body, and form the new blood requisite to sustain life. Pepsine can be artificially extracted from the stomach of a recently killed animal, that of a pig or calf in particular, and when it is placed in contact with minced-up boiled egg, butcher's meat, etc., in a glass vessel, it dissolves the meat apparently in the same way as it does in the living stomach. Substances which are occasionally taken into the stomach, such as the stones of fruit, the rind of raisins, or Orleans plums, are unacted upon by pepsine; hence such substances are truly said to be indigestible. Physicians often administer pepsine in cases where indigestion of the ordinary food occurs, and in many cases with marked benefit. The inordinate use of tobacco, ardent spirits, and condiments, arrests the flow of the gastric juice; hence the evils resulting from it. The preparation sold by most druggists, under the name of pepsine, consists of dried and powdered glandular layers of the stomachs of pigs or calves.—*S. Piesse.*

Editorial Summary.

A HEALTHY MIND IN A HEALTHY BODY.—How beneficent is the scheme in which joy begets health, and health promotes joy. Good news will give a good digestion. The sight of land has cured the scurvy in sailors. And so the head and stomach act and re-act upon each other; the head being king, the stomach a loyal and ever-grateful subject, that bounteously returns all good favors. The stomach that is well served produces a healthy body, in which the healthy mind dwells at ease, and is ever fully alive to all honorable and holy pleasures. On the body in perfect health, the mind has perfect control. Then surely the first care of every rational being should be to put all in order in the mind's tenement, since the art of attaining high health is that of reaching sound morals and elevated thoughts.

NEW LIME LIGHT WITHOUT OXYGEN.—A brilliant and steady light has been obtained by the Messrs. Darker from a mixture of common gas and atmospheric air, the latter of which contains more than a fifth part of oxygen. The air and gas are either mixed as in the Bourbouze lamp, or are emitted singly, as in some forms of the oxy-hydrogen burner. Instead, however, of the intense heat thus obtained, being employed to raise to a white heat a platina gauze cap, as proposed two years ago by M. Bourbouze, Messrs. Darker cause the flame to impinge upon lime or magnesia, either singly or in combination with asbestos, and thus obtain a light of great purity and intensity. The lime light has thus been got without the trouble and expense attendant upon the employment of pure oxygen.

A BRONZING process, applicable to porcelain, stoneware, and composition, picture, and looking-glass frames is performed as follows: The articles are first done over with a thin solution of water-glass by the aid of a soft brush. Bronze powder is then dusted on, and any excess not adherent is knocked off by a few gentle taps. The article is next heated, to dry the silicate, and the bronze becomes firmly attached. Probably, in the case of porcelain, biscuit, or stoneware, some chemical union of the silicate will take place, but in other cases the water-glass will only tend to make the bronze powder adhere to the surface. After the heating, the bronze may be polished or burnished with agate tools.

AVERAGE DUTY OF CORNISH ENGINES.—An estimate of the average duty of this class of engines, based on observations made upon eighteen engines during one month, shows the following results: They have consumed 1,377 tuns of coal, and lifted 10·2 million tuns of water 10 fathoms high. The average duty of the whole is, therefore, 50,100,000 pounds, lifted one foot high, by the consumption of 112 pounds of coal.

A CURE FOR SOMNAMBULISM.—Professor Pellizzari, of Florence, has hit upon a cure for somnambulism. It simply consists in winding once or twice round one's leg, on going to bed, a thin flexible copper wire, long enough to reach the floor. Eighteen somnambulists, treaten in this way, have been either permanently or temporarily cured. The *Gazetta Medica*, of Venice, which reports the fact, says that copper wire is known to dissipate magnetic somnambulism, and that this circumstance led the professor to have recourse to this strange remedy.

TWO spirited Frenchmen, Messieurs Tissander and de Fouvièlle, have undertaken the daring enterprise of reaching the north pole in a balloon. The machine in which the bold adventurers are about to embark on their perilous journey, and which is appropriately named "Le Pôle Nord," is now being completed in the Champ de Mars, which the government have placed at their disposal for the purpose. The car, a marvel, it is said, of strength and lightness, is constructed to carry ten passengers, 4,000 lbs. of ballast, and provisions for a month.

THE GERNER BOILER.—In answer to some inquiries in relation to the heating surfaces of the two boilers, alluded to in our last issue under the above title, we would say that the heating surface of the stationary boiler tested is 144 square feet, and that of the marine boiler at the offices of the New York and Erie Railroad is 400 square feet.

MR. LOCKWOODE, in referring to his article on the Manufacture of Plate Glass, page 199, current volume, wishes us to say that the grinding machines of the Birmingham Works turn out 12,000 feet of glass, and that the Lenox Company commenced their operations at Cheshire, Mass.