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 capillary 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.

Improved Machine for Cutting Staves.

Two classes of machines have been employed for cutting staves; namely, those which operate upon the principle of cleavage, the wood being first steamed, and those which saw out the stave with curved faces. Of the latter class, the barrel-saw machines have been principally employed notwithstanding there are radical defects in the operation, well known to those who use them; one of the principal faults being, that in obstinate descriptions of wood, these saws will become more or less cramped out of their circular form, bind, and otherwise vex the operator, as well as perform the work imperfectly.

The improved machine herewith illustrated, may be used advantageously for cutting staves in all kinds of wood, hard and soft, and for all sizes of staves within ordinary requirements; and it could also be constructed to cut staves for the largest brewers and dyers' tanks, by sufficiently enlarging its dimensions, a great advantage over machines employing barrel saws, which cannot be employed for cutting staves of great length. In short it is one of the most substantial, and best constructed machines for this work we have ever met with.

Its operation will be readily understood by reference to the engraving in connection with the following explanations:

A is the main driving pulley keyed to a shaft which carries two crank and fly wheels, B, through which power is conveyed to the other working parts of the machines, of which there may be one on each side of the wood frame-work, but only one of which is shown in the engraving. C is the connecting rod or pitman which drives the saw, D.

This saw is concave on the side shown in the engraving, the curvature being that desired for the staves. This form gives it great rigidity, so that no saw gate or stretching apparatus is required. Guides, U, attached to the frame work are provided to steady the saw when working in obstinate kinds of timber, and the saw may be removed for filing and setting by simply taking out the key which connects it with the pitman.

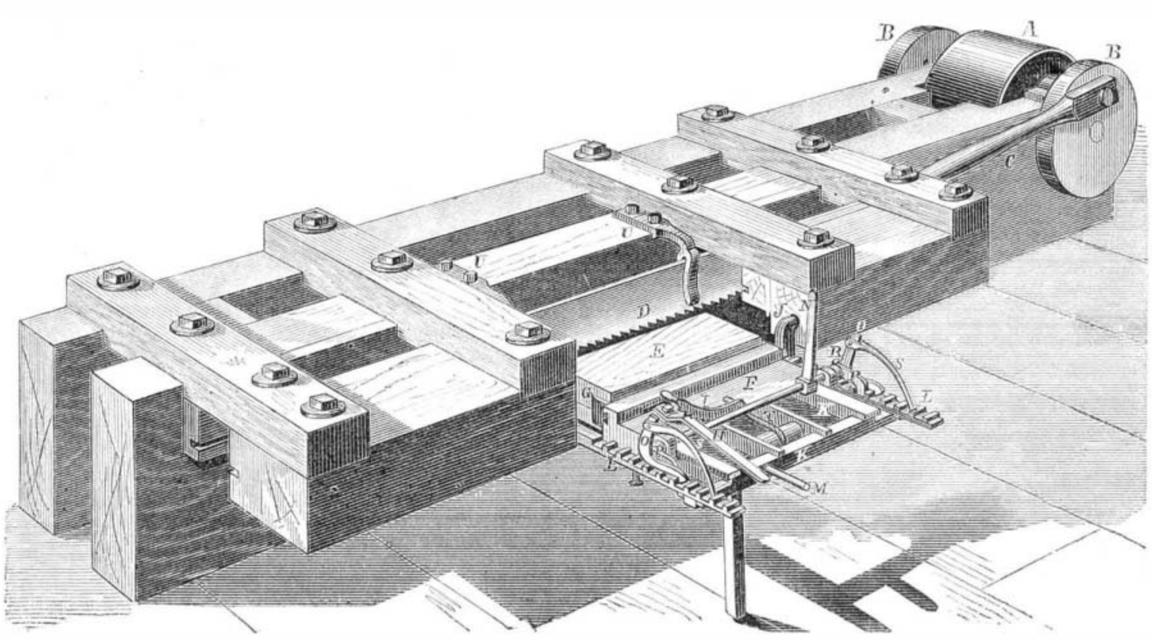
Despensing with the gate renders the motion of the saw very light and a perfectly parallel motion is secured through guides not shown in the engraving, fastened to the interior of the frame work. The bolt, E, is laid on the metallic carriage, F, which slides on ways formed on the oscillating frame K. The frame, K, oscillates on the centers, J, by which the bolt is brought up toward the edge of the saw in an arc of a circle corresponding accurately to the concavity of the saw, This motion is imparted to the oscillating frame by the operator, who grasps with his left hand the handle, M, while the bolt is fed by an apparatus operated by the handle, N, and yet to be described.

The bolt is firmly held by spurs, G, one on each side of the metallic carriage, F, one of which is movable, and is driven home by the pivoted lever, H, and held there by the toothed arc, I, which engages with the lever, H, while the bolt is being sawed. The toothed arc, I, is provided with a suitable handle for raising it when it is desired to release the lever, H, and through it the movable spur, G.

We will now endeavor to make plain the means by which the feeding is accomplished. The prime motion by which this is attained is imparted by the right hand of the operator through the lever, N. When this is moved toward the saw, the bent pawls or hooks, O, attached to a common rock shaft with the lever, N, and which, while each stave is being cut, engage with the racks, L, preventing any motion of the metallic carriage toward the saw, are disengaged from the racks, L, at the same time that the upper and longer pawls, S, are drawn toward the saw and take in another tooth on the racks. The pawls, P, which play loosely on the rock shaft and engage with the opposite side of the same tooth with which O engages and prevents any motion of the carriage from the saw, are also lifted by means of an angular projection shown at R, which engages with the back side of O, as shown in the engraving. The motion of the lever, N, being then reversed, the pawls, S, engage with the tooth taken in by the former motion and the pivots which connect them with the bent pawls or hooks, O, become fulcrums of the lever, M, through which the carriage is forced along toward the saw until the bent pawls or hooks, O, again engage with the racks, L, preventing all further motion toward the saw, while at the same time the pawls, P, also engage with the rack as shown, preventing all backward movement. These pawls are so adjusted that the single forward and backward movement of the lever, M, described, feeds the bolt onward exactly the thickness of one stave; these movements being made at the same time, the front side of the frame in which the carriage rests is raised in order to bring the carriage on the opposite side of the frame down low enough to let the upper side of the bolt come under the edge of the saw.

The movements in feeding are therefore as follows, the left hand of the workman grasping the handle, M, raises the front side of the oscillating frame and depresses the bolt, while the right hand grasping the lever, N, moves it quickly backward and forward and the feeding is accomplished. Both movements are accomplished instantaneously and simultaneously. A cord or strap, T, attached to the carriage, F, and running over the roller shown in the engraving, thence over a pulley attached to the under side of the carriage, F, thence through a hole in the floor, has a weight attached which serves both as a counterpoise to the oscillating frame, K, and also acts to throw the carriage to the front when the pawls are raised.

This machine has been in practical use three years, and the inventor informs us that no repairs have been found necessary during that time. He further states that a machine carrying two saws, with the attendance of two men will cut on the average seven thousand staves per day, these staves being sufficiently smooth and uniform, to be, after jointing, immediately set up into casks. Patented through the Scientific American Patent Agency, March 24, 1868, by W. R. and O. D. Bishop.



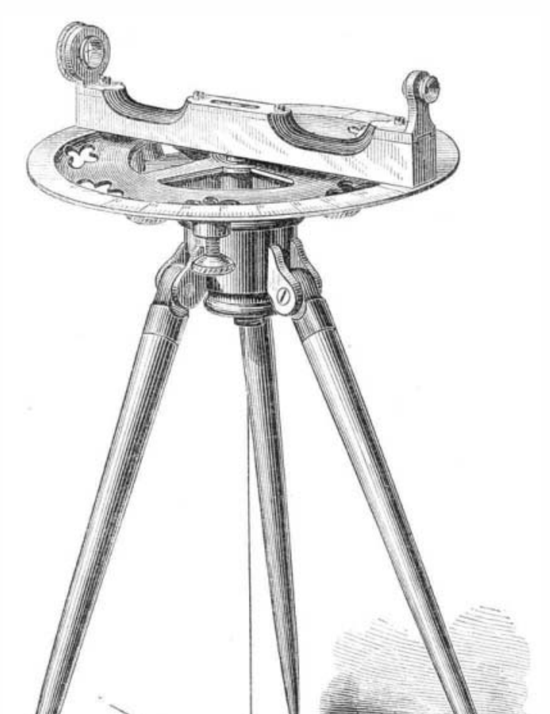
BISHOP'S STAVE-CUTTING MACHINE.

Orders for State rights, county rights, and machines, may be addressed to George M. Beach, Milwaukee, Wis., agent for the sale of this improvement.

SIBLEY'S IMPROVED LEVELING INSTRUMENT.

The instruments heretofore employed for leveling by surveyors and engineers, though excellent for the purpose and equally well adapted for carpenters and masons, in staking out foundations, or for farmers in leveling for ditching, etc., or for mechanics in general, were too costly for general use in their application to the purposes specified.

The invention herewith illustrated can be placed in the hands of all who desire it, at one fifth the cost of the old style of leveling instruments, and for most of the purposes alluded to is equally as good. For all distances within the scope of unaided vision they are sufficiently accurate.



This level is made of iron, which is one reason why it can be afforded so cheaply.

At one end it is provided with a sight having a small aperture with a short tube attached, to obviate the dazzling effect of the light, consequent upon reflection from the edges of the aperture. At the opposite end of the level is a ring with cross wires, so adjusted that the center of the sight aperture and the intersection of the wires are level when the bubble at the center indicates that the instrument is level.

The level stands on a circular graduated table, from the center of the under side of which is suspended a plumb in the usual manner. This plumb being adjusted over any point, as the corner of a building lot, and the first line laid out, stakes can be set in a line drawn at any desired angle to the first line, by simply turning the level upon a central pivot provided for that purpose, the required number of degrees as indicated on the graduated table.

The level is of ample length to secure accuracy in sighting, and the small aperture in the sight also enables the operator to run a line with great certainty. Being made of iron, it is not liable to warp or spring. The level may be lifted off the table and the adjustment made by screws provided for that purpose. Milled thumb-nuts and screws are also provided to adjust the table to level, and a neat tripod sustains the working parts of the instrument when in use.

Patented June 23, 1868. Address for further information the Warwick Tool Company, Middletown, Conn.

The Phosphoroscope.

If a person places a poker in the fire, everybody knows that a quantity of heat can be carried by it into the next room. Heat, then, like water in a jug, can be taken into certain things and carried away from its source. Not so with sound; there is nothing yet known that will hold sound, and make itself tangible to our senses when taken away from that which produces it. Odors, like heat, are however absorbed by the hardest precious stones and polished steel. Neither the most delicate scales nor the most powerful microscope will discover anything on a diamond that has been near to musk or patchouly; but their fragrance announces the fact of retention and emission of odor. Hitherto it has been an axiom that when the light is put out we shall be in the dark. Modern science now proves to us this need not always be so; on the contrary, we can now carry light away from its source. We can, as it were, bottle up some light, and store it away in a dark cellar, assured that it is there, for we can see it. In proof of this assertion a pretty toy has been constructed for this purpose, called a phosphoroscope or light-bearer, by Messrs. Harvey and Reynolds, of Leeds. It consists of an apparatus like a color-box, which contains, instead of paints, certain glass tubes, holding various light absorbers, such as sulphides of lime, strontium, barium, etc. By exposing this light box to the full flame of a gas-burner, or to the sun, or to the light of burning magnesium, light is absorbed to such an extent that any one can see what's o'clock in the dark. Each tube, according to its contents, glows with light, but of different colors, some red, others blue; but the brightest is the green. The venders call this instrument "The Phosphoroscope, or a Trap to catch a Sunbeam."—*Septimus Piesse.*

AERO-STEAM ENGINES---STORM'S EXPERIMENTS.

During a period of several years, dating from about 1851, Wm. Mount Storm, an inventor and engineer of considerable note, made a series of experiments with air and gases in connection with steam, with a view to promote economy in fuel used for generating motive power. An engine, called the "Cloud Engine," was exhibited by him at the Fair of the American Institute in 1855. The engine was named as above from the fact that the air, which was mingled in the cylinder with the steam, changed the latter into a vesicular condition, resembling fog. The inventor claimed 33 per cent, and those who saw it state that, at times, it did actually make a gain of even more than this.

Its operation was, however, fitful and unreliable, and it finally was withdrawn from public attention, and nothing more has been heard from it.

None of these experiments, however, seems to have been made on the same principles as those of Mr. George Warsop, of Nottingham, whose object is to attain to a method whereby the expansive force of heated air may be used in an engine without the difficulties attending the use of heated air alone in the cylinder, and which are met with in the engines of Ericsson, and others employing only heated airs.

In Warsop's experiments the object seems to have been to make steam assist in applying the expansive force of air.

Warsop, however, has found that a maximum effect from mixed air and steam depends upon the proper proportion of the two gaseous bodies, a conclusion which might have been theoretically drawn from a consideration of the relative capacities of air and steam for heat. Still such an inference would scarcely have warranted great hopes of economy from this source without extended experiment, and although extraordinary results—stated in a former article—are claimed, we shall not be surprised to hear that some offset to these claims has ere long been discovered.

Incidental to the results sought by Warsop is of course a better circulation in the boiler employed to generate the steam used in the experiments, from which some gain might be expected, though nothing like what is claimed.

In December, 1866, D. B. Tanger, of Bellefontaine, Ohio, took out a patent for a steam generator, between which and the apparatus of Warsop we can recognize no essential difference.

JOSEPH WHITWORTH, the inventor of the Whitworth gun, and Wm. Fairbairn, the celebrated engineer, have been created baronets.