

The "Noble Forehead" Fallacy.

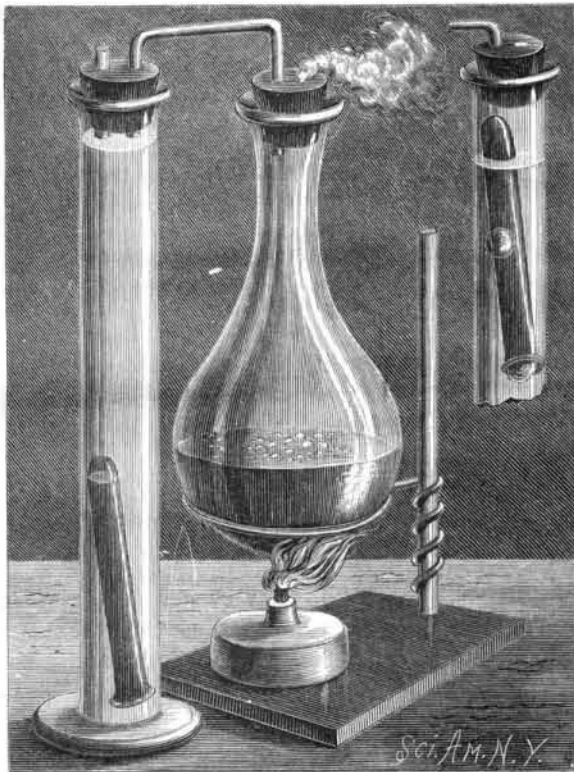
It is popularly supposed that the high forehead is essential to a good brain, and intellectual superiority is usually associated with the conception of a "two-storied brow." Dr. Wm. H. Mays ably combats this idea in the *Western Lancet*. He says:

"The size of the forehead depends much on the line of growth of the hair that limits it. A man may have what is called a low forehead; but if the hair could be removed to the height of four or five inches, the same individual would present as fine a specimen of the traditional "noble forehead" as could be wished, a perfect "dome of thought," particularly if the frontal sinuses happened to be large or protuberant. Again, a low forehead has ever been held a sign of beauty in woman, and has certainly never been regarded as an impeachment of her mental capacity. The truth is, the front part of the brain has very little to do with the intellectual process. It is the posterior lobes of the brain with which the higher faculties of the mind are associated. Gower assigns to the frontal lobes, excepting their lower and hinder portions, a negative position as regards psychological importance. Only man possesses posterior or occipital lobes; they are the latest achievements in the long line of cerebral development. In the higher apes they may be found in a very rudimentary condition; the lower mammals possess frontal or anterior lobes only. In the lower savages, and in congenital idiots, the occipital lobes are often ill developed, approaching the brute type, giving a flattened appearance to the back of the head. In the Stockton Asylum are several interesting idiots, some of whom, while possessing quite respectable foreheads, show a striking deficiency of back head. The neck and back of the head are in one line, and it is worth remarking what a foolish appearance such a contour gives an individual. When you see a lack of the rounded sweep or projection of the back of the head above the neck, you will find with it a low order of intellect. The idea that a high forehead is, taken alone, the index of mental superiority is as baseless as any of the exploded propositions of phrenology, with which pseudo-science it deserves to be classed."

EXPERIMENTS IN PNEUMATICS WITH A STEAM VACUUM.

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From the two preceding articles in this series it will be seen that several experiments usually performed with an air pump can by simpler apparatus be shown almost or equally as well. It is proposed in the present paper to extend the list. After such a series as given has been followed in this work by the experimenter successfully, he will have little difficulty in going still



CARTESIAN DIVER IN VACUO.

further, and by a little ingenuity will be able to execute a full set of vacuum experiments.

The existence of air in the pores of wood has already been shown. Striking as the experiment is, the air and its movements are unseen until it enters the water. It is interesting to watch the expansion and expulsion of air from a transparent vessel. A test tube is nearly filled with water and inverted in the cylinder or bottle that held the piece of wood in the former experiment. The cylinder should be almost completely filled with water. Under these conditions the inverted test tube sinks to the bottom, and rests there, with a small bubble of air in its upper end. The boiling flask is connected and a vacuum produced. As the vacuum grows greater the small residue of air in the test tube ex-

pands, the tube grows lighter, and suddenly, when enough water has been expelled by expansion of the air, ascends to the surface.

The air continues to expand, and begins to bubble out of its lower and open end. This is the action that takes place in the pores of the wood, and, just as in that case, a surprising volume of air will escape. On the readmission of air the test tube fills again, preserving a still smaller air space, and sinks at once. Each pore within the wood acts as the test tube does, and the latter experiment may be accepted as a magnified representation of the first one. As a further illustration of the expulsion of air from porous bodies, a piece of chalk may be placed in water and a vacuum produced. Air will escape from it, just as from wood.



POROSITY OF WOOD. BOILING POINT. EXPANSION OF AIR.

The porosity of wood may be illustrated by the use of the flask alone. A round stick is thrust through a short piece of rubber tubing, so as to make a tight joint in the neck of the boiling flask. The latter contains a little water, and is boiled, and while boiling the stick is introduced with its end under the water, the rubber making a tight joint between it and the neck of the flask. As the steam condenses, air will begin to steam through the stick from the outer atmosphere, and out of its lower end into the flask. After all is cool, the stick can be easily withdrawn. The ease with which it comes out shows how the vacuum has been destroyed by the air thus drawn in.

To illustrate the effect of a reduction of pressure on the boiling point, a small flask should be three-quarters filled with water, which is to be heated to a temperature a little short of boiling. All is quiescent until a vacuum is produced by connecting the boiling flask to it, and operating as described. As soon as the reduction of pressure has gone far enough, the water in the small flask begins to boil.

In many of the experiments, the close observer will notice the appearance of minute bubbles in the water in the cylinder of the experimental vessel. These must not be confounded with the steam bubbles seen in this last experiment. The minute bubbles are not steam, but are due to dissolved gas—nitrogen, carbonic acid, and probably somewhat less oxygen.

Another example of the expansion of air may be executed by the aid of the small flask. It is fitted with a tube that protrudes to a length sufficient to reach nearly to the bottom of the boiling flask when inverted over it. The small flask is thus inverted while empty, the tube passing through the cork of the boiling flask. The cork of the latter has its plug removed, otherwise all is tight. The water in the lower flask is boiled, and, after full expulsion of the air, is plugged. As the vacuum begins to be felt, the air bubbles out of the immersed end of the tube with great rapidity. When all has come that will, the plug is withdrawn. The water immediately rushes into and partially fills the upper flask. This condition is shown in the cut. A second vacuum is produced. As this is more than the preceding, more air will be withdrawn from the upper flask. By repeating this often enough, almost all the air may be expelled from the inverted flask.

The balloon already used may be borrowed, to show the elasticity of air. Most of its contents are expelled, and it is suspended from a rod or sealed tube passed through the cork of the boiling flask. It is sufficient to drop the balloon into the flask. Its attachment to the tube is a matter of convenience for its extraction. In either case its neck is tightly tied, so as to make it air tight. All being arranged, the water is boiled, the cork is plugged, and the vacuum is produced. The balloon slowly expands, and assumes a globular shape. When air is readmitted by withdrawing the plug, it suddenly collapses. When inflated, it will be much larger than the neck of the flask, and might be cited as a parallel case to the apples in the dumpling.

The last experiment illustrated is the familiar one in acoustics. The transmission of sound through space is dependent on the existence of some material sub-

stance. In the case of its transmission, waves are formed by the vibrations of the sounding body, and these waves affect the organs of hearing. Solids, liquids, and gases convey sound. A solid, to act thus, must be elastic and tense or solid.

A short piece of India rubber tubing is slipped over the end of the glass rod or sealed tube used in the last experiment. A bell, small enough to pass through the neck of the boiling flask, is attached to the end of the tube by a pin. The other opening in the cork is plugged. The water is boiled, the cork is slowly placed in the neck, and the lamp removed. As soon as cool, the bell may be rung by shaking the flask. No sound whatever will be heard if the boiling was long enough and hard enough to expel the air. The India rubber, though elastic in one sense of the word, is too loose or limp to convey sound waves.

In the future some more examples of this class of experiments may be given. By consulting text-books, more especially the older ones, hints for experiments in pneumatics may be found. An egg, by a large rubber tube, may be cushioned in the neck of the flask, a pin hole having previously been made in its inner end. Before resting it there, the water must be boiled. If the fit is good enough to hermetically close the flask, so that a vacuum is produced, and if the smaller end be placed downward, its contents will be expelled partially, at least, by the expansion of the air bubble. If a second pin hole is made in the upper end, the contents will be driven out much faster. A sharp edged metallic tube, fitted to the neck by a large rubber tube, will core an apple. While the water is boiling, an apple is screwed down on it; and if the vacuum is good enough, the core will be drawn violently down into the flask. The tube protruding from the flask must be long enough to go completely through the apple.

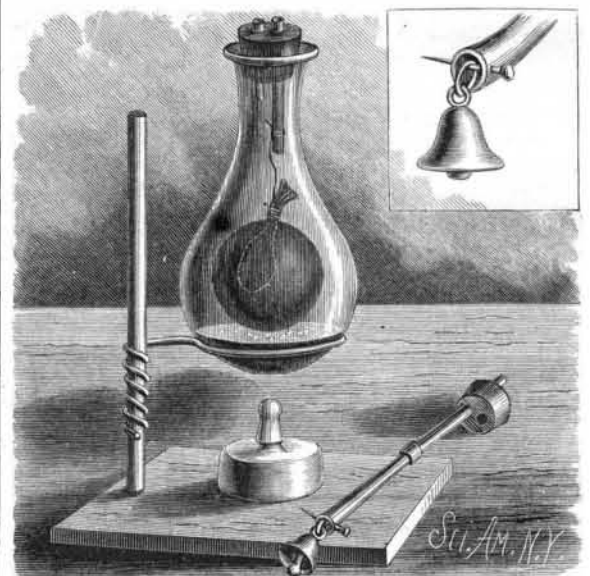
No difficulty will be encountered in these experiments if good rubber corks are used and rubber tube joinings between separate glass tubes are avoided.

Points on Patents.

One of the most common errors that inventors fall into is the mistaking of mere mechanical skill for invention; and one of the most puzzling things the examiner in the Patent Office and the judge on the bench are confronted with is the necessity of determining just where mechanical skill ends and invention begins.

Another error prevailing very commonly among inventors and others is that an individual or corporation has the right to manufacture a patented article, provided it is for their own use, and not made for sale. This is not so. The law gives the patentee the exclusive monopoly for seventeen years to make, use, and vend.

Another error of inventors, although not so common as those above, is that the object for which a machine is constructed, or the use to which it is to be put, is what the patent is granted for. This maybe true, to a very limited extent, where the article thus produced is a new article of manufacture; but, generally, the patent is for the mechanical arrangement



BALLOON IN VACUO. ACOUSTIC PARADOX.

whereby the desired result is obtained, and not for the result itself, and the use of such patented machine for an entirely different purpose is an infringement of the patent. The granting of the patent carries with it the exclusive use of the machine, no matter for what purpose.—C. N. Woodward, in *Wood and Iron*.

Waterproofing Cloths.

The following mixture is given by a correspondent in *L'Industrie Textile* as suitable for waterproofing all kinds of woven fabrics: Linseed oil, 77.0; acetate of lead, 1.845; litharge, 10.0; amber gum, 0.4; vegetable wax, 1.3; soap powder, 1.2; Manila earth, 0.7; lamp black, 4.0; essence of turpentine, 2.0; India rubber varnish, 1.555; total, 100.

A Large Anaconda.

An anaconda, 15 feet long, the largest, it is said, that ever came hither, arrived last week, and was almost immediately dispatched to the Philadelphia Zoological Garden, where it now is. Mr. Frank Thompson, the dealer in wild animals, who imported it, exhibited it to the writer in his headquarters at 411 East 56th St. An attendant knocked off the top of a large box which lay upon the floor, and the monster was seen in his entirety, the great folds of the body, of a light brown color, marked with dark circles, lying tier upon tier from the bottom to the top of the box. No sooner was the light let in upon him than he began to move his head from side to side and shoot out his forked tongue threateningly.

"I want to examine his mouth," said the dealer, "to see if there is any appearance of canker, for it is of such corroding humors that these reptiles usually die." Saying this, the dealer eyed the monster for a moment intently, and the latter returned the look with interest. Suddenly the dealer, a powerful man, thrust forward his right hand and seized the huge neck with an iron grip, and the great mouth was opened wide in anger. There was no appearance of cancerous growth, and the wary dealer, letting go his hold, dodged to one side, and the blow aimed at him by the reptile fell short. Before he could get ready for another, the top of the box was jammed down upon him. It was curious to note the effect the sight of the anaconda had upon the kangaroo and other animals in the adjoining cages. They seemed beside themselves with fright, jumping hither and thither; the eyes of the former almost starting from the sockets.

The anaconda is found almost exclusively about the Amazon watershed, and is essentially a water snake, living in or near the water. The boas come from the same locality, but are distinctly land animals. Wallace and Bates (the latter is now secretary of the Royal Geographical Society), in their voyage up the Amazon, some forty years ago, had their chicken coop, which hung over the stern of the vessel, torn to pieces and robbed by an anaconda one night while they lay at anchor, and they aver that this reptile will take any kind of an animal off a vessel's deck if he can reach it.

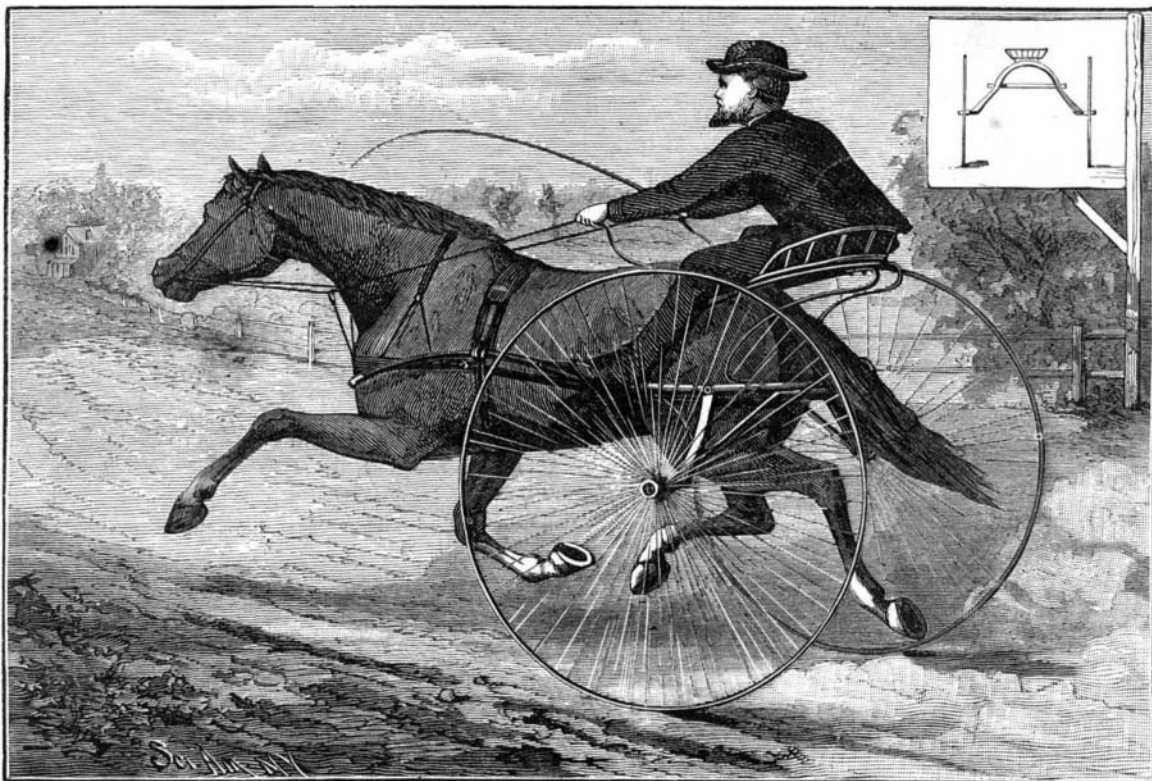
He lies hid in the water where animals are wont to come at night to drink, and when a favorable opportunity presents itself, darts his head forward, seizes his prey with his teeth, and then, dragging it into the water, he winds himself around, crushes, and then devours it.

THE "SADDLE SULKY."

The essential feature in the construction of the sulky represented in the accompanying engraving consists in so curving the axle as to admit the rear of the horse between the wheels, thus permitting the horse to turn upon his center of motion, thereby making riding in such a vehicle very safe. In many respects it is like riding in a saddle on wheels, as it is to all intents and purposes a part of the horse. The inventor claims that a vehicle of this nature will be of marked value, particularly for riding over rough roads, or where ordinary vehicles cannot be used, as there would be absolutely no danger. From the engraving it will be seen that the front of the seat of the sulky is supported upon a spring perch, rising and curving backward from the shafts, the rear portion being held upon flat springs secured to the curved bow uniting the ends of the shaft. This construction especially promotes the comfort of the rider, and avoids the unpleasant motion usually experienced in two-wheeled vehicles. The sulky is very light, and at the same time exceedingly strong, since the axles are firmly secured to the continuous shaft, and well braced.

The sulky here shown is intended for exercising horses, but we are informed that a still lighter model for trotting purposes is made, similar to the small diagram, wherein the axle makes a continuous arch under the seat over the rear of the horse. This form, the inventor claims, prevents very largely the slewing usually experienced in turning around the curves of a track, thereby tending to increase the speed of the horse and lower the record.

This sulky has been recently patented by Charles F. Stillman, M.D., of 142 Broadway, New York City, and is being manufactured by Brewster & Co., of Broadway and 47th Street.

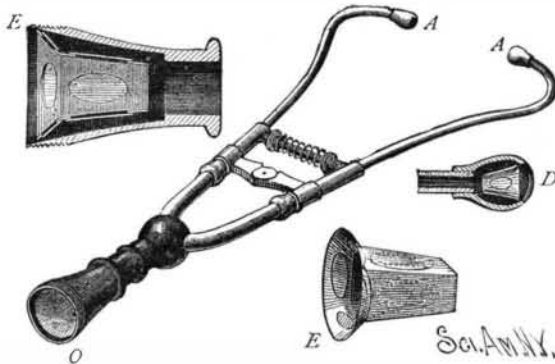
**STILLMAN'S "SADDLE SULKY."**

for the purpose of keeping the streets open to free and uninterrupted travel. But the legislature had not the power, neither had the municipal authorities, as against the adjoining owner, to confer upon any person the right to make use of the highway for any other purpose than to pass and repass, without the consent of the owner of the fee.

takes a pride in showing his fearlessness in the pursuit of his vocation under all circumstances. Sensible people call it foolhardiness. It has cost the life of many a good fellow, and we really believe that whenever a man exhibits unmistakable symptoms of this form of mental obliquity, he should be discharged from positions involving danger to himself or others.

IMPROVED VIBRATING STETHOSCOPE.

The engraving represents a stethoscope provided with vibrators or sound-augmenting diaphragms, arranged to act on the sounding board principle, to increase the efficiency of the instrument. The vibrators are thin disks of metal, skin, rubber, or other suitable material, placed in the ear tips and in the receiving tube. As here illustrated, the tips and receiving tube are each provided with four diaphragms held in a thimble inserted in the tips and tube in such manner as to form a sounding board chamber for each diaphragm by the relative position of the thimbles, the diaphragms, and the material of the receiving tube and the tips. Four diaphragms are preferably employed in the receiving tube, and air chambers are provided in the upper edge of each thimble.

**BLODGETT'S IMPROVED VIBRATING STETHOSCOPE.**

It is claimed that by this arrangement of vibrating diaphragms and air chambers the effect of the sound waves in their passage through the tubes over the diaphragms is vastly augmented, and the efficiency of the instrument to detect the most subtle and feeble sounds within the human body is increased in a remarkable degree. As shown in the engraving, the letters, E E, indicate sectional views of the vibrating diaphragms inserted in the receiving tube, O, and the letter, D, indicates sectional view of vibrating diaphragms inserted in rubber tips, A A. These diaphragms may be applied to all stethoscopes now in use.

This stethoscope is the invention of Dr. F. M. Blodgett, of No. 207 West 34th Street, New York city.

Use of Public Highway.

According to a late decision of the New York Supreme Court (*McCaffrey v. Smith*), neither the State legislature nor a village can confer authority on a person to occupy part of the public street as a hack stand as against the adjacent lot owners. The court said: The legislature undoubtedly had the power to authorize the village authorities to pass ordinances and by-laws (which they might enforce) limiting and restricting the use which the public might make of the streets beyond their rights of travel—ordinances which could be enforced as against the adjoining owners themselves

Patent Rights as Property.

The *Weekly Law Bulletin* reports the following decision:

Section 14 of chapter 222, Pub. Stat., provides that execution may issue against the body of the defendant in an action of assumpsit, whenever, among other things, the defendant has been guilty of fraud "in the concealment, detention, or disposition of his property;" and an order for the execution may be granted on an *ex parte* hearing without notice to him. A judgment debtor who has a valuable patent right is not entitled to withhold it from his creditors upon the ground that it is an incorporeal or intangible right; such a right is not exempt from attachment by law, and one having property not exempt, which he detains for his own use, refusing to apply it to the payment of the judgment against him, is guilty of fraud in the detention.—*Re Samuel D. Keene*, S. C. R. I. II. New Eng. Rep., 505.

Submarine Mining Experiments.

Extensive submarine mining experiments were carried out near Portsmouth on September 14, with the view of testing the efficiency of the present system of firing mines, the system, owing to the weakness of the detonating charges, having broken down at the recent naval review. Two experiments were made. The first was with observation mines, which consisted of a line of six mines, each containing 500 lb. of gun cotton, so arranged as to blow up an enemy's ship should it have crossed the line. The mines were at the bed of the channel, covered with 10 fathoms of water, and connected by an electric tube in which was inserted at each mine a charge of fulminate of mercury. On a key being pressed, four out of six mines were exploded, and each sent up a huge volume of water, 400 feet high. Gunboats were stationed 600 yards off, and after the first violent shock the sensation was as though the boats were bumping heavily on rocks. These mines were laid on a mud bottom, large quantities of which, together with tons of fish, were blown up with the water. The next experiment was with a line of 12 countermines, supposed to be laid over an enemy's mined channel, and these also each weighed 500 lb., and were 180 feet apart. On the key being pressed, 11 out of the 12 mines exploded; but, owing to these being laid on a sandy bottom, the shock was no greater to the gunboats than in the first experiment. The tests were carried out on a point of land eight miles from Portsmouth, where the effect of the shock was not felt.

Foolhardiness.

To one who is familiar with the carelessness exhibited by persons who have served a long time in dangerous occupations or in close proximity to dangerous machines, the wonder is not that so many accidents happen, but rather that so few fatal casualties occur. A young man of exceptionally steady and cautious habits was employed some time ago by one of our leading woodworking establishments. His steady, cautious nature led to promotion, and a part of his duty required his presence where there are many rapidly revolving pulleys and belts.

It was noticed that he gradually got to "fooling" with the belts, and he was warned of the danger by some of the old hands. The other day there was a sudden jar and a stoppage of a part of the machinery. An examination revealed a broken belt and the mangled corpse of the young man. The cause was evident to the coroner's jury—pure carelessness. Every week we read of accidents to carpenters, painters, etc., and no wonder. The recklessness of this class of men in trusting themselves on rickety scaffolds is incomprehensible. The other day we saw a painter at the top of a long light ladder, the foot of which rested on a frail pine goods box on a sideling pavement. On a close calculation there was not more than an inch, or at most two inches, of "center of gravity" that prevented his receiving a terrible fall. And this man, like hundreds of others,