NEW FORMS FOR BOATS.

Two boats have been recently chronicled in the papers which make in each case a decided departure from the old type, and we may say the stereotype, which has to a certain extent ruled all ship building from the day of Noah down. For much as models vary, they all seem to be planned on one principle—the boat must take *deep* hold of the water; and especially is this held to be true in the rough service of the open sea. In any one, for instance, of our splendid ocean steamers, her breadth of beam does not much exceed one-tenth of her length, and of course therefore her draught is so great that Sandy Hook scarce gives water enough to float her without watching for the tide.

Now, is this necessary? Are we bound to go on in the same way, or is it one of the nursery legends which have come down to us by inheritance, and with which, when we learn to go it alone, we can dispense? The two plans of boats to which reference has been made turn our attention toward this matter. The first one was evidently intended only as a pleasure boat, and to be of small size, but it was original in its design. It was to have the general proportions of a catfish, that is, the bullhead of Connecticut, or minister and bull pout of Massachusetts, the *Amiurus nebulosus*. This brings the bow broad and flat, the breadth carried very well forward, and gently rounded up only, while aft it tapers to a narrow waist and wedge like stern, with nothing there to make her drag water in the least. The greatest breadth, away out, quite near the bow, will be about one-fifth the length of keel.

What this peculiar build will do remains to be seen. It is certainly unlike any ordinary model, and it is much to be hoped that its results, whether satisfactory or not, may be made public. The trials which fail are of perhaps the most interest and advantage to every one except the originator.

In the other case there was not absolutely anything new. It was a small steamer constructed for a sugar estate on the Magdalena River, and to secure a sufficiently light draught her beam was about one-fourth of her length, with full bearings carried well fore and aft, yet without a really flat bottom, fine lines being her general characteristic. With a length of 54 feet her extreme draught is to be only two feet.

This for river navigation is nothing special. We all know the swarms of Mississippi boats built to "run anywhere that the ground is a little damp." But the peculiarity of this new craft is that she is to be run out to the Magdalena on her own merits, by her own power. And there is where the difficulty seems to come in, and so much so that the captain is guaranteed a special extra payment if he makes the trip successfully. It is apparently taken for granted that the long surges of the Atlantic, and perhaps in particular of the Caribbean, will pitch her about and drive her before them at such a rate that she can never give a good account of herself.

Because forsooth she does not go down into them, but floats lightly over them, they will knock her here and there like a bubble. Well, let them knock. What harm will it do? If she has strength to stand the run of the sea, why should she not be lifted easily *above* it, instead of having every timber wrenched and strained in the effort to come up *through* it?

No one can stand well forward and watch an ordinary steamship as she is plunging into a heavy head sea, and see her come rushing down a long swell through the trough, without being conscious of the terrible strain which comes upon her, as she buries herself in the next sea before she begins to rise. Her sharp bow cuts into it like a knife, and away down, down, she goes before her displacement is able to overbalance her weight and her downward plunge, and then eventually she lifts and goes over.

If now instead of this knife edge she had had the breadth forward which would have rendered impossible any such depth of submersion, whose amount of displacement would have sent her over the coming sea when instead of plunging thirty feet down into it she had hardly buried herself a fathom, what laws of hydrodynamics will show that in this latter case a decidedly important part of the strain upon her timbers would not have been avoided? We are perfectly well aware that we shall at once be told that all this question of bluff bows and sharp bows has been settled years ago, that every one knows sharpness and speed are but convertible terms, and that for sea going craft the deep keel or its equivalent is indispensable. Very good! Perhaps all this may be so, and then again perhaps it may not. We are entitled to our own free judgment, and some time by and by we may give the reasons for what we believe as to it. A.

FAITH REMEDIES.

It is unnecessary to resort to some collection of anecdotes relating to old-time superstitions to show how great an influence faith or fancy may have on the human mind, and act through the mind on the body. The faith cures which are a portion of our current news are supplemented by practices by sensible people which are considered by them to be of such an occult or doubtful nature as to be concealed, usually, for fear of ridicule. It is not uncommon now for persons to wear around the neck a suspended miniature sachet of silk containing gum camphor as a defense against fevers, measles, and small pox. A string of red coral beads, or in lieu thereof a bit of scarlet yarn about the neck, is even now considered a necessary protection of the infant from various ills. Some persons who are periodically afflicted with rheumatism carry either a small potato or a horse chestnut as a charm against the attack of the dreaded foe. This sort of nonsense is not confined to the vulgar or ignorant, for in at least two instances one was a doctor of divinity and the other a man of liberal education and cosmopolitan experience.

The cure of warts has always been associated, more or less, with the occult or unknowable. A pleasant mannered young woman who made no pretensions to unusual skill and medical knowledge, was for years the resort of all the wart-afflicted in the town and vicinity. Speaking from youthful memory, what she did was to take the number of the warts given her by the patient or an accompanying friend, and that was the sum and substance of the prescription. There are plenty of her patients, however, who will swear that their visit to the quiet little dressmaker was followed by the rapid disappearance of their warts. There are reasonable and sensible men living who will aver that they cured their warts by stealing, unobserved, a bit of fresh meat, rubbing it on the warts, and burying it in the ground. In cases of threatened tetanus, caused by a foot wound, the drinking of water in which vinegar-rusted nails have been stirred was formerly adjudged to be a specific, and there are persons who will readily give testimony to this effect. In this case it is not impossible that the iron tonic may have been advantageous.

It may be difficult to draw the line between the effect of medicaments on the human system under certain known laws and the mental influence of belief and desire on the physical body. Whether mental emotion or intelligent faith does really affect the animal portion of the human structure or not, it is a curious fact that education and culture do not eliminate a belief in faith cures or remedies.

SOLAR MACHINERY.

No reference is made here to the machinery by which the sun is run, but to the machinery to be run in the future by the sun. Yes, we are speculating again as to those wasted powers of nature which we have had under consideration several times of late. The idea of allowing any force which we can use without expense to escape our grasp is exceedingly unpleasant, and yet we are doing it constantly. We have glanced cursorily at one: it will do no harm to call up another. May be some good may come of it.

The use of wind power is an indirect application of solar heat to the moving of machinery; why should we not use that heat directly instead of mediately? We have learned to harness the lightning to our car; we have just as good a right to yoke in the sun's rays, and not merely take pictures with them, but send our spindles flying and our cars rolling forward by their power. There is nothing new in this. The thought has often been suggested and the attempt made, and it is partly to take note of what has been already done, and partly to look a little away ahead, that we bring up the subject now.

The direct rays of the sun in one of our hot, or even common, summer days strike with so much energy, and in fact cause us so much suffering by their intensity, that no one would think of questioning the assertion that were they concentrated, say only four or five fold, on a proper receptacle, its contained water would boil with violence, and steam for mechanical uses be generated abundantly. But those days are relatively, in our latitude, of small number, and on any one of even this number clouds are liable to intercept the brightness and the burning heat.

Still, there are regions in which the heat is always great, and where clouds are rare, and it is in those that the greatest benefits are easily available, and it is to those that attention has hitherto been chiefly turned. But alas! those are not the regions in which power is mostly needed. They are not where the cotton mill is playing with its looms and spindles, or where the planer and the lathe ask for hundreds of horse power behind them to give them life and activity. On the dreary wastes of Nevada, Arizona, etc., you may feel the fiery heat of the sun scorch your face before his disk has risen half its diameter above the edge of the desert, and then that heat increase hour after hour with fearful force. And still further, you may watch week after week, and month after month, and never see a cloud such as the prophet saw, "like a man's hand." Solar engines might indeed seem easy of construction there, but—*cui bono?* Jackass rabbits and horned frogs are all the life that is visible to you as you sit and rock to and fro in your scorching saddle the whole day through.

And that is too much the condition of most of those sun-favored lands. But there are exceptions. Ever since the French have have had possession of Algeria, they have been favorably situated for working out the very problem we have before us. Nor have they been idle. For years experimental work has been going on, and some very interesting and to a certain extent satisfactory results have been attained. The same thing has been done in British India, though they have less of cloudless sky than in the African regions, and apparently not as good progress has yet been made.

The prevalent idea in all trials thus far has been to utilize the direct rays of the sun by concentration through the agency of reflectors. This perhaps will persistently remain the most available means, as it certainly has the great advantage of cheapness of apparatus. Were it not, however, for the great expense of the instruments, convex lenses would demonstrably accomplish very much more work within a given space than has ever yet been achieved with reflectors.

Will not some inventive soul set himself to this task of devising some way of constructing lenses of great size at a moderate cost? We shall see a use for them as we go on later to look at the possibilities of solar energy, even for our cool and cloudy regions. No absolute degree of perfection in their form is requisite; nothing like achromatic conditions; only the power of concentration to a moderate focus, though of course the sharper and more definite the better. It is even probable that polygonal surfaces, without curves of any sort, may be made available, and if so, great diameters may be easily reached. This is a thing well worth investigation practically, as we will see.

The results in Algeria have led to a practical trial being made, not under the scorching sun of Africa, but further north even than we are, in the Garden of the Tuileries, Paris. It was on the 6th day of August of last year. The apparatus of M. Pifre, of Algeria, was adapted for use in the French capital. A reflector in the form of a hollow cone, three and one-half meters in diameter, was used to concentrate the solar rays on a vessel for the generation of steam. This steam drove a small printing press, and though the day was not hot, and clouds frequently obscured the sun, the press ran steadily from one o'clock till half past five, and printed on an average five hundred copies of the *Soleil Journal*, a paper specially prepared for the occasion. The cross section of the reflector of course comprised a little over a hundred square feet, and the power secured from this under these circumstances is indicated by the work stated above.

This is not by any means an insignificant showing. It is true no great results will be manifested from it for some time to come, but the future possibilities are there, and by and by they will be worked out. A.

Fermentation of Baker's Dough.

It has hitherto been supposed that the fermentation of bread dough set up by sour leaven, or beer yeast, was a real alcobolic fermentation. We learn from a paper in *Comptes Rendus*, that G. Chicandard has investigated the subject microscopically. He found that the *Saccharomyces cerevisiæ* put into the dough very soon disappeared and numerous microbes, which he took for bacteria, made their appearance. These bacteria multiplied with great rapidity on the yeast in dough, and they can be cultivated in water containing yeast. Hence he concludes that the beer yeast favored the growth of these microbes. An analysis of the gases evolved during fermentation proved the presence of 70 per cent of carbonic acid, while the rest consisted of hydrogen and nitrogen. The composition of these gases is similar to those formed by the putrefaction of albumen.

From this it would appear that the fermentation of bread does not consist in liquefying the starch by alcoholic fermentation, but in the conversion of one portion of the insoluble albumen of the gluten first into soluble albumen and then into peptone. Starch is first decomposed by heat in the process of baking, forming soluble starch and some dextrine. The cause of the fermentation is, however, a bacterium.

Nitrogenous Ferments in Human Milk.

Bechamp has published a paper in *Comptes Rendus* on milk, in which he says that cow's milk contains two distinct albuminous substances besides caseine. One of these remains insoluble in alcohol after it has been precipitated by alcohol, and is an enzymotic substance which possesses the power of liquefying starch without first converting it into sugar. Dumas and Cahour have already proved that the enzymotic constituent of woman's milk possesses much greater power than that of cow's milk, nearly equally to diastase.

Bechamp isolated the enzyme by the following process: normal slightly alkaline woman's milk was carefully acidified with acetic acid, and then at least three times its volume of 95 per cent alcohol was added. The very bulky precipitate was collected on a filter, washed with weaker alcohol to remove the milk sugar, then with ether to remove the fatty portions, and then taken up with distilled water. After a few hours it is filtered. The solution thus prepared possesses to a high degree the property of liquefying starch and converting it into sugar. Twenty or thirty cubic centimeters of milk are sufficient to prove this assertion.

Another Valuable Life Ended.

Many persons who have had dealings with Messrs. Ellwagner, the extensive florists and rose growers at Rochester, will regret to learn of the death from typhoid fever of Mr. Henry R. Ellwanger, after a four weeks' struggle with the disease. Although but thirty-three years of age, Mr. Ellwanger had become the acknowledged authority on the subject of roses in the United States. He was the author of a work entitled "The Rose," published last year, which established his reputation, and the *Century* for July contained an illustrated article entitled "Old and New Roses," which has attracted wide attention. This was the young man's last work.

Adamascobite.

Adamascobite is the local name of a mineral which is said to be found in only one place in the world, and that is the State of Missouri. The stone is very peculiar in its structure and properties. Its cutting power is diamond-like, cutting away steel very rapidly, and still retaining an exceedingly fine edge.