### LETTERS TO THE EDITOR.

[We do not hold ourselves responsible for the epinions of our Correspondents.]

### ENGINEERS IN THE NAVY.

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Sir.—I observe in your impression of March Sth a letter from Professor Hele Shaw, which, standing by itself, is calculated to mislead, no doubt unintentionally on the Professor's part, any origineering student who may be considering the advisability of joining the Royal Navy. The assistant engineer certainly starts on £109 10s, per annum, but out of that he has to buy an expensive outfit and to pay his mess, servant, &c. If he is lucky enough to pass into the first class he will be sent to college for a course of skudy, but he will find himself relegated to a separate mess as a person unfitted to mess with other officers at the college. The Admiralty may perhaps tell him that it is outly a separate mess, in so far that it is found necessary to divide the college into a senior and junior mess, but they will forget to inform him that all other officers of equal rank to the assistant engiteer, such as sub-lieutounate and lieutenants of marines, mess in the senior mess.

If an assistant engineer should not be so fortunate at to pass in the first class he will be sent to one of the reserves, from whence in due course he will be sent to one of the reserves, from whence in due course he will have as his associates boye of from fitteen to eighteen years dags. Supposing the assistant engineer injust of the assistant engineer of the promoted to the rank of engineer. He now will be in receipt of 9s. per day, and will hold the relative rank of with "but after" a licutenant, until he has served for any years in that rank, when he will be allowed to commence to count his time for seniority. To realise the full meaning of this with "but after" in rank, it is necessary to understand that for six years in that rank, when he will be allowed to commence any, providing he passes his examination and his conduct is actively real substitution. April 200 per mum. Throughwat are his chances of ever reaching £500 pe

## JOHN BRICHSON.

Sing.—Your leading article this week under the above heading is cortainly in complete disagreement with one in another American journal besides that actually quoted by you. The Ragnacring News of March 186h has an article, which, after declaiming in no stinted language against the pitituity small ripple in the current of life in that country caused by the death of one who, it asserts, was "by fart the greatest of living ongineer," remarks:—"It is questionable if, keeping in mind also Ericsson's unusually long professional career, there be not a certain sense in which he may even be regarded as the greatest engineer who ever lived; in the sense, that is, of having combined great and era-making achievements, with that all-roundness in design and in practical work which marks the difference between the professional engineer and the mere inventor." And it then proceeds to argue that Ericsson had not only the quick insight of the inventor, but that he worked out his results scientifically, with a practical knowledge of engineering: "and that hence not only do his inventions cover a very unusually herod and varigh field, but they were very unusually and speedily successful." You, on the contrary, have endeavoured to prove that mest of his inventions were practical failures, and have cited a number of examples—with many of which such was undoubtedly the case—asserting that nearly everything he produced was ephomeral in its character; and, while holding that Ericsson was a most remarkable and original genius, do not hold that he was, in the proper sense of the term, a great engineer.

In this nattor, as in so manyothers, may not both views to a certain extent be correct, atthough exparently so contandictory and opposed to each other? And is it not true of Ericsson, as of nearly every other great inventors, that most of his inventions foliad, whils a few were cannontly successful? Take, for example, the one upon which the Raginacring News lays the greatest stress, namely, the design of the Monitor. You argue, from the b

and consequent leakage of the hugo wrought iron cylinder bottoms 14th, in diameter. Of both of those kinds of defects there are frequent illustrations in our own day, in the case of mechines which are new departures, though designed by engineers whose claim as "practical" men could not be disputed. The truth is that Ericsson had, in the heat engine, taken up one of the most difficult of all problems, and it seems as unjust to make his want of successin bringing that engine into common use an argument against his practical skill as an engineer, as it would be to abate in any way our admiration for the practical genius of the late Sir William Siemens because he worked so many years and spont so much money on the same subject without ever bringing it to a successful result. Many of the problems which Ericsson took up were not those which a mere money-grabbling inventor would have had anything to do with, but such as he took in hand were carried to a point which it is difficult to believe would have been surpassed by any other man. In the only great problem of a comparatively simple mechanical nature, vix., that of the screw propeller, Ericsson showed practical genius of the highest order; and I entirely fail to follow your statement that his screw propeller, for example, was admirable simply as a propoller, but it was not admirable as an appurenance to a ship. Thus the Princeton was most successful in point of speed, which reached thirteen knots—at that time considered vary high—and her commander, Captain Stockton, was most enthusiastic in her praise. The appartenance of the six teamere built next year not thirty the year after. The number of blades was ultimately reduced, but in its essential features Ericsson's serve is much as the screw of the present day as that of Mr. F. P. Smith, the English fermer.

reduced, but in a second and the first first first first first first forms of the present day as that of Mr. F. P. Smith, the English farmor.

I fant this letter is a long one, but the subject justifies some consideration. When we think that the great Swedish inventor was born while James Watt was yet engaged in some of his later inventions, and in the same year as Robert Stevenson, that he was competitor in one of the greatest events in the history of engineering, viz., the locomotive trial at Rainhill, that he expended energy and eloquence in trying to induce our Admiratly to adopt, in the form of the screen propeller, what has been of vast importance to this country both to its Navy and mercantile marine—of course in winch thus taking a prominent part in two of the greatest triumphs of mechanical science; that he may be said to have designed and built the first furret ironchad was vessel, and had the courage to design and make the large wrought iron guns of the Princetown, which, however disastrous in their first trial, were truly forerunners of our modern ordnance—when we think of this and much more that Ericeson did, it is worth while to try and learn correctly the lessons which are taught by his life and character.

University College, Liverpool,

March 30th.

March 30th.

Sin,—In your article on Ericsson, it seems to me that you have given him more credit for the Monitor than he deserves. That he invented the combination of a "Chease on a fist beard" is likely enough, but he did not invent the turret. That was invented by a man named Timby, and the builders of the Monitor, Messrs. Winslow, Griswold, and Rushnell, paid Timby 5000 dols, royalty for each turret fitted to an American ship. Timby 5000 dols, royalty for each in 1841. He says that he took out his patents in 1862, covering the broad claim "for evolving towors for offensive or defensive warfare, whether placed on land or water." Extracts from the Patent-office records show that a caveat was filed January 18th, 1843, and a patent was issued Soptember 30th, 1862. In that your he says that he entered into a written agreement with the contractors and builders of the original Monitor, John F. Winslow and John A. Griswold, of Troy, N. Y.; C. S. Bashwell, of New Haven, Comm. and their associates, for the use of his patents covering the turrets, by which they agreed to pay him, and did pay him, 5000 dols, as a royalty on each turret constructed by them.

Captain Ericsson was exceptionally fortunate, in that hewas rich, or, as all events, slways had the command of money; this sambled him to test his inventions on a sufficiently large seals to attract much attention. Take, for instance, his calorie sengine; it likely would have been heard of that had it remained a little affair, but an inventor who can command a big ship and four cylinders 14ft. in diameter is sure to attend notice. Ericsson was a very elever man in more ways than one.

Charing-cross, April Std.

# FAN EFFICIENCY.

SIR, —I read Mr. Ellis's letter in your last impression with much pleasure; he perfectly grasps my meaning. If Mr. Bower will look again at my letter, he will see that he is talking of one thing and I am talking of mother; and there is, so far as I can see, no contradiction, save in deductions. I have shown that the energy in any given length of the exast chimney veries as the velocity of the air in that section. Mr. Bower holds that the energy in any unit weight of air, say a pound, varies as the square of the velocity. There is no contradiction whatever, that I can see. To say there is, sounds as though I having said there were lious in Africa, Mr. Bower said there was sand in the desert, which my statement contradicted. How far the fact that the energy in any section of the chimney varies as the velocity may affect your correspondent's argumenta I must not stop to consider.

Let me, before quitting the subject, endeavour to put the results of the discussion before your readers as they strike me.

I asked a question, not as a catch question, but because the precise case had surned up. How was the efficiency of a fan to be measured by the discuspro in the chimney! It is an open secret that the matter will probably be heard of in a court of law at no distant period, and it is not impossible that I may yet meat your correspondents in court.

The result of the discussion in your pages is, firstly, no intelligent explanation which could be taken in by a jury composed principally of engineers and mining men, or, at least, non more or less familiar with machimery, has been ellered to account for the action of an exast chimney.

Secondly, two highly competent professors disagree, and practi-

explanation when came of engineers and mining men, or, at least, mon move of engineers and mining men, or, at least, mon move of engineers and mining men, or, at least, to the action of an exest chiamoy.

Secondly, two highly competent professors disagree, and practically leave the subject where they found it.

Thirdly, a highly competent mathematician, Mr. Bower, flatly contradicts both Dr. Lodge and Professor Unwin, and draws up a very satisfactory, complete, and convincing explanation of what takes place, which has only this fault—that it is, according to Professor Unwin and Dr. Lodge, quite opposed to facts.

My own conclusion about the matter is that further investigation of the whole subject on a large scale is needed; that we are quite in the dark as to why an exast chimney does good; that the value of the said chimney is very much over-rated—more, a great deal, depending on the ratio which the opening out of the fan bears to the inlet into it than on the shape of the chimney; and thus, lastly, I really think that the discussion cannot fail to have done good, in their mode of action.

A Minsen.

A Minsen.

# STORM WAVES AT LIGHTHOUSES.

Sin,—Having observed a diagram and some paragraphs about storm waves, in The Engineers of last week, in an article on lighthouses, I venture to intimate that a good deal of indefiniteness seems still to exist in writings giving descriptions of sea or storm waves. It seems to be accepted that they are similar to waves in a tank or pond, produced by impact of a falling body, which might be called dead waves or the oscillatory kind; but the sea waves are very different, as they are full of life and motion, imparted to them by fresh winds and gales without intermission.

It is stated by Sir dames Douglass that a storm wave rose 70ft. Up the body of the Bishop lighthouse last November, and the spray went 50ft, higher to the lantern, and it is left to be inferred that this was a huge and unusual wave. Now, instead of this boing the explanation, it should be considered only as the launch of the

wave, or the surf roller that impinged on the rock and basement of the tower. In the open sea the wave that produced such a launch roller would have been only about 10ft, to 12ft bigh, as measured from a ship away from the coast.

As the surf spray ascended 12ft, up, so the length of the open wave would have been 240ft, which would give a height of real wave of only 12ft, reskening wave height at one-twentieth of the length on an average. A similar occurrence is reported from Dunbar during the last gaie of March 20ft, who the surf roller rose 90ft, up above the harbour wall in a clean sheet before breaking. Here, then, the length of the wave in the open would have been 180ft, at least, and the height only 9ft, or one-twenticit of the length, which is about the average of storm wave heights in closed seas. If the obstacle against which the wave in the open would have more stanting than a wall or lighthouse, such as a sloping beach, then the wave hunch would reach still further, but with a greater velocity, say, to three-fourths of the wave length, and return in the same period to the surf.

The whole body of storm wave would seem to be rolled horizontally along the surface of the sea at rates, say, of lifteen railes per hour; and this, multiplied with the mass of sea-water in the roller, would give ample scope for the searcies of the imagination upon the force and destructiveness of storm waves on a coust.

April 4th.

W. J. Black, F.R. M.S.

### ARITHMETICAL SYSTEMS.

Sir,—Mr. Anthony S. Bower has quite an original method of reading the letters of your correspondents. "Suggestion" in his letter says, page 274, "Suppose we have a radix of 8 or 10, and let Mr. Bower amuse himself again by translating his examples into scales with those radices, and he will not find such a great danger of wasting paper." He is not happier in his characterising as absurd the words of another correspondent, who, when arguing with "Radix," says, "Making the hundredweight equal to 100 lb., and the ton equal to 2000 lb., "while he himself says, "Americans have made their ton = 2000 lb., and their hundredweight = 100 lb." But Mr. Bower thinks it inconsistent to have degrees of proference for certain numbers as a muiz. One may not profer 8 to 10 and 12 to 8. But if Mr. Bower does not like these things put in this way, and as appears from his episedes on tan efficiency that the much profers algebraical forms, let him write it down as a ratio. Perhaps it will appear quite other in the following form:—

Advantage of Advantage of Advantage of 10 as radix as radix Benderal

8 as radix as radix Bankers'

as radix

Bankers': Physiciet English

But Mr. Bower winds up by recommending engineers in an engineering journal to read a book on the subject written by a banker.

Bugineers are a long suffering people.

Finelly, Mr. Bower does not see any necessity for changing our system of right angle division, and be thinks the navigator a very naughty person for using the knot instead of the foot, and oracularly adds, "The foot is just as good." Mr. Bower is fond of working examples, so hore is one for him. Find the difference of intitude and longitude of Liverpeol, latitude = 53° 24′ 40° N., longitude = 2° 55° 50′ W., and New York, latitude = 40° 42′ 6′ N., longitude = 78° 59′ W., and New York, latitude = 40° 42′ 6′ N., longitude = 78° 59′ W., and New York, latitude = 54° 42′ 6′ N., in the control of the physical people. Directly the matter goes into the hands of the mechanical engineer—that is, as soon as machines are to be made—the engineer's units are used. The dimensions of dynamos are in feet and inches.

Mr. King must see that it is not merely a child's question, and that not the simplest, but the most complex radix should be adopted if everyone is to be suited.

April 4th.

## THE ISTUMUS AT CANTYRE.

THE ISTHMUS AT CAPTURE.

Sin,—In your correspondence on arithmetical systems one correspondent wrote incidentally on an isthmus to shut out the Gulf Stream at Cantyre, to reclaim shallow submerged land in the Loughs and the Irish Sea. Surely this would be a momentous matter, to make the two islands integral, and compensate for the encroschments of the sea along the eastern consts of England and Scotland. Of the value of the reclaimed land we may form a rough estimate by recent sales of a foreshore in the Iste of Man, which fetched £12,000 an acre for beliding upon. Would Mr. King tall us more of his great project?

C. RENNIE, April 2nd.

THE SANIPARY INSTITUTE.—The next Congress and Exhibition of this Institute will be held in Worcester at the end of September next. Arrangements are in progress, and will be published shortly.

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WRIDED WATER PIES.—Miscars Thomas Piggots and Co., of
Spring Hill, Birmingbam, have just secured an order for about
1200 tons of their patent wrought iron welded water mains, for the
conduit of water for a new waterworks in South America. The
length of this pipe line is cleven and a half miles, and 14in. diameter is the size required; but each 14in. pipe can be nested with
others of very slightly larger diameter, so as to make the whole
nest ship at weight and not measurement. It is interesting to
notice that welded pipes, freigitt included, came out in this case
nuch cheaper than rivetted pipes, owing to it being possible, as
there are no projecting rivet heads, to nest them more closely.
The competition, therefore, was with cast iron pipes at about the
same price per foot run; but a saving of nearly 3000 tous in weight
made in transport alone an economy of some £9000. Besides this
there would only be about one-half the number of joints to make.
These considerations practically and speedily decided the matter in
favour of the newer system.

Sup Legarryon—Messers, W. H. Allen and Co., of York-street

These considerations practically and speedily decided the matter in favour of the newer system.

Supp Learnest, Mesers, W. H. Allen and Co., of York-street Works, Learnesth, have just completed the lighting of a large passenger vessel, built by Mesers, Laird Brothers, Birkenhead, for the Compania Sud Americana de Vapores. The vessel, named the Imperial, is one of 2000 tous burthen, propelled by engines of 4000 horse-power, and is specially built for the stade between Valparias and Calino. The boot is fitted with the most modern appliances, and the saloon is lined with ample and satiawood, beautifully ernamented with carrings, and haurinously upholistered. The electric light has been provided for every part of the ship, from the masthead to the ceal bunkers, and employs over 200 gbm lamps of the Edison-Swan type. The signal lights are considerably stronger than can be provided by the best oil lamps, and are so fitted that oil can be substituted if needful, at a moment's notice. Special brackets are supplied for loading purposes. In the enginerous, bunkers, and holds plugs have been inserted so that the current may be tapped, and a powerful light concentrated in any given spot for temporary purposes. The elegant electrolists for the saloon and social hall have been designed to suit the fittings and furniture, and are adapted both for oil and electricity. The lamps expessed to rough usage are enclosed by damp-proof bell glasses, and these are protected by strong wire cages. Cockburn's sinte switches and fuse boxes have been plentifully used throughout, each state-room being separately connected. The conductors-branch into six circuits from a six-way slate switch board, and a second board with the main fuses and fitted with a voltmeter is placed on the return circuit. All the wires are embosed in wood ensings. The Kapp dynamo is compound wound, and capable of feeding the whole of the lamps at the low speed of 280 revolutions per minute. It is driven direct by an Allen twin engines a a stoam pressure of 160 lb. The