ELECTRICITY'S NEW WORK.

PROGRESS IN APPLYING POWER IN THE MECHANICAL ARTS.

Superiority of Electricity to All Other Means—"Electrical Installations in New Factories—Their Great Economy—Cost of Steam Power and That of Electrical Power Compared.

In this the end of the nineteenth century, among other things, one witnesses surprising changes in the use of mechanical power for purposes of manufacture and of transportation, and especially in the substitution of electrical apparatus for shafting and belting as the method for transmitting mechanical power—a substitution that has become so general as to become a principal subject of discussion before technical associations, both old and new.

The general application of electricity to the propulsion of street cars and other vehicles in great measure has diverted attention from the important work of that same agent in the industrial arts; and it is the purpose of this article to indicate and to illustrate the extent and the advantages of the use of electricity in the mechanical arts.

After getting from animals all the aid that he could, man turned naturally for more power to the winds and to water, and at such points as involved the least cost and preparation.

Ultimately the invention of the steam engine made it possible to apply power at any locality where it was wanted, to a certain extent, and the various forms of applying steam power have been so worked out and applied that now, in spite of its low theoretical economy, steam power easily competes with water power in many localities where fuel is not too dear or where special conditions do not render it possible to develop the water power and equipment at a very low expenditure.

Since the early eighties the new agent, electricity, has pushed forward so fast that there is a popular impression that it is the source of all power, mechanically speaking, and not merely a convenient agent for transmission of the real energy otherwise developed. In fact, we who for some time have been intimately associated with electrical applications are almost too prone to attribute to it all power and possibilities and at times mistakenly to attempt its application to some purposes better served by a plain, old-fashioned crowbar.

Doubtless the enthusiasm of those connected with this development has accelerated its progress, but in many cases we may deplore as premature attempts to apply the new agent. For instance, in the case of the storage battery street car; much money and energy were expended while the accumulator was yet a mere toy, and with such poor results that now when well qualified engineers and equally well qualified financiers take up the problem of the storage battery, past failures come to mind, and the opportunity to make new applications of the method, fairly promising success notwithstanding the continuing difficulty of excessive weight, is correspondingly difficult of improvement.

Our old friend, compressed air, very recently has been resuscitated and partially rehabilitated, but in spite of stronger storage cans, permitting the application of more economical methods in its compression, the results are yet in question; and although it cannot be denied that progress has been made, and that on various trials at least one car has been kept running, yet so many inherent difficulties attend its very general application that electricians seem to feel no fear that their technical services will soon become unnecessary or that they will be obliged to adopt this rival method.

Indeed, it would appear that now the electric current has all its own way, and few are the newly erected factories whose projectors, before deciding on its method of power distribution, do not first discuss the applicability of electrical apparatus, and not a few adopt its use generally or to such extent as their special line of business may render possible.

In a previous paragraph it was observed that electricity, of course, is a means of distribution of energy and not the prime mover, and notwithstanding its introduction we still have to trust to steam or water or to some other power for generating the electric current, whether in our own buildings or in some more or less distant station.

A question of moment has been the distribution of power developed at some central point more or less distant from the point of use, but beyond ordinary limits of the close or nearby transmissions made by the use of a belt or of gears. Such transmissions over some distance, whether thirty or a hundred feet or more, have been made by the various methods of steam piping to separate engines, by textile and wire ropes, and by shafting of various kinds. For local distribution of power in factories shafting has been the most largely used, and in spite of a very large application of electricity to such purposes, the line and the counter shaft still hold their own, and where the individual machines are small, will continue to do so. Consequently one of the puzzling questions for the mechanical engineer is just where to draw the line, and to cut off the shaft and apply the individual motor.

While doubtless it is a fact that in the different methods of power distribution the losses have always been taken into account in calculating on expenditures for power, it is during only the comparatively short period since the electric motor came before the power-using public that especial attention has been given to the very heavy losses inherent in all prior methods of power transmission, and especially to the excessive waste of energy that takes place in all shafting and belting where both are used in long lines and with many connections. Under these conditions the loss of power has been proved to be considerably more than the part actually employed by the machines in doing useful work.

Specialists have devoted their energies to determining all the factors involved in the most economical condition of applied power; some to ascertaining the actual power required by separate machines and by groups of machines under all conditions of use; others to the friction of the distributing methods, as shafting and belting, and to the discovery of the ratio of useful horse power to the amount actually developed at the prime mover, and still others to the comparative economy of the several methods.

In the most remarkable manner all agree that under almost any condition the results favor the use of electrical distribution rather than of shafting or of any other method yet tried.

Various investigations as to the proportion of developed power usefully applied, in factories equipped with shafting and belting, show that in most cases less than one-half the developed power is used, and that in fact it is a pretty good plant that has a power efficiency of 50 per cent., some plants running as low as 20 per cent. of effect, and most running along at 30 and 40 per cent. efficiency.

Of course, in computing the general economy of such a plant, there must be considered the difference in first cost; but, outside of the generator, which, with its accompanying engine, can be of considerably smaller capacity than would be necessary for an engine to drive by belt and shafting, the cost of motors and wiring, set in place, is but little more than that of shafting and belting, requiring engines and boilers of extra size to provide against increased friction.

Today electric motors are very efficient machines, and having but two bearings, both running in oil, consume but little energy in friction; and if so proportioned as to run constantly at more than three-quarters load, and in units of above ten-horse power, they give more than 80 per cent. efficiency; and the finely designed dynamo now obtainable forms a plant that will take power almost in proportion to the work to be done and will not waste a large amount of its energy in the continuous load of shafting and belts.

For running factories and such plants power costs somewhat in proportion to the size of plant and special conditions; but for the average user it will cost over $75 per horse power per annum at the cylinder of the engine; and as only about 40 per cent. of this is used in doing actual work, any change that will improve this condition will effect a material saving.

At an efficiency of 40 per cent. the cost per horse power of useful power would be, say, $75 x $\frac{100}{40}$ = $187.50, so that if by the use of electric generators and motors we can obtain an efficiency of 70 per cent or even 60, the saving will be quite large; at 70 per cent. the cost per useful horse power will be $75 x $\frac{100}{70}$ = $107, a saving of $80.50 of the original cost; and at 60 per cent. will be $75 x $\frac{100}{60}$ = $125, a saving of $62.50 per horse power per year.

Therefore a plant using 100 horse power would make a saving that in a reasonably few years would pay for the installation of electric machinery in place of the old shafting and belting.

Of course the above calculations are crude, but they will serve to show the relative costs of the two agencies.

In a paper read before the American Society of Mechanical Engineers in December, 1896, Prof. Benjamin of the Case School of Applied Science showed the results of experiments and tests on sixteen different plants using mechanical power applied through shafting and belting.

Of these plants six were doing heavy machine work, the largest having a capacity of 400 horse power, the smallest 38 horse power, and the average for the six being 142 horse power.

He found that of the whole power developed at the engine cylinder an average of but 38 per cent. was used in the machines; in one case 81 per cent. of all the power being consumed in the shafting and belting.

In six other plants classed in his paper as light machine work a somewhat larger percentage of the power was useful, 45 per cent. being consumed by the machines, the plants averaging 117 horse power each.

In four others of varying capacities the loss of power in the transmission was 46 per cent. of the total produced.

Other tests have been made, and in plants using large machines the loss is considerably more than those in which smaller machines are used and are kept going more continuously.

Taking a case with which the writer is acquainted, in which over 100 electric motors are used aggregating in capacity 3,000 horse power, very widely scattered and used for a number of purposes, a dynamo of 500 horse power maximum capacity is ample for the supply of current for the whole 3,000 horse power. With shafting this transmission would have been impossible of accomplishment, and formerly part of it was done with small steam engines, the steam being carried to them from great distances (for steam piping), and the waste must have been something fearful to contemplate, to say nothing of the much larger repairs needed for the steam apparatus.

Among other applications in this particular plant for which the electric motor is better fitted than is any other distributor of power is the travelling crane both for shop and yard use, of which machines over thirty are here in use. The celerity with which the machines handle loads of ten or twenty or more tons suggests the accounts of the employment of elephants to move timber in India.

Another application of electricity little known to the general public is in the operation of passenger and freight elevators. Although in general use but a very short time, the very first application of electric current for power purposes made in New York city was upon a freight elevator in Spruce street, somewhere about 1882.

The statement has been made that in New York city perhaps as many people travel perpendicularly as horizontally; however this may be, the elevator industry is now very large, the most competent engineers and designers are employed, and the safeguards generally adopted are such as to lead those acquainted with them to wonder how accidents of any kind can be possible. If the statement of the amount of travel be anything like correct, the percentage of injuries to those using elevators is probably smaller than to those adopting any other method of transit.

One large electric elevator manufacturing company, after having taken a large part of all the new contracts for elevators in New York city in the past two years, has just invaded London and has carried away the largest contract for elevators ever given, and that in competition with some of the oldest hydraulic "lift" companies in the business.

Although the applications of electric power on the other side of the Atlantic are ridiculously small, as compared with those in the United States, the above contract would indicate that English men are alive to the benefits, and when makers of machinery in the British Isles can get it through their heads that it is much cheaper to make machines of any kind by the quantity, the same as flour or wheelbarrows or any other staple article of commerce, then, and only then, will they begin to use electric power freely. In passing it may be said that the underground railway company that gave this large order for elevators also awarded to American firms a very large order for electric power and car equipment, and a committee of the Board of Trade made the statement that the company could not do otherwise, as there was no firm or firms in Great Britain able to fulfil the contract in the time set for the completion of the road.

Regarding the question of distribution of power by electricity in factories, &c., many schemes for distribution on a much larger scale and for all general uses have been developed, notably the installations at Niagara Falls and in the extreme West. At Portland, Or., the street cars and electric lights are supplied with current generated by water power over ten miles from the city, at Willamette Falls. The same kind of power supply is now being furnished to Sacramento, Cal., from Folsom, more than twenty miles away, and one could go on naming and describing other similar plants, including those at San Bernardino and Telluride, to the number of perhaps fifty or sixty.

The methods of charging and the prices charged for power supplied from these sources vary according to local circumstances. It has been fortunate in much of the electrical business of the past that, where the power was supplied by water, prices have been made so low as entirely to prevent profit, but in the later periods of the past two or three years this has been to a great extent overcome, so that customers are now willing to pay a fair price for this much better power.

When the customers used power in but small units, say from 2-horse power to 20-horse power, with an occasional 50 and 75 horse power motor, it was a comparatively easy matter to meter the current as ordinarily is done for lighting; but since the distribution and use has become so general other methods of charge have had to be devised, and now large customers are generally arranged with separately and according to the conditions of each.

One feature that tends to affect charges for power is the very general ignorance of the amount of power actually used and its actual cost. It is generally agreed among those who have had occasion to become acquainted with the actual use and cost of power that almost without exception the consumer will rate his supply 100 per cent. too high; and it is quite usual for him to give as the measure of his actual use the builder's rating on the engine. Of course these facts considerably affect the computations of cost, and when the user can be got to assemble all the items going to make up his power cost and then to divide the total by the actual useful power, invariably he is astonished at the result. There seems to have been a idea that a good average unit cost of power could be named off hand, and in the past two years or so the writer has been largely engaged in determining actual cost under conditions thus existing and in comparing the same with estimates by others. As most of the investigations took place in and about Buffalo, N. Y., perhaps some of the conditions and results may be interesting to outsiders. To begin with, it would naturally be expected that in the region of Buffalo steam power would be cheap, for coal there is low priced, the average cost for power purposes being about $1.75 per ton of 2,000 pounds. The result is not always agreeable to this theory, as it is often the case that the careless or ignorant use of cheap coal quite overbalances the extra cost in localities where it is higher in price. Again, coal by no means forms the great proportion of the cost of power commonly supposed. Only in those cases where power is used in large and steady quantities is the cost of fuel one-half the total, and in nearly all cases it is less than a third, and in some cases not over one-eighth of the entire cost. The use of the exhaust from the engine for heating purposes is often counted on as making the actual cost of power low, but this, too, has been much overestimated. As mentioned above, it is not only difficult but unfair to state a figure on cost of steam power that may be called average; for example in one kind of business two establishments with similar plants, but differing in the amount of power used, showed the cost of the lowest to be $62 per year, per horse power, and the highest, $240. In another class of business, where the power is developed in amounts exceeding 1,000 horse power for each plant, and the work or load is constant for ten hours daily, the cost per horse power in the highest was $28 and the lowest $17, and in other classes of business the costs were found to vary quite as much. Therefore in stating the probable cost of power for a given plant, to say the least it would be unwise to give the average costs in similar plants, as the conditions might bring it under the high or low cost class.

In order to get somewhat more definite knowledge of the cost of steam power the writer in the past two years has examined and tested twenty-two plants, besides several others on which more or less exact estimates were made. Of those as to which full and exact data were obtained two were electric lighting stations, one of them large and of the best of its type, the other small and of a very usual mixed type; one grain elevator, three waterworks pumping stations, two flouring mills, six large cotton mills, four newspaper and printing offices, one department store, one furniture factory, one large bakery, and one glazed and fancy paper factory.

While the list is open to the criticism that scarcely enough plants of any one kind were examined to determine a fair average, it is thought that a careful examination of the following table of details will show that averages are unfair to use, as the variations are so great. While the costs given in this table are per annum, attention is especially called to the fact that the number of days and hours given, shows that it is not exactly correct to state a cost per annum, as the time run varies so much, and therefore a more correct statement of cost would be by the horse-power hour.

OUTPUT. | OPERATING EXPENSE. | FIXED CHARGES.

No. of plant.	Average lbs. per sq. in.	Per cent. of No. indicated capacity.	Time first Mo.	Days per year.	Hours per year.	Fuel.	Wages.	Supplies.	Repairs.	Water.	Total.	Interest.	Depreciation.	Insurance.	Taxes.	Total.	Cost per horse power.
1	110.70	78	34	297	7,128	$26 20	$10 96	$1 64	$5 77	$ 96	$45 56	$27 55	$3 53	$1 07	$ 67	$7 81	$53 37
2	100.90	85	34	293	8,806	32 00	14 61	3 16	2 90	1 13	53 61	14 90	11 62	1 50	5 43	33 45	87 06
3	100.70	37	9	301	9,067	48 91	54 12	9 12	7 62	4 13	124 00	41 66	6 46	4 13	2 79	55 04	179 04
4	100.40	33	23	361	8,661	51 03	37 82	7 84	1 96	3 49	102 14	6 27	5 21	1 94	1 13	14 55	116 69
5	100.50	33	23	365	8,760	53 07	5 09	2 02	77	30 74	91 69	3 10	2 75	3 00	2 80	11 65	103 34
6	100.00	74	10	365	8,760	13 00	9 89	1 98	1 00	2 72	28 59	1 10	12 40	1 30	7 50	22 30	50 89
7	100.00	62	11	365	8,760	13 76	13 00	2 74	3 53	1 39	34 03	3 10	12 75	1 43	7 67	24 95	58 98
8	100.00	53	34	365	8,760	24 44	33 67	6 66	1 96	2 67	68 40	4 11	12 55	1 43	7 67	25 76	94 16
9	100.10	39	34	365	8,760	31 62	44 39	8 86	1 39	2 67	88 93	5 27	12 55	1 43	7 67	26 92	115 85
10	100.00	32	30	365	8,760	34 54	47 50	9 48	1 39	2 67	95 58	5 41	12 55	1 43	7 67	26 96	122 54
11	100.00	41	30	365	8,760	37 50	53 30	10 63	1 03	2 67	105 13	10 78	12 55	1 43	7 67	32 43	137 56
12	100.00	84	34	365	8,760	41 70	49 30	9 84	1 39	2 67	104 90	5 27	12 55	1 43	7 67	26 92	131 82
13	100.00	52	34	365	8,760	45 00	61 74	12 32	1 39	2 67	123 12	5 27	12 55	1 43	7 67	26 92	150 04
14	100.00	75	30	365	8,760	50 30	73 42	14 64	1 39	2 67	142 42	5 27	12 55	1 43	7 67	26 92	169 34
15	100.00	97	30	365	8,760	54 00	79 30	15 82	1 39	2 67	153 18	5 27	12 55	1 43	7 67	26 92	180 10
16	100.00	95	30	365	8,760	60 00	87 74	17 49	1 39	2 67	169 29	5 27	12 55	1 43	7 67	26 92	196 21
17	100.00	70	30	365	8,760	65 00	95 07	18 96	1 39	2 67	183 09	5 27	12 55	1 43	7 67	26 92	210 01
18	100.00	84	30	365	8,760	70 00	102 30	20 40	1 39	2 67	196 76	5 27	12 55	1 43	7 67	26 92	223 68
19	100.00	86	30	365	8,760	75 00	109 60	21 86	1 39	2 67	210 52	5 27	12 55	1 43	7 67	26 92	237 44
20	100.00	32	30	365	8,760	80 00	116 90	23 32	1 39	2 67	224 28	5 27	12 55	1 43	7 67	26 92	251 20
21	100.00	3	30	365	8,760	85 00	124 20	24 78	1 39	2 67	238 04	5 27	12 55	1 43	7 67	26 92	264 96
22	100.00	3	30	365	8,760	90 00	131 50	26 24	1 39	2 67	251 80	5 27	12 55	1 43	7 67	26 92	278 72

In determining the costs as exhibited in the above table a thorough study was made of each individual case, as it was found that even in the same class each case is handled in a manner differing so much from all others as to make it practically independent. In such plants as offered the opportunity tests of the engines were conducted long enough to determine as nearly as possible the average load under ordinary working conditions, such as flouring mills offering in its daily output of barrels of flour a good unit for computing the yearly average; but in no case was less than a yearly average used.

The accounting costs were taken from the books of the concerns, and usually under the supervision of the writer to see that all repairs, extraordinary and otherwise, were included, as it is often found that such a thing as replacing a whole bank of boilers, putting a new cylinder on the engine, or replacing a burst fly-wheel is not counted in the cost of power.

There are two main factors of expense entering into the cost of steam power usually, and in this paper called "operating expense" and "fixed charge," the first being made up of fuel, wages, repairs, supplies, and incidentals such as lighting the engine and boiler rooms, removal of ashes, &c. These are comparatively easy to determine, but fixed charges are more difficult to separate, as few firms pay any attention to the two items, interest and depreciation, while insurance and taxes are of course charged to their usual account, and when estimating cost of power are omitted altogether. In many cases the plants, including buildings, boilers, engines and piping, have been built by contract and a definite separation of values is difficult.

The first two items of fixed charges, interest and depreciation, are of serious importance the attention they deserve, especially the latter, which, if handled at all, is considered as included in the cost of repairs, but which should not by any means be so included.

Of course plants vary much in the amount of depreciation chargeable, and must be accounted for accordingly. While the writer has seen steam plants in continuous use for thirty and more years, the cases are exceptional, and, as the time in which a plant becomes obsolete or outgrown is usually much shorter, say ten or fifteen years, this also is a matter to be taken into account, and whether it be charged off yearly or in a lump when new apparatus is installed the cost is just the same and is chargeable only to the cost of power for the time during which such depreciation took place. In fact, one learns only when meeting the world into the subject how generally incorrect are the statements of cost of steam power, and it is safe to take as correct only those results obtained in special cases by thoroughly competent engineers.

It is, of course, true, in places where no especial advantage obtains that will permit the development of cheap water power, that electric power in small amounts still costs considerable, yet when such costs are correctly compared with the cost of steam power the result is likely to be in favor of electricity, and the very great advantages inherent in electric power for outweigh any matter of cost, even though it should occasionally happen to be more.

In the first place, the great facility with which it can be applied to almost any purpose places it far above steam, or in fact any other known form of power; in the case of large machines a motor can be directly applied on the machine itself, and where many small machines are in use, sections of shafting driving a convenient number can be attached to one motor, and if necessary can be moved with the engine the motor can be set up in any part of the room.

In the newer cotton mills motors are being suspended from the ceiling and the shafting coupled to the motor shaft, thus doing away with all large belting.

One of the principal advantages of using electric power is the fact that at the present time in most large cities it can be obtained from central stations, and thus the user avoids a large capital expenditure for first cost of plant, permitting the use of just that much more money in his business, and what is more, avoiding the usual high depreciation of plant value, as the modern electric motor will with nominal repairs last indefinitely.

And, again, the user need pay for plant only large enough for his present requirements, and thus not have a large amount of capital idle for future growth of his business, and then, as his business does increase, he can increase his power by adding motors, and current from the central station will furnish him with all the power he may require, to say nothing of the fact that he can also get an occasional extra supply, which is not convenient, or in many cases possible, when supplied from his own plant.

In connection with the distribution of power from the Niagara Falls installations, Buffalonians gradually had talked themselves into the belief that power could be developed at Niagara Falls, and practically for their exclusive use at very little cost, and it is said that for a time real estate dealers quoted $5 per horse power in Buffalo as the outside price. Of course any one who for a moment stopped to think would know that such a price is ridiculous, but probably it will be difficult to convince many of the steam users that in most cases their own steam power costs over $75 per annum per horse power, or they should not expect to receive electric power from the falls for much less than one-half of the price of their steam power. New users of power generally consider the character and cost of the power pretty thoroughly, and it is never difficult to convince them that at present prices the cost of Niagara Falls power permits a very considerable saving as compared with the use of steam power.

If the growth of electrical applications meets the expectations of its friends the two and a half years left in this century will show a development that will be hard to beat by any changes that may come following 1900.

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JACK TAR'S LETTERS HOME

ONE OF THE DUTIES OF THE SHIP'S WRITER ON A MAN-OF-WAR.

Bluejackets Not Good at Correspondence—The Art of Writing to Another Man's Girl—Domestic Matters Calling for Diplomacy—Scenes on the Arrival of the Home Mail.

WASHINGTON, Aug. 14.—Another point of difference between the enlisted men of the army and navy is that while the average soldier is a persistent and fairly capable letter writer, the bluejacket and the sea soldier will travel any length to wriggle out of the necessity of handling a pen. This difference is of course almost entirely a matter of environment. The soldier has his ample bunk, his gear chest, the tables in the day room of his quarters, and the well-furnished desks of the post library to pick from for letter-writing purposes; the sailor or the marine has only his 8x12-inch ditty box, held perforce between the knees, and therefore no very stable affair for the exercise of penmanship. Of course there are some sailors and some marines who write letters home or elsewhere, but these are mostly the landsmen, recently shipped, and the recruits, suffering from the lonesomeness and the isolation of early uniform wearing. A seaman with a rating badge on his arm, or a sea soldier with an enlistment stripe or two on his sleeve, is not often seen on a man-of-war with a pen in his fist. Yet the old-timers, especially when they are on remote foreign stations, are exceedingly fond of receiving mail when the mail steamers arrive at the ports in which their ships lie; and, oddly enough, those among them who are the rarest writers often receive the heaviest mail.

The ship's writer does the absolutely necessary writing for the bluejackets and marines, who despise the manipulation of the pen. Sometimes, if he is a newly rated ship's writer, he does the work for nothing; but the ship's writer who has been in the service long enough to have worn out several eagles on the sleeve of his mustering shirt is not so amiable. He establishes a set of charges for his ink-slinging labors, and thereby fattens his income considerably in the course of a cruise. Nor does it seem unreasonable that the ship's writer should exact fees for this sort of work, for he has to snatch intervals between his really heavy labors of an official character to perform it, and it is the merest indolence, after all, that prompts man-of-war's men to employ another man to write their letters for them. The three yeomen of a warship—all of them sixty-dollars-a-month chief petty officers—occasionally write letters for particular chums among their shipmates who feel their incapacity for pen work, but they are not appealed to by the crew in general for favors of this sort, as is the ship's writer. There is some excuse for the genuine old-timers among the bluejackets for not doing their own letter writing, for their hands, after many years of man-of-war deck labor, or toil down below in engine and fire rooms, become stiffened and their fingers bent and rigid, thus making pen work out of the question for them. But for the old-time marine, who during his entire service has never been called upon to do any harder work than pipe-claying his belt, and whose hands remain as flexible as a woman's, there is no excuse sufficient to warrant his not paying the ship's writer for doing his letters for him, while he himself puts in all his leisure time playing pinochle on the spar deck.

A ship's writer often has queer jobs on his hands in the way of writing shipmates' letters. He writes letters to sweethearts, wives, mothers, sisters, brothers, uncles and aunts, all sorts and conditions of relatives and friends of the man for whom he does the job. The sweetheart letters preponderate. Letters to wives come next. Almost every return letter that a man-o'-war's man gets from wife or sweetheart contains a reproach for his indifference or carelessness in permitting another man to write his letters for him; reproaches which are of course ignored when the ship's writer indites the next epistle to them.

The extent of the instructions which the ship's writer usually gets from the man for whom he writes a letter is, "Tell her this and tell her that," so that with hardly any proper sort of knowledge of the contents of the epistle to which he is making reply the writer must shape his epistolary fabric. Once in a while, if he is a particularly intelligent ship's writer, he comes within a mile or so of really answering the questions submitted in the letter to which he replies; more often, and necessarily, he writes irrelevantly, quite beside the main points of the correspondence, and simply because he can't help it, he orginarily ignores the most salient matters that the man-of-war's man's correspondent wants to know about in detail. Occasionally, when a sailor receives a letter from a sweetheart in the States that he wants the ship's writer to make reply for him, he will surreptitiously slip the writer's desk and hands the missive of love to that petty officer, with the remark:

"See here, mate, I want you to answer this thing; you can read what she says; make it strong; pile it on thick, but don't make it too strong, for she'll believe it if you do. Now, I'm just telling you what to say, and am not writing myself, because my hand is sore; tell her I've been sober for six months, and haven't been ashore all that time; and, say, if you shoot off a blooming word about this up for'ard I'll break your head."

Now, instructions such as these give a ship's writer some headwork to perform, for their range is wide. To do the job successfully he must adopt the mental characteristics of his client; and to write in the style, or the lack of it, of another man, and a woman, has puzzled some eminent heads. However, the writer plunges into the job. Ship's writers are an exceedingly intelligent class of men as a rule—generally clerks whose indiscretions ashore have got them into man-of-war's men's uniforms. So, the client having a bottle of rum put forward, he sets to work to reply to the sweetheart's letter. He must carefully repress the inclination to write as he would to a sweetheart of his own, for otherwise he would exhibit, probably, a looseness of diction and an epistolary enthusiasm that would be utterly incompatible with the character, temperament, and intelligence of the man for whom the work is performed. He must have recourse to short, scrappy sentences; and not infrequently he adds realism to the thing by falling into gross slovenliness as to grammar. Under these conditions, even, much may be expressed, and the sailorman's expressions of undying affection may be piled on thick, but the work is nice, and worth the ship's writer's fee.

Not infrequently when the ship's writer in doing a job of this sort inadvertently steps over the limit and indites rhetoric to his client's girl, which she, of all other human beings, knows is of a higher flight than her Jack is capable of, the writer finds himself in a peck of trouble. When the mail steamer from the United States arrives abeam the ship Jack races out to the writer's office, flourishing a letter in the air, and hoarsely inquires:

"Say, what the devil did you put into that letter, and what kind of a lime-juice monkey hash you been trying to make of me? Look at this."

The writer takes the letter from Jack's sweetheart and finds simply that the girl has commented enthusiastically, and perhaps sarcastically, on Jack's manifest improvement in literary style. But he has a job to appease Jack, all the same.

The letters which the ship's writers execute for the married men among their clients aboard ship are usually of a much more tepid character, beginning and ending in commonplaces. "Ship got here last week; start to-morrow night for Tangier; hope the kids are all right; why don't you send me some more papers?"—this is a sort of sketch of the style of document the writer gets up for shipment to the wives in home ports. Very often, however, these matrimonial epistles relate chiefly to the matter of money, and then there is a whole lot of warmth infused into them. The wife writes to her husband on the China station inquiring why he is not sending her regularly through the paymaster her share of his pay, or, perhaps, demanding an increase in the allotment. Here is where the ship's writer's diplomacy must exhibit itself. The recipient of the letter, in giving instructions for the reply, often employs language that might be all right up forward under the to'gallant fo'c'sle, for the instruction of the parrots hanging in their cages to the hammock hooks, but would make the man who expressed it on paper liable to imprisonment for using the mails for profane purposes. Therefore, in these financial snarls, it is the writer's business to dump his mental balm of peace upon the troubled waters, and, to their credit be it said, ship's writers succeed in healing many a breach opened wide by the inopportune and very often unjust letters sent by wives to their man-of-war husbands.

As a general thing the man-of-war's man puts off answering his absolutely necessary letters until the last moment. About two-fifths of the sailors and marines who get letters write to do their correspondence for them wait until the bo'sun's mate on deck passes the word as to the time of departure of the mail orderly, as "All hands that's got any mail for the United States get it in by 3 o'clock; mail ship sails at 4:30." Then the loungers and pinochle players on deck go through a thigh-slapping performance and bellink them that it is imperatively necessary that such and such a letter they received in the last mail must have a reply, whereupon all hands among these make a swoop upon the ship's writer. With the writer it is a case of first come first served, and on mail-departing day he is the busiest man on the ship. The letters he writes on these days are characterized by that brevity which is the soul of wit; and, employing the utmost brevity, he is often unable to work off more than half the letters he is asked to write on these days, to the profound disgust of the procrastinators who get left.

Mail-arriving day on the remote foreign stations is a pretty sizable occasion on an American man-of-war. The men eagerly await the word, generally brought off by the cox'un of the steam cutter, that the steamer carrying United States mail has been sighted "off the heads," and they scan the horizon carefully for her appearance. Mail for a man-of-war is carried in separate bags on the mail steamers, so that when the steamer hauls into harbor the warship's cutter, carrying the boarding officer and the mail orderly, puts off for her. In expectation of such boarding, all of the man-of-war's mail has been got up on the steamer's deck, and is thrust over the rail into the cutter while the boarding officer is in the steamer's cabin with the skipper. Then the warship's boarding officer hops back into the cutter, big and little boat being still in motion, and the United States mail is on the way to the man-of-war, the whole ship's company standing around the decks waiting for its distribution. The mail orderly carries all of the bags aft to the cabin, sorts out the mail for the officers first, and sends that for the enlisted men forward in armsful by the marine orderly. The master-at-arms clears a space, the mail is dumped in front of him, and he calls off the addresses, taking letters first, papers second, and packages last. Several bags full of mail are thus issued in a short space of time. There is always an accumulation of letters for men who have deserted, died, or been transferred, and these the master-at-arms puts aside and takes care of afterward. Man-of-war's men's friends and relatives in the United States send them enormous bunches of Sunday papers, and saloons largely patronized by sailors in the big American maritime cities forward great packages of papers and magazines addressed to the whole ship's company for distribution by the master-at-arms.

AMONG ATHLETIC CHRISTIANS.

The Various Branches Actively Preparing for the Fall and Winter Campaign.

Athletic pastimes among the Y. M. C. A. branches are booming. The Mott Haven grounds are now cut up, and the Twenty-third street branch, as well as several other branches, are using the grounds at Weehawken. More than usual interest is being displayed by the members of the Central branch of Camden, N. J., in the tournament of sports to be held on Labor Day. The games will be decided on the grounds of the association and will be the first of note ever given by the branch. Arrangements have been made for a series of indoor games, including quoits, swimming, bowling, and tub racing. There is a movement on foot to form a volley ball league with other associations of Camden and Philadelphia.

Preliminary work for the coming season is being actively indulged in by the athletes of the Harlem branch of the Y. M. C. A. of this city. The gymnasium is being put in perfect repair, and will be open for exercise on Sept. 1. The gymnasium members are already making extensive preparations for the autumn gymnasium exhibition, which will take place on Oct. 8. Basketball will again be in full swing at the branch in a short while, and everything possible is being done to turn out a champion team. The bowling alleys have been in constant use during this month, and the men trying for the team to represent the branch in the intercity tournament are so evenly matched that the management will find it a hard task to select the right men.

At the Young Men's Institute plans are being made for a vigorous winter season in the gymnasium. The gymnasium has been overhauled, and now is in first-class condition. Several new pieces of apparatus have been added, and the space for basketball has been made larger. The basketball men will begin training as soon as possible, and prospects are bright for a strong team. There are several members who are talking about football, and there is every chance of a team being organized.

The new West Side branch will be represented in every line of sport to be held under the auspices of the Y. M. C. A. Athletic League of North America, and in all the indoor games to be held this winter. The football squad will soon be organized, and under the direction of a competent coach will begin work in about two weeks. The bowling teams are now fully organized and in excellent condition to take part in the intercity tournament.

Although the Mount Vernon Y. M. C. A. members are still very much interested in baseball, the basketball enthusiasts are preparing for a prosperous season in their special line of sport. With the raw material the association had last year, it made a most brilliant showing, playing games with nearly every association in this vicinity and winning out with flying colors in a majority of the contests. The same team will be reorganized this year. Among the baseball contingent there is some football talent, and as soon as the season on the diamond closes steps will be taken to form a team for gridiron games. There is a movement on foot among the bowling members to organize a team to be entered in the proposed bowling league.

The East Eighty-sixth street branch will again resume its place in athletics this season. A new building has been erected in East Eighty-seventh street, which will be ready by Sept. 1. The selecting of candidates for the various teams has already begun, and as soon as the gymnasium is in order practice will start at once. Basketball, bowling, handball, tennis, quoits, and swimming will be the sports cultivated. The athletics at the Greenpoint branch will be as active as heretofore. The branch will have a good basketball team in the field. The branch is represented by a junior team which has yet to be defeated. Although young in years, the boys have experience, and they have announced their willingness to play any team their average in weight and years in the country.

Everything is in running order at the railroad branch, and although the members very seldom indulge in any of the athletic sports other than basketball, they expect to score heavily on this specialty.

Aquatic sports find favor with the members of the New Bedford Association. A boat and canoe club has been organized, and a water front of ninety-five feet has been leased on Pope's Island, in the harbor, where a boathouse has been erected. The bathing and boating facilities are excellent, and are indulged in by the members quite frequently. An open-air reception was recently given, at which water sports, fireworks, and a beach supper were the features. A strong basketball team is being selected to represent the association, and when fully organized will play all the leading teams in this vicinity. There is a movement on foot to develop a good football team, and in a short while candidates will be selected.

SUICIDAL DOCTORS.

What Is the Explanation of a Remarkable Fact Shown by Statistics?

From the Pittsburg Dispatch.

Statistics show that the medical profession is more prone to suicide than any other. During the last three years the number of suicides occurring among physicians has been, respectively, forty-five, forty-nine, and forty-seven per annum, an average of nearly one to 2,000; or, as the death rate among the physicians is about twenty-five to 1,000, nearly one-fiftieth of all the deaths in the profession have been by suicide. It has been suggested that an explanation of this tendency may be found in the development of morbid fancies in the mind of a doctor, on account of his constant association with the sick and dying, or because he has the requisite knowledge of how to die painlessly and conveniently.

A medical journal dissents from all these views and holds that the leading factor is the accessibility of the poisonous drugs, which are almost invariably used. Suicide is largely a matter of insane impulse. Imagine a man fatigued in body and depressed in spirits—as the doctor very often is—swayed by an overwhelming conviction of the utter weariness of life to the impulse of suicide. If he had to put on his hat and walk to the drug store and tax his ingenuity for a lie with which to explain his desire for poison, he might not possess the fatal act from mere inertia, or he may meet a friend or have his interest in life aroused by one of a multitude of every-day occurrences, or physical exercise may bring him to his senses. If, however, as is the case with almost every doctor, he has simply to feel in his pockets, or walk across his office to get a deadly poison, the impulse may be carried into execution before anything can happen to supplant it in the brain.

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