

"I then ascertained, from the man who had actually executed the job, that one of the young gentlemen from the College had come in, just as he was finishing 'pulling' them, and had offered him 'five bob' for a copy of it."

This statement produced what the newspaper reporters call a "sensation," which increased as Mr. Beresford went on.

"The man had been carefully warned of the great importance of keeping dark the contents of the papers, and so he very properly refused to allow the 'young gentleman' even to glance at one, though he finally offered as much as thirty shillings to look at one just for a minute. The printer assured me that he ended by packing up the papers and sealing them, there and then, much to the young gentleman's disgust, and he carried them off to an upstairs room for safety. When he returned, the boy, it seems, abused him for being 'such a fool,' and departed in wrath."

At this the boys looked rather blank, for apparently the villain had been foiled in his attempt to gain unlawful information.

"On my way back from Swainton," continued Mr. Beresford, "I formed a theory of the course which had been followed by this would-be swindler, when baffled in his pursuit. In order, however, to prove the correctness of my theory, it was necessary to find a certain piece of evidence, which I had good reason to believe would have been most carefully concealed. After searching daily for more than a fortnight, my patience was rewarded, and the proof of Brill's guilt is contained in this bag." So saying, he drew out from under the chair on which he had been sitting a small, black bag, which he held up for everyone to see.

Opening it, he took out, to everyone's astonishment, a pair of very dirty white flannel trousers, at the sight of which a perfect roar of laughter went up; but Brill buried his face in his hands, and groaned in a state of utter collapse.

"This pair of trousers," said Mr. Beresford, "is naturally dirty, for I dug them up only

yesterday, out of a hole in the ground at the back of the cricket-pavilion.

"I will now explain my theory, and the way in which it is confirmed by these trousers.

"It seems that the day on which Brill made his visit to the Swainton printer's was a wet half-holiday, and he was dressed in flannels, with a long mackintosh to keep him dry!

"Now, it occurred to me that during the few moments that the printer left the room he might have sat down on the inked type, and carried off an impression of the paper on what I believe you are accustomed to call your 'bags.'"

Here the laughter was renewed, for the idea of anyone quietly sitting down, with a dictionary, to "construe" the surface of his flannel trousers, proved irresistibly comic to the schoolboy mind; but the speaker quickly resumed his story.

"I next ascertained from the matron that a pair of Brill's flannels had disappeared; and it then became evident that, not daring to send them to the wash, he must have hidden them somewhere, where he reckoned that there was no chance of their being found. My search was at length successful, and when the earth was shaken off them, there was the Greek Unseen, somewhat blurred, but still quite capable of being deciphered with a little trouble."

When Mr. Beresford had finished his story, the Doctor rose once more, and called up Brill, who seemed utterly overwhelmed with the burden of his disgrace, but who nevertheless succeeded in dragging himself up to the dais where the masters were assembled.

"As for you, Brill," said the Doctor, in his clear, ringing voice, "I can only feel the heartiest contempt for your disgracefully mean and underhand conduct. It was my full intention to take this opportunity of expelling you now, publicly, in the presence of all your schoolfellows. Thanks, however, to the strong pleading of Graham, the very boy whom you did your best to injure, I have decided to deal more leniently with you.

When I explained to Graham this morning how things stood, his first thought, I may tell you, seemed to be, not so much satisfaction at finding that the scholarship would fall to him after all, but anxiety to save you from punishment and disgrace. After consulting with the other masters, I have come to the conclusion that I am bound to give great weight to his intervention, where that of anyone else whatever would have failed to influence me; and so you may thank him for the knowledge that you will leave the school in the ordinary way at the end of the term, without suffering the ignominy of expulsion." At this the whole school rose to its feet with a single impulse, and gave "Three cheers for Graham," with a vehemence that threatened to endanger the roof.

"He further entreated," continued the Doctor, "that the whole affair might be kept a secret, but that was, of course, impossible.

"At the same time, it remains for all of you to decide whether the knowledge of his disgrace shall be allowed to spread beyond the limits of the school; and in view of what Brill is probably suffering at this very moment for his misconduct, I will ask you all to consider the advisability of keeping the secret to yourselves, and avoiding the subject altogether when you get home."

It is satisfactory to learn that this hint of the Doctor's was taken, and, in spite of the large number of boys in whose hands it was placed, it never leaked out. Poor Partridge was compelled to make a public apology to Fanning, and had the further mortification of finding his nickname sarcastically transferred into "Sherlock."

Felix Graham is now at Oxford, where he is distinguishing himself both in the schools and in the world of athletics; while Brill, who has gone into business, has probably learned, once for all, the lesson that he will never help himself forward, even in this world, by the aid of a shabby trick, however ingenious and carefully contrived it may be.

[THE END.]

A VISIT TO H.M.S. "WORCESTER."

BY ARTHUR LEE KNIGHT,

Author of "The Rajah of Monkey Island," etc. etc.

I was busily engaged in reviewing some books for the "Slasher" the other day, when there was a hurried knock at the door, and before I had time to shout "Come in!" it was burst open, and Archie stood revealed in the opening, his hair dishevelled, his necktie flying about like a man-of-war's pennant, and a look of expectancy in his bright brown eyes.

"Hullo!" I cried, "I thought you were at school—where all good little boys ought to be!"

"Saturday's a whole holiday at St. Paul's; do you mean to say you don't know that?" exclaimed Archie, advancing into the room with a bright smile upon his face. "Besides, this is our day for the *Worcester*; you've forgotten all about it, I suppose?"

I gazed at him in silent horror.

"But the sub-editor is waiting for copy," I stammered out at length, "and—"

"You don't mean to say you do copies at your age!" broke in Archie, with the easy flippancy of a schoolboy. "It really isn't necessary, for you write a very fair hand, although your spelling is about as bad as it can be, honour bright!"

"Thank you," I said stiffly. "Now you

may clear out, and leave me to my work. I think, if I remember right, you've got an engagement to go to the Oval with a chum to see the match between Surrey and Sussex."

"Nothing of the sort!" retorted my candid young friend, as he sank into the only armchair in the room. "I'm going down to Greenhithe to see the *Worcester*, and, what's more, I'm going to take you with me, and have just bought this new straw hat at Whiteley's for the occasion."

"I suppose you think that blue ribbon looks nautical," I said sarcastically. "I wonder you didn't buy a pea-jacket with brass buttons at the same time, a crimson muffler, and a pair of sea-boots!"

"I got a new 'bike' instead," answered Archie promptly; "guess what I gave for it."

"I'm in no humour for doing mental arithmetic," I said peevishly. "If you've thrown over that good-natured 'pal' of yours who was so bent on going to the Oval, you can go to Madame Tussaud's with my landlady's little girls, who are very anxious to—— I say! stop that, you young rascal! What are you up to?"

Archie had sprung from his chair—a dangerous light in his eyes—and with an audacity of which only a schoolboy could be capable, had snatched up the book I was reviewing and stuffed it under the fender.

I fancy I grew pale to the lips.

"Do you know that that book belongs to the editor of the 'Slasher'?" I asked in an awful voice.

"I say! Does it though! Is the editor a waxy sort of chap that would give you the sack? Why that jolly red cover will be all scored with black marks."

I sprang to my feet, but Archie was before me—schoolboys are as phenomenally active as the monkeys they so closely resemble!—and when I reached the fireplace he was deliberately seated in the fender, his arms clasped around his knees, and a "Come on if you dare!" look in his brown eyes.

"I'd throw you out of the window if there wasn't a savage collie dog in the garden," I exclaimed angrily.

"Try it," said my tormentor laconically, and began kicking his heels about as if meditating an attack on my shins.

"Do keep quiet, Archie," I implored; "there's a new crimson firescreen, the pride

of the landlady's heart, just behind you, and if you should fall backwards, your head would go right through it."

Ten minutes later—strange to relate—Archie and I were on the top of an omnibus, making the best of our way to Charing Cross, from whence start the trains for Greenhithe, off which Kentish village is moored H.M.S. *Worcester*, the well-known training-ship for boys who intend to become officers of the mercantile marine.

I was securely lashed to the chariot wheels of my young friend for the rest of the day. The editor of the "Slasher" might frown, and the sub-editor might despairingly groan, but it would not affect Archie one jot or tittle. The only frowns and groans he dreaded were those of his form-master.

"I feel rather like a schoolboy out for a holiday myself!" I exclaimed, for I was secretly delighted to be out in the warm exhilarating sunshine, and to have the chance of a pleasant day in the country. And I had promised to take my young friend over the *Worcester* on this particular Saturday. I had better admit this at once, for if Archie's eyes should chance to light upon these columns—I know that he is a subscriber to the "B.O.P."—he might feel that he had been treated with injustice, and pay me a second visit to demand satisfaction.

"Do you really feel like that?" said Archie, his eyes dancing with fun. "Then count the tuck-shops on the left-hand side between this and Charing Cross, and I'll count those on the right. Whoever gets the lowest score shall stand a packet of butter-scotch. No cheating, mind!"

"This is too frivolous," I said reprovingly. "It will be more improving to the mind to study the architecture of our noble streets and public buildings. Let me draw your attention, for instance, to that Grecian portico that—"

"Oh, I say, look at all those designs they're fixing up for the Jubilee illuminations," interrupted my irrepressible young friend; "how jolly they'll look when they're lit up!"

"If you want me to keep my hair on, don't mention that word in my hearing," I exclaimed, moodily pulling my grey felt hat down over my brows.

But Archie only laughed with what I considered unseemly levity, and then began telling me a long story about some young grey plovers which he was trying to rear at his father's place in the country; in the midst of which recital we reached Charing Cross. Ten minutes later we were steaming out of the station, Archie curled up in a corner of the carriage half buried in a pile of literature. As he remained quiet and good for five minutes straight on end, I rewarded him with a stick of special Ceylon chocolate, which I carry about with me for the purpose of encouraging exemplary conduct! So seldom do these opportunities occur that I generally have to eat the chocolate myself to save it from falling into a state of general decay! Comment is needless.

It was early in the afternoon when we reached Greenhithe.

On the platform were two or three *Worcester* cadets in their shore-going uniform, which consists of blue cloth pea-jacket and trousers, and a naval cap with badge, underneath the latter being the name *Worcester* in tiny gold letters.

"Can you tell me if Captain Wilson-Barker is on board?" I said, accosting one of these youngsters.

"No, he's at the cricket-field, sir. There is a match going on this afternoon."

"Thank you. Come on, Archie, we'll make straight for the *Worcester*. Cricket

matches you see often enough, but a training ship is a novelty not often thrown in your way."

It was not my first visit to the *Worcester*, and so I made straight for the landing-stage, from whence I knew that it was possible to signal to the ship for a boat.

At length a fine reach of old Father Thames lay revealed before us alive with shipping, and there full in view lay, securely moored, that grand old two-decker line-of-battle ship the *Worcester*, her masts and rigging clearly outlined against a cloudless sky of blue. A north-easterly breeze was blowing freshly.

We had reached the landing-stage, at the head of which stands the little signal staff. Here a knot of *Worcester* lads was gathered, and one of them obligingly hoisted the cone for us. The cadets certainly look as if their training life agrees with them, for their faces wear a bright, happy, and healthy look, which speaks volumes.

"I say! What a jolly ship the *Worcester* looks!" exclaimed Archie, in high delight. "Which are the main-chains, and the fore-top, and the bowsprit, and the lubber's hole, and the spanker boom? You're a naval man, and ought to know."

"Dry up!" I said. "Do you think I came down here on purpose to give you a lecture on seamanship?"

"Very well, then, I'll race you down this sloping stage; it'll fill up the time till the boat comes, and you said you felt like a schoolboy out for a holiday! It's jolly slippery at the lower end, but that's where the fun comes in. We must run as fast as we can down the slope, and then bring-up suddenly at the edge of the water! Are you ready?"

How could I have been so foolish as to make that unlucky remark about feeling like a schoolboy? Stout, middle-aged gentlemen ought to know better!

However, just at the critical moment I was saved from a month in hospital by one of the *Worcester* lads shouting: "Here comes the gig!" and Archie's attention was immediately absorbed in watching the boat dash alongside the stage, cleverly steered by her cadet coxswain.

"Do you want to go off to the ship, sir?" queried this young fellow, lifting his cap—the *Worcester* lads have charming manners.

"Thanks, yes, I do. Jump in, Archie, and mind you trim the dish, and don't talk to the man at the wheel."

"Shove off forward!" and in a moment we were buzzing through the water at a rapid pace—the four stalwart oarsmen being also cadets. The working dress of these young fellows consists of a blue frock or jersey with the name of the ship across it in large red letters, and blue cloth trousers secured around the waist by a belt from which a seaman's knife is suspended—a very workmanlike rig indeed. As they do almost all the work of the ship—including the scrubbing of decks, cleaning wood and brass work, hoisting up and manning boats, and sail drill aloft—they soon learn to become practical young sailors.

We glided alongside the port after-accommodation-ladder, and quickly gained the quarter-deck, on the starboard side of which stands a breech-loading 4-inch gun, at which the cadets are occasionally drilled. The *Worcester* boasts of a very large poop, underneath which are the captain-superintendent's quarters.

The chief officer was on the quarter-deck, and received us most courteously.

"I am expecting the captain on board very shortly," he observed in answer to my inquiries, "and meanwhile it will give me much pleasure to show you over the ship."

And so we started on our voyage of exploration.

"What's that light yard so low down on the mainmast?" inquired Archie, who had picked up a few nautical terms from me, and was evidently bent upon airing them.

"That's the *monkey yard*," I answered promptly, inwardly chuckling at getting such an opportunity; "and if you were a new boy just joining, you'd have to drill upon it!"

Archie looked such daggers at me—although I was only speaking the simple truth—that I really felt thankful that the chief officer was walking between us! He did not really recover from this rather crushing hit till his eyes lit upon an Amazon parrot and a marmoset monkey belonging to the captain.

The upper deck of the *Worcester*, which is very spacious, forms a sort of playground for the cadets, where they play cricket, tennis, and "sling the monkey," and even practise roller-skating at times. The electric light is in use all over the ship, and at night the electric anchor light hangs from the fore-stay, whilst on the mainstay is a fine cluster which illuminates the whole of the upper deck.

We descended the companion, and found ourselves on the airy main deck, which is ninety feet in length.

"This is our 'school deck,'" said the chief officer, pointing to the desks and benches which were ranged on both sides. We hold our school classes here under the superintendence of the headmaster, and also our seamanship sections. It is part of my duty to supervise instructors and cadets when practical seamanship is being taught. You see our decks looking very spick and span, for it's our day for scrubbing them."

The fore part of the main deck is portioned off as a mess-room, and our guide introduced us to it, and showed us that the tables were all laid out in readiness for the cadets' tea—and very clean and tidy it all looked.

Adjoining the mess-room is the petty officers' private sitting-room, and here they can come at any time, when off duty, to play games or otherwise occupy themselves. I must here explain that the petty officers are chosen from amongst the cadets themselves, their position being somewhat similar to those of monitors at a public school. Good-conduct badges are awarded to cadets whose conduct and application during three successive terms on board are satisfactory. The petty officers are chosen from the holders of these badges.

The usual time for training on board the *Worcester* is two years, and as the reader will doubtless be anxious to know what the system of education is, I shall here make a quotation from the prospectus issued by the authorities of the ship:

"The cadets are exercised in all the duties of a first-class ship; they are taught practical seamanship, such as knotting, splicing, reefing, furling, heaving the lead, management of boats, swimming, etc., together with navigation and nautical astronomy. Their training, in a word, is thorough, and always with the end in view that, after practical experience at sea, they may become efficient masters of their profession. The cadets are exercised in gun and company drill. Besides the usual branches of a sound English education, algebra, geometry, trigonometry, mechanics, steam, naval architecture, marine surveying, freehand drawing, chart drawing, and French are taught.

"The annual terms of admission in the upper school for cadets from 13 to 15½ years of age are fifty guineas, and in the lower school for cadets from 11 to 13 years of age forty-five guineas, payable in advance, with a charge to each of ten guineas per annum for uniform, medical

attendance on board, washing, and use of general school-books and stationery.

"The year is divided into three terms, viz.: Lent, Easter, and Michaelmas, commencing February, May, and September.

"No candidate will be considered eligible who has not received a fair elementary education. A previous knowledge of algebra and geometry is desirable, as it will enable cadets to pass more rapidly into the nautical divisions.

"The ship is fitted to accommodate one hundred and fifty-five cadets.

"All applications for admission must be made on the printed form annexed, and accompanied by certificate of birth, testimonial of character from last school, and certificate from a medical man certifying the perfect health of applicant, and that his general health is good.

"It may be added that every part of this large, handsome, and roomy ship has been planned and arranged with due care for the health, comfort, and convenience of all on board. The ship is heated by hot water apparatus, the ventilation is excellent, and there is an abundant supply of water laid on from the Kent Waterworks."

Quitting the forepart of the main deck, we walked aft.

"Morning and evening prayers and Divine service on Sundays are held on this roomy part of the deck near the mainmast," observed the chief officer; "then this cabin on the starboard side is mine; whilst on the port side are the cabins of the headmaster, chaplain, and masters, and the special classroom for cadets preparing for the Royal Navy."

Archie pricked up his ears at this—he has rather a hankering after the Navy—and gave me a nudge.

"I thought the Worcester cadets were all for the merchant service," he whispered.

"No, not all," I answered, pulling a printed paper out of my pocket. "Read that, my young 'Sucking Nelson.'"

For the benefit of the reader, we will suppose that Archie is reading aloud:

"Her Majesty has been pleased, with a view to encourage boys of the Worcester to qualify themselves for the special cadetship in the Navy granted annually by the Admiralty, to declare her intention of offering a prize to the boy who competes for this cadetship in H.M. Service. The prize consists of a binocular glass with a suitable inscription, and a sum of 35*l.* towards the expenses of the outfit of the boy who obtains the prize. The young gentleman nominated counts the two years passed on board the Worcester as if served in the *Britannia*, and may gain one year more by extra good examinations and good conduct, thus shortening the midshipman's service afloat. Her Majesty has also been pleased to grant for competition a gold medal, to be annually awarded to the boy who shows the qualities likely to make the finest sailor; these consist of cheerful submission to superiors, self-respect and independence of character, kindness and protection to the weak, readiness to forgive offence, and above all fearless devotion to duty and unflinching truthfulness. The medal will be open to boys who have been one year on board the ship, and have received not less than half the total marks at the previous quarterly examination. The commander, after conferring with the headmaster, shall select not less than three or more than five of the boys whom he considers to possess the qualities for which the prize is given. He shall submit these names to the boys who have been assembled for the purpose in the school, and each boy who has been on board six months previously to the time of distribution shall then and there vote for one of the boys so selected. The boy who obtains

the highest number of votes shall receive the medal.

"The Lords of the Admiralty grant extra cadetships, to be competed for in July and December of each year between the cadets of the Worcester and Conway"—a similar training-ship in the Mersey—"and awarded to those who pass the best examination, irrespective of the ship to which they belong. These competitive examinations will take place on board H.M.S. *Britannia* at Dartmouth. One cadet from each ship will be allowed to present himself for competition for each cadetship offered. The conditions are that the boys nominated shall have passed two years on board the Worcester or Conway, be of good character, be in the first class in school work and first section in seamanship, and be under 16½ and over 15 years of age on July 15 or January 15 following the competitive examination, shall be able to swim, and that their parents shall guarantee provision of outfit and private allowance as required for naval cadets."

"I say, wouldn't it be ripping to get that gold medal?" said Archie, as he returned me the paper; "something worth working for."

"The Worcester boys are well off for prizes," I answered. "The Trinity House and the P. & O. Company each give a valuable prize every year, and there are heaps of others—many of them valuable nautical instruments."

"We'll go down this after-ladder," said the chief officer, "and we shall then be on the lower or sleeping deck, where the cadets' chests are kept and their hammocks slung."

"The boys lash up and stow their own hammocks in the morning, don't they?" I inquired.

"Yes, they stow them away in those racks amidships till turning-in time comes round, when they have to hang them up in their proper places. The petty officers have the privilege of sitting up later than the rest of the cadets, and their hammocks are slung amidships."

The boys' chests are all ranged in ship-shape style along both sides of the deck, and the chief officer lifted several of the lids, and bade us observe the dainty way in which the interiors of the latter were embellished—usually with some art muslin, so arranged as to contain photographs and other home treasures.

"The cabins and messroom of the instructors are also on this deck," observed the chief officer, "and the lavatory and sick-bay."

"I hope you've no one in the latter?"

"It's empty at present. Our lads are a wonderfully healthy lot."

"They look so, certainly," I replied, "and the life must certainly agree with them. I suppose they are exercised at fire-quarters occasionally, are they not?"

"Yes, and at boat-stations too, and very smart they are at it, I can assure you. I don't think I showed you the large 7-inch Downton pump on the main deck, which is available in case of fire. On this deck we have a 4-inch Downton pump for distributing fresh water in the ship."

We peeped into the lavatory and sick-bay. The former is furnished with 113 basins and a plentiful supply of water, and the latter looked airy and comfortable with its neat little cots ready for use.

"We'll go down this hatchway just abaft the mainmast," said our guide, "and you will then see our library and some models."

Having warned Archie not to tumble down the ladder and dash out his small modicum of brains—for as we descended the light grew more uncertain—I followed the chief officer down, and we quickly found ourselves in the spacious library, where are many shelves of books, and convenient tables at

which to play chess, draughts, and other games. Here, too, amongst others, is a splendid model of the hull of a modern liner, in sections.

"In the fore part of the hold," said the chief officer, "is the electric-lighting plant, which consists of a compound vertical engine, Essex vertical boiler, Crompton dynamo, and a set of accumulators. One great advantage in having the electric light is that the cadets can pick up some practical knowledge of the steam-engine and electricity." Retracing our steps to the lower deck, we descended by a hatchway on the starboard side to the gymnasium, which is fitted with all the latest appliances in this branch of athletics. A gymnastic instructor is attached to the ship, and a very competent teacher he is. Concerts and lectures are also held in the gymnasium, and it is really very well adapted for such a purpose.

"The cadets cut their names pretty large and deep here," observed Archie, pointing with some wonderment to some adjoining bulkheads.

The chief officer smiled.

"We give them leave to do it here where they can't damage anything," he said; "it acts as a sort of safety-valve for them, and when they've exhausted their hacking energies over these bulkheads, we'll take 'em down and put fresh ones up."

Having paid a hurried visit to the orlop deck, where are the carpenter's shop, the store and paint rooms, and a bath-room containing eleven full-sized baths, we returned to the upper deck, and having ascertained that Captain Wilson-Barker—with whom I was already acquainted—had returned on board, I sent in my card by the steward, Archie meanwhile entering into a sort of pigeon-English palaver with the chief's Amazon parrot, which was airing itself on the quarter-deck.

We were at once cordially received and ushered into the spacious and handsome drawing-room of the captain-superintendent, which occupies the whole width of the after-part of the ship—her beam is considerable—and has a delightful stern gallery from whence most interesting views of the river and the Essex and Kentish shores can be obtained.

On the back of an armchair sat a most exquisite little marmoset monkey, with which, needless to say, Archie at once fell in love.

"That's the tamest little creature I ever knew," said its owner. "I only bought it in Liverpool a few days ago, and it has made itself most perfectly at home"—and so saying, the captain seated himself in the chair, whereupon the marmoset, in a most confiding manner, sprang on to his head, and sat there blinking and winking.

"I was sorry to hear that the *Conways* had beaten your boat's crew on the Mersey the other day," I observed; "but no doubt you will have your revenge next year when the match takes place on the Thames."

"We'll hope so," said the captain—himself a former Worcester cadet—with a smile. "The *Conways* had a very big heavy crew this year—three fellows over six feet high."

As we were discussing tea, the mate of the deck—a senior cadet, one of whom is always on duty with a telescope during the day as a kind of officer of the watch—entered to make a report, and the captain immediately rose to leave the cabin.

"The beaten crew are just coming alongside," he observed to us. "If you go out in the stern gallery you'll get a glimpse of them."

We took advantage of this hint, and were just in time to see one of the barges dash alongside. The defeated crew looked a strong, well set-up lot of lads, but the

ominous silence with which they were received by their shipmates must have been a little depressing, for of course they had done their best for the honour of their ship.

This boat race is an annual affair, taking place alternately on the Mersey and Thames, the prize being a silver cup, which, like the Ashburton shield, is constantly changing hands.

After tea the captain took us up a little winding staircase to his study on the poop. Here Archie found himself in a sort of Lilliputian enchanted palace, for he was surrounded by stuffed animals, such as iguanas and baby crocodiles, cases of stuffed birds, beetles, stick insects, and other strange and wonderful creatures; to say nothing of drawers full of eggs, gorgeous butterflies, and other specimens dear to the naturalist.

Meanwhile I was examining books full of most interesting photographs taken by Captain Wilson-Barker himself, for that officer—who occasionally lectures before the Camera Club—is not only a first-rate seaman, but a man of considerable scientific attainments; and therefore admirably suited for his responsible post. I cannot conclude

this article better than by giving the tables of daily summer and winter routine on board the *Worcester*.

SUMMER.	
A.M.	
6.0.	Cadets turn out, wash, and dress.
6.30.	Chocolate and biscuits.
6.45.	Seamanship and drills.
7.30.	Clear up decks.
7.50.	Divisions for inspection.
8.0.	Prayers. Breakfast.
8.30.	Stow hammocks.
9.0.	School.
11.0.	Ten minutes interval.
Noon.	Dismiss school. Ten minutes interval.
P.M.	
0.10.	Seamanship and drills.
0.50.	Dismiss.
1.0.	Dinner.
2.0.	School.
4.30.	Dismiss school. Clear up decks.
5.0.	Tea.
5.30.	Cadets land for recreation (if weather permits). Library and gymnasium open.
7.30.	Cadets return on board.
8.15.	Hammocks hung.
8.30.	Prayers. Three minutes' silence for private prayer. Cadets turn in.
WINTER.	
A.M.	
7.0.	Cadets turn out, wash, and dress.
7.50.	Divisions for inspection.
8.0.	Prayers. Breakfast.

8.30.	Stow hammocks. Sweep decks.
9.0.	School.
11.0.	Ten minutes interval.
Noon.	Dismiss school. Ten minutes interval.
P.M.	
0.10.	Seamanship and drills.
0.50.	Dismiss.
1.0.	Dinner.
2.0.	School.
4.30.	Dismiss school. Clear up decks.
5.30.	Tea.
6.0.	Library and gymnasium open. Gymnastic or physical drill.
7.50.	Library and gymnasium closed.
8.0.	Chocolate and biscuits.
8.15.	Hammocks hung.
8.30.	Prayers. Three minutes' silence for private prayer. Cadets turn in.
SUNDAYS.	
A.M.	
7.0.	Cadets turn out, wash, and dress. Stow hammocks.
8.0.	Prayers. Breakfast.
8.30.	Clear up decks.
10.15.	Divisions in full uniform for inspection by captain-superintendent.
11.0.	Divine service, conducted by the chaplain.
P.M.	
1.0.	Dinner.
2.0.	Library opened until 5 P.M.
5.30.	Tea.
7.0.	Divine service, conducted by the chaplain.
8.0.	Chocolate and biscuits.
8.15.	Hammocks hung. Three minutes' silence for private prayer. Cadets turn in.

HOW TO MAKE A DRY BATTERY.

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Such a number of queries come in on this subject! In almost every selection sent me by the "B.O.P." Editor, this question crops up! It seems, therefore, the best thing to do to write a short article on this subject, giving fuller particulars than can possibly be given in the Correspondence column, which does not admit of sufficient expansion to contain all the details, and in which repetition is to be avoided as far as can be done.

The dry battery is not to be considered as a panacea for all the evils which the amateur electrician has to contend with. It will not solve the vexed question of an electric light that will work for hours, without recharging, merely shutting off, or turning on, the current, as required. It will not work electro-motors with one cell, unless very small. It will not last for years, and work for hours every night; in fact, it will not realise the aspirations of those who expect, with an exceedingly small amount of materials, to get a power that will do the most wonderful things without the expense that attends other batteries. On the other hand, the dry battery certainly has great advantages of its own. It can be carried about without fear of spilling it; it is more constant than the Leclanché battery, to which it is most nearly allied; it recovers itself rather more quickly from a state of exhaustion than that battery does; and last, but not least, it is cheap to make, so it can be manufactured again when used up, and it is also easy to manufacture by anyone not possessed of apparatus for doing very hard forms of electrical work.

These recommendations make its adoption very desirable in some cases, especially where a battery with liquids to spill about would be objectionable. The materials are pretty easily obtained from any electrical dealer.

The first thing we want is a plate of carbon. The cheapest form in which this can be obtained is the size 6 inches by 1½ inch. This only costs fourpence, whereas the size below it (5 in. by 2 in.) is sixpence. You will want as many carbon plates as you are to have cells of the battery, one for each.

plate should have a hole drilled in the middle of its breadth, close to the top.

We now want some binding-screws to go through these holes. These are of the form shown in fig. 1. This is known as the "tele-

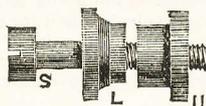


FIG. 1.—BINDING-SCREW: TELEGRAPH PATTERN. S, screw; L, lower nut; U, upper nut, or milled head.

graph" pattern, and they will cost 3d., 6d., or 9d., according to size. The two top nuts are to be taken off, and between them and the head of the screw is to be inserted a little washer of brass, or zinc, or tin, about ½ in. in diameter. Then the screw is passed through the hole at the top of the carbon, and the lower nut again screwed on, so that the washer is on one side of the plate and the lower nut on the other. The upper nut then screws on to the top, to fasten on the wire, when we come to that point. When this is done to all the carbons we are to use, they are ready for use in the battery.

We shall want some covered wire for connecting purposes. This can be number 18 or 16 B.W.G., and cotton-covered, paraffined, wire will do well for this. But the most important thing has yet to be done, viz. the construction of the outer vessel to hold the whole cell.

The simplest way to do this is to procure a cylinder of zinc measuring about 3 inches in diameter, and 6 inches high. The thickness of the zinc may be any ordinary thickness—say about ⅛ inch. Now, at the bottom of this has to be fastened (by means of solder) a circle of the same material, so as to form a kind of pot. This pot is filled with the following mixture: Plaster of paris, 25 parts; ammonium chloride, 10 parts; water, 55 parts. In making this mixture you must get the materials well incorporated together, and, as the plaster of paris has a trick of setting hard rather abruptly, I think the best way to manage it is to mix the water

and chloride of ammonium first, by which means a solution is secured, and then to mix this with the plaster of paris. When you have thus made the mixture you must lay a coating of it on the bottom and sides of the zinc cell, this coating being about ¼ inch thick. The coating goes up to about one inch of the top edge, but this inch is left uncovered. We now wait till this mixture has set a little, and when still moist enough to be capable of taking dents when the finger is pressed on it, the carbon plate is put in the centre, and round it is rammed tightly the following mixture: Powdered graphite, 75 parts; manganese oxide, 10 parts; chloride of zinc, 5 parts; chloride of ammonium, 10 parts; glycerine, 2 parts. This is made into a stiff paste with just sufficient water, and filled in inside the plaster of paris. It must not extend beyond the upper edge of the plaster layer. The edges of the plaster, and the surface of the inner mixture, must be

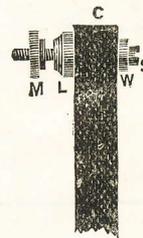


FIG. 2.—METHOD OF ATTACHING BINDING-SCREW TO TOP OF CARBON PLATE. C, carbon; W, washer; S, head of screw; L, lower nut; M, upper nut or milled head.

level, and the top of the pot is then filled with melted pitch. The top of the carbon will, of course, project up in the centre, and it must not be so low that the binding-screw will have any chance of touching the edge of the zinc pot. If it is so, the fault must be remedied by using a carbon about 6½ inches high. You now have to make the zinc terminal, which is done by taking a copper wire (cotton-covered will do), and soldering it to the outside of the zinc pot. Another similar wire attached to the binding-screw on