CHAPTER CXLIV.

THE MEDICAL SERVICE OF THE ROYAL NAVY.

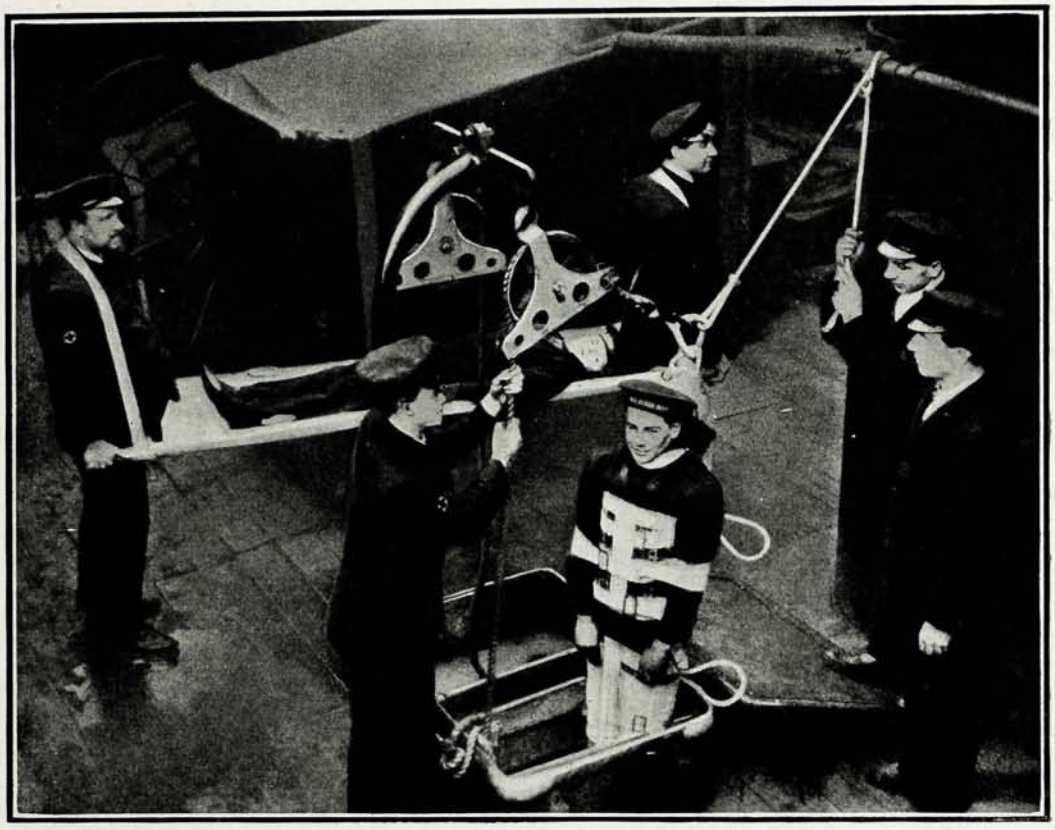
The Naval Doctor and His Work—Problems of Modern Warfare—Prevention of Disease—Nerve Strain and the Seaman's Psychology—The Naval Medical Department—Dangerous Diseases—The Typhoid Peril—Ventilation of Ships—New Devices—The Naval Action off Heligoland—Treatment of Wounded—The Value of Experience—Hospital Accommodation—Hospital Ships and Trains—Medical Work in Minor Actions—The Pegasus—The Emden—The Tiger in Action, January 24, 1915—The Dardanelles—Naval Mission to Serbia—Royal Naval Air Service—The Battle of Jutland Bank—On Board the Warrior—In the Lion—Honours for Naval Doctors.

In earlier chapters the story of the work of the Army doctor has been told. It has been shown how that work fell naturally into two divisions, the work of attending to the wounded and the work of guarding the health of the forces in the field. The latter duty was, perhaps, of paramount importance, since upon the mental, moral, and physical well-being of its fighting men depends at all times the efficiency of an army.

The army doctor, however, was not the only member of the medical profession into whose hands a great trust was committed when war broke out; equally with him the naval doctor shared the heavy responsibility. Disease was perhaps a less instant menace to the fleets at sea than to the troops ashore, but the task of the naval doctor was no whit less difficult, no whit less important than that of his Army colleague. It was, moreover, a task of a special kind, differing in essential particulars from that of the army doctor, demanding knowledge of an unusual sort, and presenting many complex problems of a kind not met with in other spheres.

It is a tradition of the Navy to keep silence; silence, also, is the tradition of the medical profession. In the Naval Medical Service the traditions were joined, and so little was heard by the world of the great work which these sea doctors accomplished, of the heroism revealed by them, of the sacrifices which they offered. Yet it is certain that the men of the Naval Medical Service performed a task, the value of which cannot be reckoned too high. They themselves were the shield of the "Sure Shield" of our coasts, in that they stood between our seamen and the influences threatening their efficiency; they were guardians of the well-being of our fleets, just as our fleets were the guardians of our national well-being; behind the gun was the man, but behind the man, again, responsible for his steadiness in emergency, his fighting capacity, his untrammelled use of all his faculties, was the doctor.

The naval doctor was ready when the call upon him came, so ready, indeed, that within four days from the declaration of war hospital ships were fully equipped and on their way to join the Grand Fleet. The equipment had been thought out and prepared long before; had been packed and stored in readiness; it included everything which the wit of experienced man could suppose might be wanted during and after an action at sea. There was only



ON BOARD A WARSHIP.
Passing wounded down to the Sick Bay.

to speak the word and to proceed forthwith to the war stations.

As it happened, this early equipment was not required at once; the great battle which many expected during the first days of war did not take place, and the calls upon the hospital ships were few. This, however, is no reason for minimising the importance of the preparations made, nor yet for forgetting that, in the hour of need, the Naval Medical Service was ready just as the Navy was ready, fully equipped, fully trained, in a position to handle the work occasioned by a great battle. Jutland Bank, with its fierce incidents, its terrible calamities, might have occurred in August 1914 instead of in May 1916, so far as the ability of the doctors to cope with it was concerned. The administration at Whitehall had done its work thoroughly in the light of knowledge; readiness had been its watchword for years.

Nor was this readiness destined to become the prelude to a policy of *laisser faire* while the long days of waiting and watching which followed the declaration of war ran their course. In the Navy, as in the Army, a new conception of medicine had during the years before 1914 become firmly established. Men remembered with glowing pride the gracious figure of the surgeon pictured in attendance upon the dying Nelson. They recalled, perhaps, with wistful thought the fierce setting of smoke and flame in which that picture ever presents itself; they thrilled as the eyes of the hero rose in their minds. But they knew that those old days had passed for ever. The greatest office of their service was still, in a sense, the office of mercy and of healing, but in a sense only. Naval battles were no longer as the battles Nelson fought; vast ships carried to sea vast numbers of men; the Grand Fleet was a town, a city, subject to all the dangers and troubles which beset the health of cities, needing protection from these dangers, dependent for its efficiency upon the vigilance, the knowledge, and the devotion of its health officers.

This was the new doctrine of preventive medicine: the doctrine that while few diseases are really curable, almost all diseases, certainly all infectious diseases, are preventible. The Naval surgeon found himself faced with a

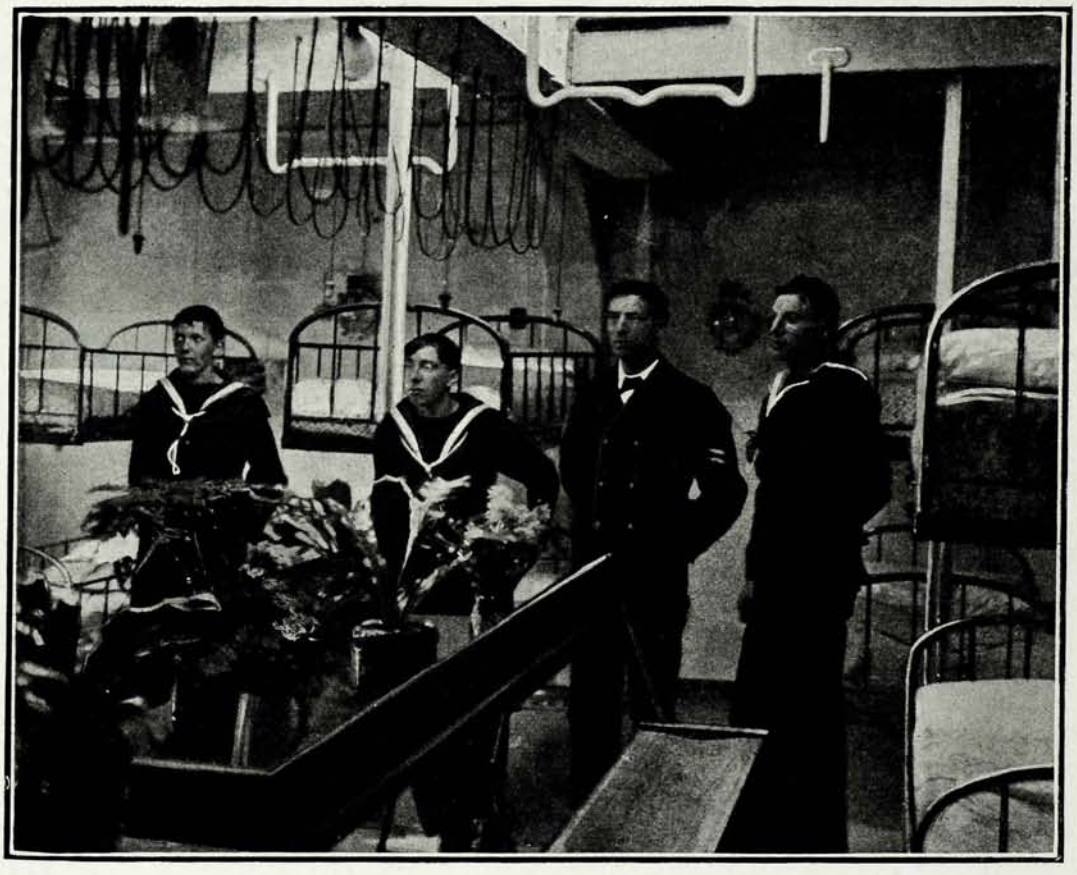
harder task than healing the wounds of battle. He realized that to his care had been committed the health, the fighting capacity of those highly trained, irreplaceable men, the gunners, the engineers, the signallers, and all the ratings who go to make up the strength and efficiency of the Royal Navy. He was the health officer of a community in which every man counted, and in which the value of any particular man was beyond assessment.

The conditions of work, too, were not easy. Much was written at the time about the long strain of waiting and watching undergone by our seamen during those early months, but probably the full extent of the penalty exacted was not then grasped by anyone outside of the Service. On the one hand there was the prospect of battle at any hour, on the other the weariness of hope indefinitely deferred. And later came the anxiety of mine and torpedo, demanding a ceaseless vigilance.

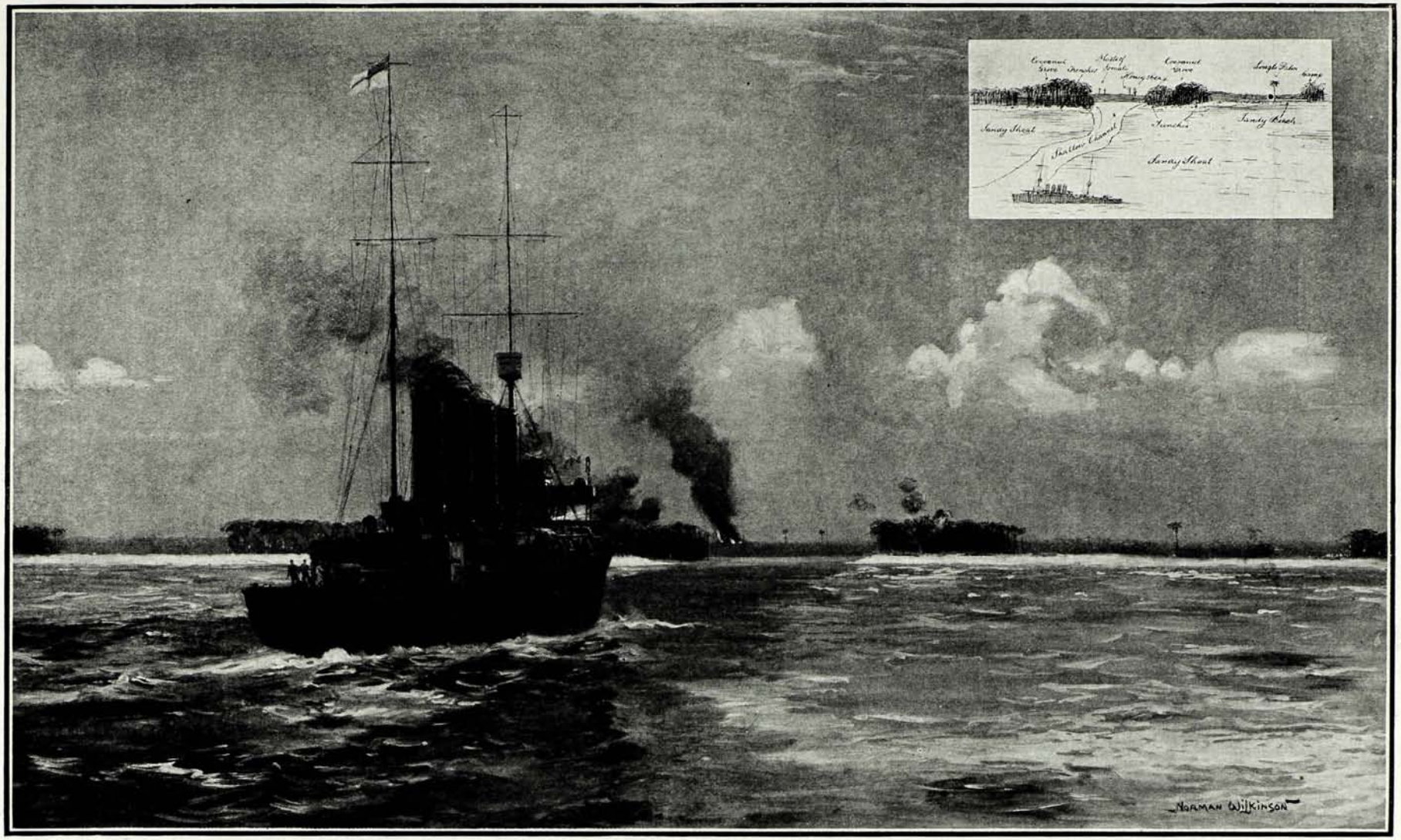
These were menaces to health without question, for it is an established fact that a man who has been subjected to prolonged mental strain falls an easier victim to disease.

"The nervous strain of being under shell-fire day after day, week after week, and month after month might," wrote a surgeon of the Royal Marines in Gallipoli, "be expected to cause a large amount of mental depression and even insanity amongst the troops. The expectation was not realized in this battalion. During the first six months of war on board a battleship in the North Sea I saw many more cases of conditions allied to melancholia than I did during my stay on the Peninsula. Surgeon Beaton, R.N., whom I had the privilege of serving with in that ship, found, after an exhaustive inquiry, that the number of mental cases (both severe and slight) was less than 5 per cent. of the ship's company. Though I had neither the time nor the skill he possesses in the investigation of the minor forms of mental disturbance, my impression is that in this battalion there were much fewer cases. The mental strain of being under shell-fire appeared to be much less than that of being exposed to the hidden dangers of mines and submarines."

These observations of Surgeon Beaton, R.N.,



THE SICK BAY ON BOARD A WARSHIP.
Showing how the cots are swung



THE "KÖNIGSBERG" (IN THE DISTANCE) "BOTTLED UP" BY THE "CHATHAM," OCTOBER 30, 1914.

The German cruiser, with masts disguised as palm trees, was discovered by H.M.S. "Chatham" hiding in shoal water about six miles up the Rufigi River, opposite Mafia Island (German East Africa).

which were published in the "Journal of the Royal Naval Medical Service," were indeed of a remarkable character as showing one side of the great problem which had to be faced. The ship's company which formed the material of the investigation was perhaps exceptional, for most of the men were married and had held, during their shore life, positions demanding considerable intelligence and necessitating much self-reliance. Some had had a certain amount of responsibility in civic life.

The ship under consideration lay for a long period at the beginning of the war (over four months) in an exposed position on the East Coast; next she went to sea for two days; lastly, she lay six weeks in a protected harbour on the South Coast. Surgeon Beaton commented: "Roughly speaking, the influence of the first period was in the nature of a prolonged and monotonous stress. Owing to the nature of the position the routine demanded was of an extremely irksome type, consisting of continual watches, night and day, daily repetition of the measures for defence and offence possessed by the ship and, save for a very occasional route march, giving the men two or three hours away from the ship, nothing to break the monotony or to give some little change to the environment. Recreation, while off actual duty, too, presented many difficulties, owing to the need for darkening the ship and the shortness of the daylight at the time of the year. There was the always-present possibility of attack by submarine or by ships of superior force, at some times more apparently imminent than at others."

A very careful and important analysis was then given of the steps by which a man passes from one mental state to another under this strain. This record presents the situation with deadly clearness and deserves to be studied by all who would learn how much our sailors did and suffered on our behalf:

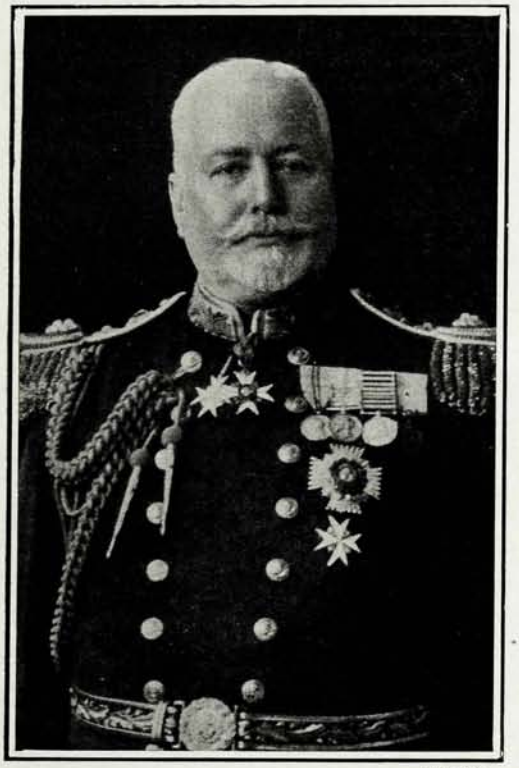
"The man takes up his duties," wrote Surgeon Beaton, "it may be assumed with more or less eagerness and pleasure, the unpleasant facts of leaving his home and his ordinary life and the possibility of danger in the new sphere being more than counterbalanced by the emotional satisfaction arising out of the gratification of his patriotic instincts. Largely influenced by this self-satisfaction, he smooths over his absence from his home; the life on board ship obtains a certain glamour; and the little difficulties to be encountered do not appear on the horizon. There is also the feeling of returning again to a life belonging to his younger days, of which he undoubtedly recalls much that is inviting. He meets a large number of entirely fresh faces, and in the interest to be found in such circumstances his mind is fully employed.

"It was remarkable to notice how quickly the men settled down and merged their individuality into the component of the ship's company. Given a short space of time the man has sorted out the new acquaintances into friends and otherwise; the novelty of the situation has passed off; the routine no longer demands that close attention which was necessary at first, and there is nothing further to be discussed in the ship. His mind then turns to other more remote matters; the possibilities of the duration of the war, the probabilities of the employment of the ship and the part he himself will actually play in the war. Such topics are naturally of great importance to him, and consequently they are discussed everywhere in the ship. Pass along another week or so and these matters have been threshed out to the bone; everyone's opinion has been given many times over. The newspapers do not help by bringing any fresh material as food for discussion, and he is completely in the dark as to any movement on the part of the ship herself.

'It is only to be expected that under such circumstances discussion of these topics becomes unprofitable and highly unsatisfying. To a man accustomed to foresee his own course of action, it is very difficult to maintain a state of intelligent anticipation with so little material to work upon. More than that, the effort to maintain it in the face of such difficulties, coupled with the feeling of helplessness in his own destinies, becomes an irritating factor the longer it continues.

"As a result it was found that, as a subject of general interest, the war and its personal application to the individual ceased to be heard. Instead, as a defensive measure, the man adopts a condition of more or less unstable apathy to his future, unstable on account of the setting on one side of his instincts of self-preservation and self-control

"In the meantime, he has been going on, day after day, repeating the same evolutions of the routine; and though, as regards the efficiency of the ship, the automaticity with which these



[*Vandyk.*

SIR JAMES PORTER.
Director-General, Naval Medical Service, 1908-1913.

come to be performed is very desirable, from the individual's standpoint the results are not so happy. Apart from the actual time while on duty, the man has nothing of importance in the ship left to think about. The effort, too, at maintaining a sufficient interest in so monotonous and trying a routine, becomes a steadily increasing stress as time goes on."

The writer then goes on to show that in these circumstances small events tend to assume great proportions, and continues: "It will be seen from the fact of the underlying stress and the failure of satisfaction of the primary instincts and habits of the man that the emotional background is more likely to be dark than bright. The disproportion will therefore probably exist in a direction tending to produce a state of anxiety and distress of the mind. It must be remembered that this anxiety, though outwardly attributable to the insignificant event, is in reality the outward expression of the general unsatisfaction of the mind."

The extent of such mental disturbance depends on the cast of the man's own mind, and necessarily varies in each individual. Generally speaking, however, the doctors had to weigh the factors just outlined when visiting the men.

"The attendance at the sick bay towards the end of the period under discussion, showed quite plainly the necessity for taking these considerations into view in dealing with the various minor ailments and injuries which came under notice. Mild conditions of neurasthenia with hypochondriacal ideas were prevalent. Minor accidents all had a mental sequence of some kind."

From this period of writing, the story passed to the second period of active service at sea. It was productive of very striking effects. The relief from the monotony was very welcome, and the patriotic emotions were stirred anew. Against this was the new risk to the individual. What occurred was this:

"By far the majority of the men showed appreciable relief—a general rising of spirits was to be noticed. Work was carried out with an eagerness belonging to the early days of the war—altogether a sense of satisfaction could be felt throughout the ship. In one case, however, a fatal result ensued, the man severing his carotid artery on the second morning at sea. In another, severe emotional crises arose, attributed by the man to an alteration in his home affairs of which he had just heard. In others, the intensity of hypochondriacal ideas in cases under observation became much greater."

In the final period the conditions were entirely different; the men were not continually subjected to the stress of imminent danger, and they could have a little time ashore away from the ship and its discipline. Also they saw new people. The writer concludes:

"It may be said that so far the men have come through exceedingly well. Mental troubles of a really serious nature have occurred in less than 1 per cent. of the ship's company, while the mild neurasthenic conditions amounted to under 3 per cent. or 4 per cent. The conclusions to be drawn can only be that such lengthy periods as the first four months under the conditions which prevailed in the first part of the war are highly undesirable, and should be prevented if military exigencies will permit. All the attention possible should be paid to the need of change in the mental environment while the men are under the influence of such continued stress, especially as adequate recreation could not be obtained owing to the military

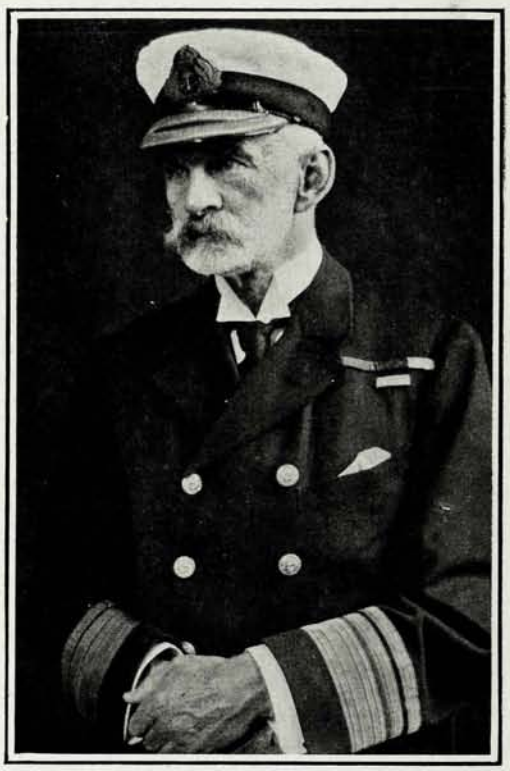
precautions necessary in such a situation That the results were not more regrettable can only be due to the standard of the men and their *moral*, and of that nothing too good can be said."

Here, then, was a lesson learned early in the war by the naval doctor. But let there be no illusion; the lesson was not learned by doing nothing and waiting for events to force themselves upon attention; these doctors went out to look for their lessons. In their own sphere they were as watchful as the fighting men were in theirs. The minute description of the mental state of the men afforded by Surgeon Beaton shows how carefully he carried on his investigation, how diligent were his observations, and how shrewd his deductions.

The value of the work scarcely needs emphasizing. After all, the good spirits of a great fighting unit are one of its chief assets; loss of enthusiasm, of freshness of mind, means deterioration of all other qualities; every man is then less a man than he was. The discovery of the factors which, if given free play, must sap energy and damp interest was no small service; the ability to indicate a better way was a service of infinite worth. Not in vain did the naval doctor constitute himself thus early in the war the guardian of that "jolly spirit" of the Navy which throughout the world has always been its title to love and admiration.

But this after all was only a fraction of the great work which the doctor accomplished aboard ship. While *ennui* and depression and the strain of prolonged expectancy were attacking the minds of the seamen a host of dangers no less threatening were attacking their bodies. For a great city, be it ashore or afloat, is not, as we have seen, kept in health by good luck. Hard work, clear thinking, and strenuous preparation are the only means by which this end can be accomplished.

No one knew this better than the heads of the Naval Medical Department, Sir James Porter and, later, Sir Arthur May. Sir James Porter, who was Director-General from 1908 to 1913, laid the foundations of a great new system of naval health; to Sir Arthur May, who succeeded him, it was given to carry the system into execution and to amplify it in accordance with the needs of the hour. The broad principle adopted may be summed up in the word "supervision." Nothing was to be left to chance; no detail, however

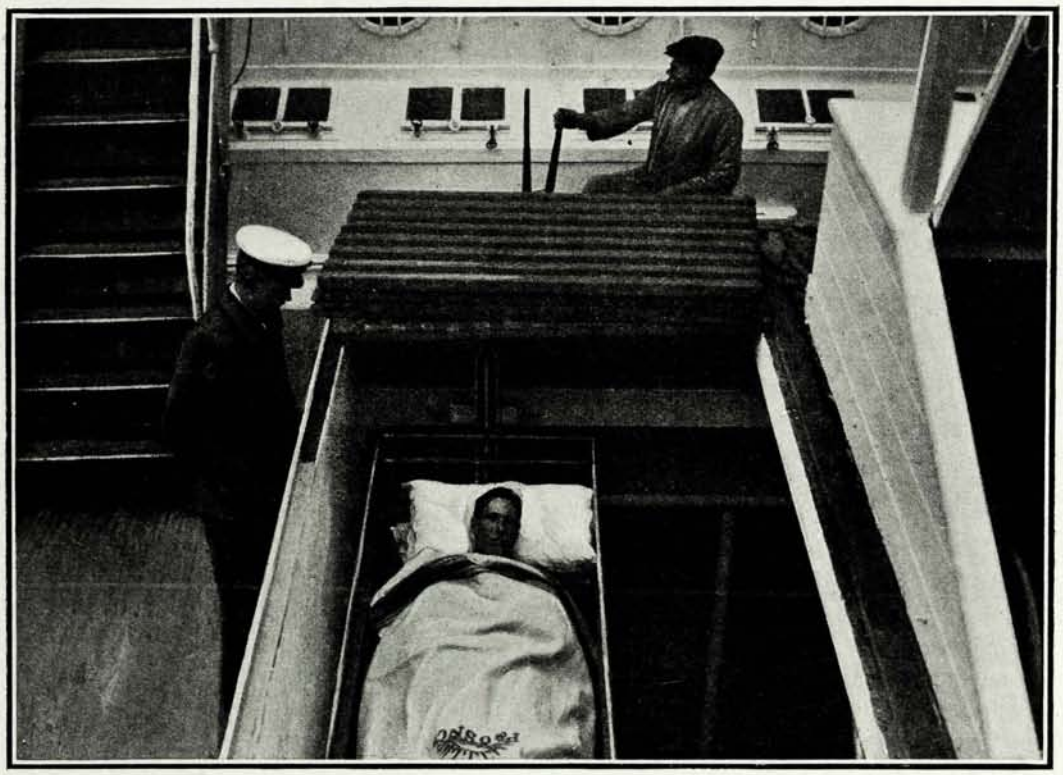


SIR ARTHUR MAY.
Director-General, Naval Medical Service, in the War.

insignificant, was to be overlooked; no pains were to be spared.

It is easy to make light of a policy of this kind; but it is not easy to discount the fact that by the exercise of it a number of men equivalent to the complete crews of two super-Dreadnoughts were presented during the first year of war as a gift to Britain. Before these measures of protection and prevention and of inspection were instituted these men were in hospital as a permanent incubus. Had the measures not been instituted they would have stayed in hospital at a time when the need of them was overwhelming!

The object of these health measures was expressed in the phrase "to secure for the officers and men in their unavoidably crowded conditions on board freedom from infectious disease, an adequate supply of pure air, pure water and good wholesome food." This object was, of course, as old as the Navy itself, and the history of the efforts made to attain it is a fascinating one. All the great naval commanders, including Anson, Rodney, Howe, St. Vincent, Nelson and Collingwood, took an interest in work of the kind, and not without good reason. For the Navy had been fear-



ON BOARD A HOSPITAL SHIP.
Method of lowering a man into the wards.

fully scourged by disease on more than one occasion. Commodore Anson, for example, in his famous voyage round the world lost four out of five of his original crew, and in the first nine months 666 men out of 961 who made up the crews of the three ships of war—the Centurion, the Gloucester and the Tryal—that succeeded in rounding Cape Horn during the worst and most tempestuous period of the year and reaching the coast of Peru. Pizarro, who followed him in pursuit with a Spanish squadron, fared worse; he failed to weather the Cape and returned with only one ship, the Asia, and 100 men out of an original squadron of six battleships and 3,000 men. Most of Anson's men had died of fever and scurvy, while Pizarro's men had died of scurvy and hunger. Some of our expeditions actually failed because of sickness, and among these was Sir Francis Wheeler's attack on Martinique in 1693. But much later than this, disease was the great enemy of the sailor.

Scurvy was at one time one of the worst of the foes, but a naval surgeon, Lind, killed scurvy by his discovery of its origin in a faulty diet. There remained as dangers up till the beginning of the Great War the ordinary fevers, especially typhoid and cerebro-spinal fever ("spotted fever") and venereal disease. From the following table, which is taken from an article by Prof. W. J. Simpson in the "Journal of the Royal Naval Medical Service," may be gathered how steady was the progress of health work in the Navy before the war.

ANNUAL DEATH-RATE IN THE BRITISH NAVY FROM DISEASE.

Average Rate of Mortality.

Years.		
1776–1780	..	1 death in 8 men.
1810–1812	..	1 ,, 30 ,,
1830–1836	..	1 ,, 72 ,,
1885	..	1 ,, 112 ,,
1895	..	1 ,, 143 ,,
1905	..	1 ,, 256 ,,
1907	..	1 ,, 298 ,,
1910	..	1 ,, 311 ,,
1913	..	1 ,, 309 ,,

It was evident that, mobilization having taken place, steps must at once be taken to arrange for the nipping in the bud of any epidemic which might threaten. An epidemic in the Navy, it must be remembered, no matter how light its character, would have been a calamity which might even conceivably have assumed tragic proportions. Therefore it was

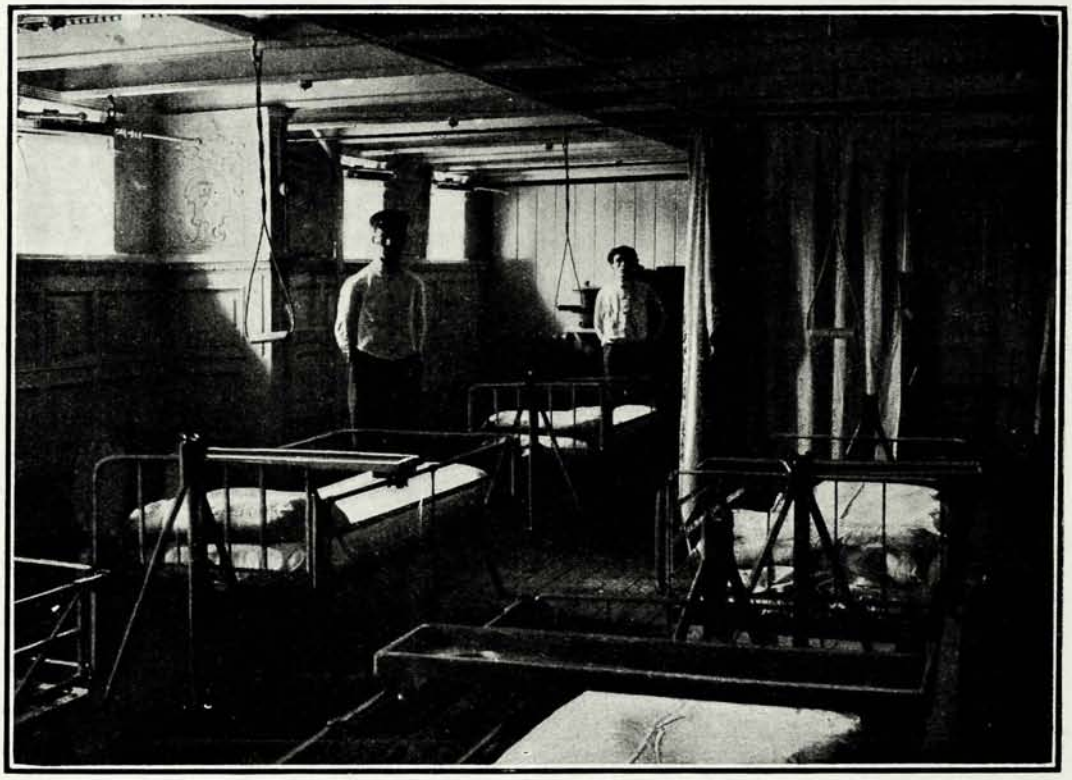
greatly feared, and every kind of precaution was taken to prevent it.

The Navy for one thing was a vaccinated force. Every man had been vaccinated against smallpox, and inoculation against typhoid fever was general. It being quite certain, in spite of the declarations of well-meaning faddists, that vaccination does protect against smallpox, the Navy medical authorities rightly refused to take the risk of shipping persons who might originate an epidemic. And so successful was their policy that naval men on leave were free to enter areas closed to soldiers because of outbreaks of the disease. No ill effects were noted.

Typhoid fever was always an enemy and the utmost vigilance had to be exercised. The danger, of course, was greater in the Mediterranean than in the North Sea; but nowhere was the danger a negligible quantity. A case was recorded, for example, in which a particular ship showed a constantly recurring series of cases of typhoid fever. No cause could be found in the water or food, and so it became clear that a "carrier" must be responsible. A "carrier" is a person who has had the fever and made a good recovery, but who does not cease to harbour the bacillus. A search was made, the blood of the crew being carefully examined by the test known as the Widal reaction and by other methods, and, finally, the evidence pointed to a particular man. Investigation proved that this man, who had suffered from typhoid fever 10 years previously, had infected men in every ship in which he had been stationed. In all some 53 persons were infected, of whom 11 died. The following note was made upon the disposal of this man:

"From the naval point of view he was not a safe man to have in any ship where any number up to 900 men live under cramped conditions." He was accordingly invalided out of the Service, the medical officer of health ashore being warned about him.

An even more remarkable case, which illustrates how vigilant the naval doctor had to be, occurred in Portsmouth Harbour, in October, 1914, on board H.M.S. Euryalus. In this case some oysters had been bought from a local fishmonger, and were eaten at dinner, at 7.30 p.m., when most of the officers and ward-room servants partook of them. Next day the ship went to sea. Within 48 hours of eating the oysters several officers were attacked, and similar cases

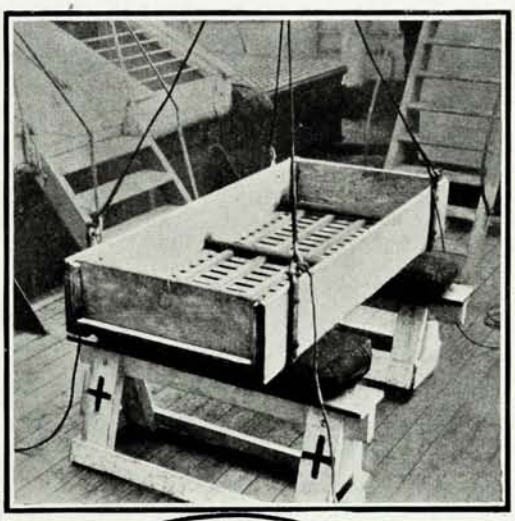


ON BOARD A HOSPITAL SHIP.
A ward set apart for officers.

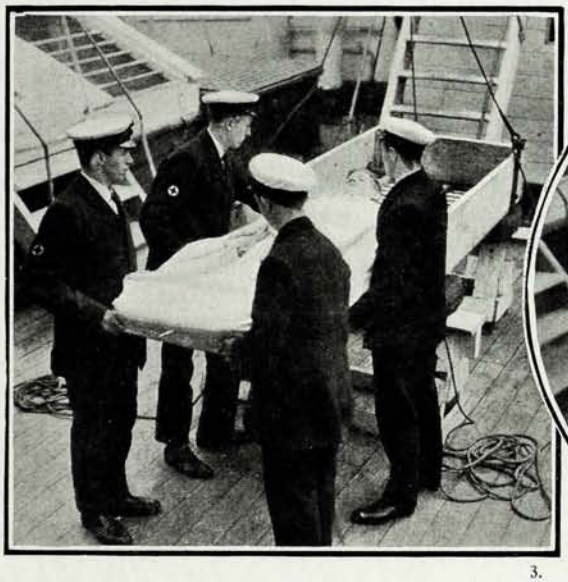
occurred among the ward-room servants, and within the next week other cases appeared. Finally, typhoid fever was diagnosed in the case of a lieutenant, a midshipman and a marine servant. The oysters were traced to a contaminated bed, and in several specimens obtained the bacillus of typhoid fever was found. Unhappily there was no law to prevent oysters from this bed being sold in Portsmouth, and as ships were constantly coming and going to the harbour, the utmost vigilance became necessary, since a case of typhoid fever on board ship is an ever-present menace.

The efforts made to control typhoid fever met with full success, and except for an occasional case the disease did not show itself. On the other hand the naval doctors had to cope with an outbreak of cerebro-spinal fever (spotted fever) which reached the dimensions of 170 cases. A very small number of these cases occurred afloat, however; ten in the Impregnable, an establishment consisting of three ships, used for training purposes, and 12 in sea-going ships. As the means of propagation of this fever was not known, the outbreaks were difficult to cope with, but a solution of a more or less satisfactory kind was found in a careful search for "carriers" and in hygienic measures, the chief of which was good ventilation, the prevention of overcrowding, and personal cleanliness.

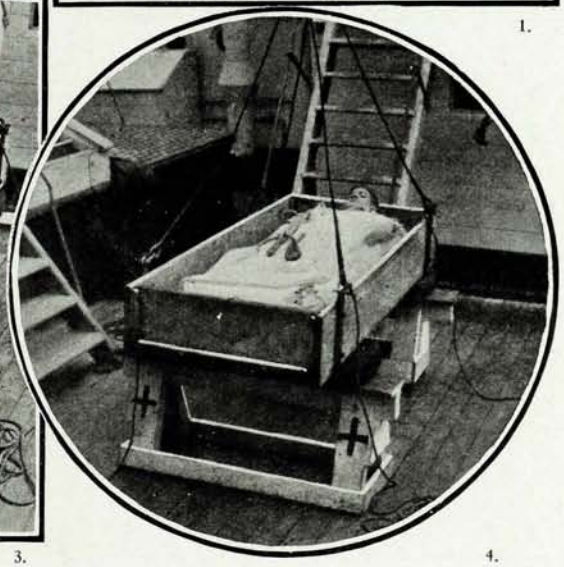
The outbreak, which was a land outbreak, was prevented from going to sea—a tribute to the doctors who laboured to prevent it, and a tribute to the organizers who had made ready against such a chance. These organizers, Sir Arthur May and the men associated with him, were kept as fully informed of the movements of their enemy—disease—as were the admirals of the movements of the German fleet. Every week there came to Sir Arthur May's desk a report on the health of every unit, every destroyer as well as every super-Dreadnought. In that report exact figures were given, and an average presented. As a general rule, the average of sickness was a point per cent.; but if it rose for any reason, instantly the chiefs of the Medical Service knew that it had risen. It was as though the foe had been sighted upon the



1.



3.



4.

1. Cot-carrier on cushioned tressels, showing the rollers and movable tail-boards in their slots. 2. Tail-tail-board has been removed at one end for the purpose. 4. Tail-board replaced and patient ready to be

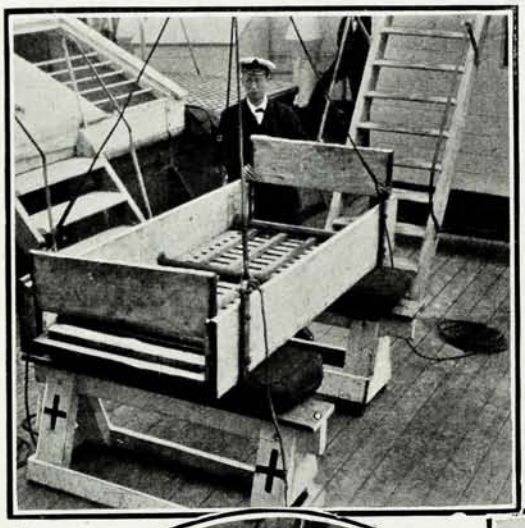
FOR TRANSFERRING SICK AND WOUNDED

horizon. The decks were cleared for action; measures of protection and measures of offence were initiated until the dangerous rise in the figures had declined again, and the enemy been driven back. Any case of infectious disease, measles or typhoid fever or any other fever, was notified when diagnosed, and transferred at once to an isolation hospital ashore. And all the men who had been in contact with it were watched to make sure that they had not been infected, or that, if infected, they would not spread infection from one unit to another.

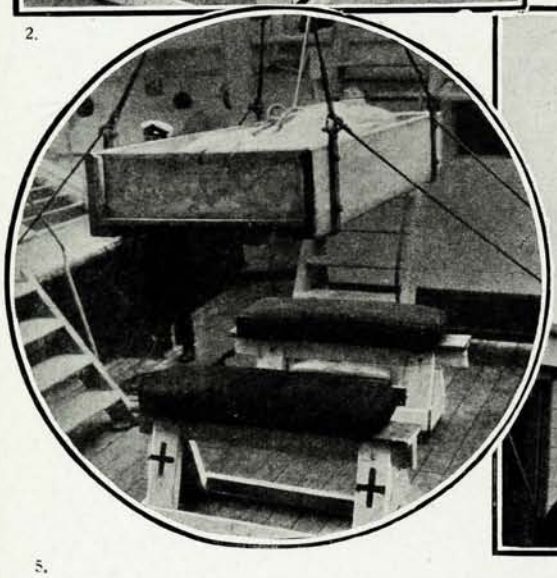
These weekly health reports from the ships, from the North Sea, from the South Sea, from the Mediterranean, from the coasts of India, were, indeed, inspiring documents. Each of them told of honest work performed in the light of an ever-present sense of duty, a love of the Service and a pride in it, and also in the "doctor-man's" own ship, which made the remarkable sick percentage—0·6—something more than a mere triumph of organization.

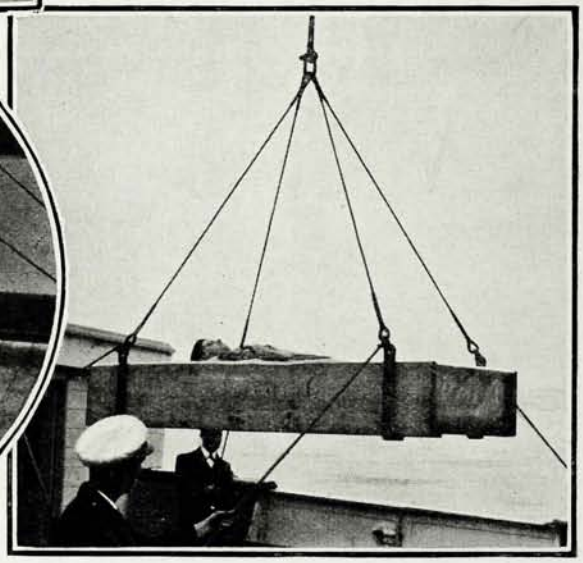
Thanks to these devoted ship's doctors the health of the Navy improved during the war in spite of shock and alarm, and the long weariness of inaction. In fact, the health of the Navy had never been so good. Writing in the first war number of *The Practitioner*, Surgeon-General Rolleston, R.N., stated that the health of the Navy had been "much better" in war than in peace time, and that the figures given (1 per cent. to 0·6 per cent.) would have been lower, but for the higher percentage incidence among the men of the Royal Naval Reserve and the Royal Naval Volunteer Reserve. "In two battleships with a complement of over 1,000 each," he wrote, "which I happened to visit on two successive days, there were only two men in the sick-bays. . . ."

Setting aside for the moment the work of inoculation and of inspection, two things undoubtedly contributed in an especial degree to this splendid result: these were improved systems of ventilation and the instruction in health matters given by the doctors to the crews. The latter was indeed a most important adjunct to success, for it achieved the double purpose of enlisting the sympathy of the men, and of opening their eyes to the dangers surrounding them. Lacking knowledge, a man is



2.

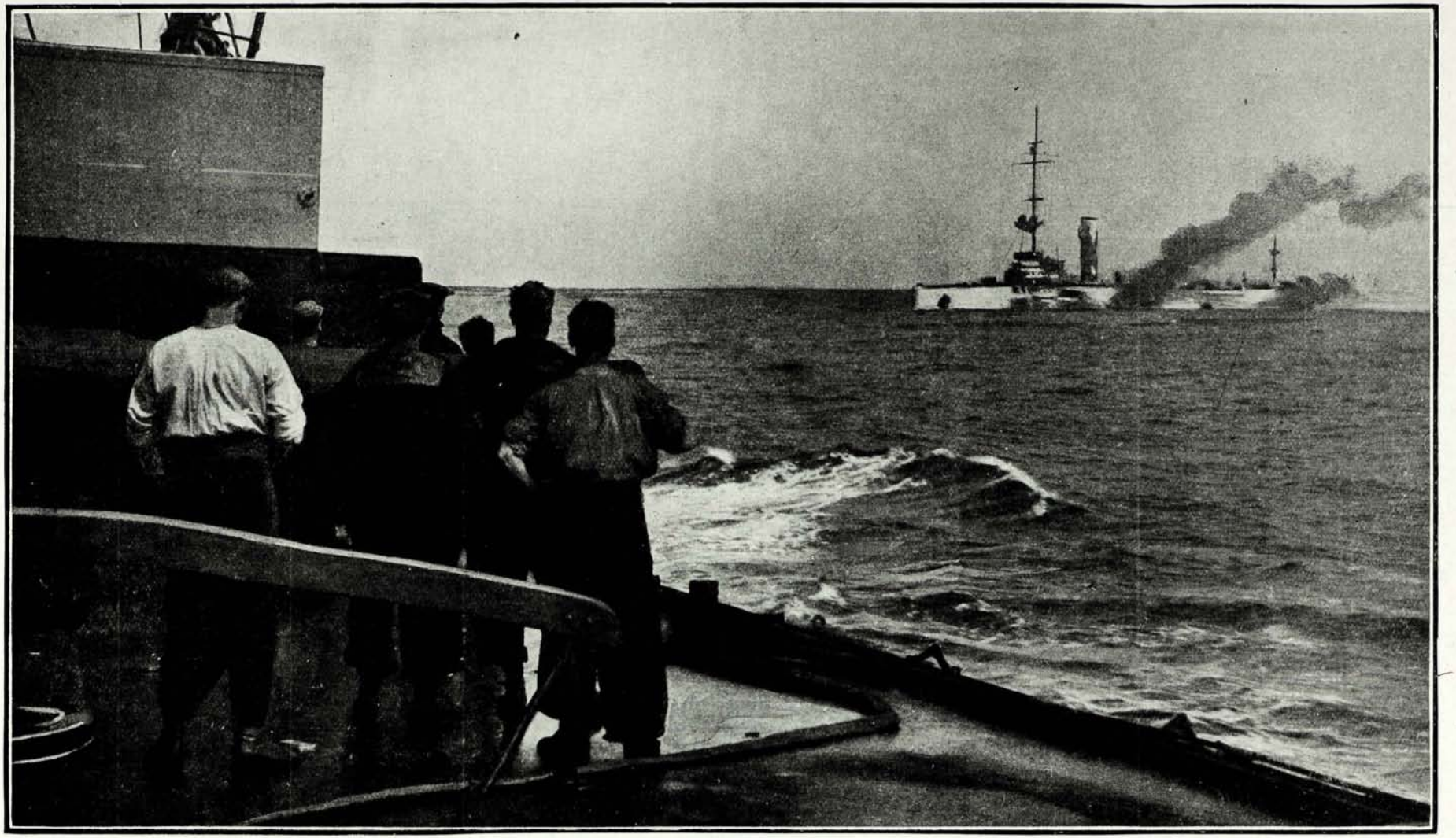




5.

boards partially removed from their slots. 3. Canvas-cot being passed into carrier on the rollers. The hoisted out. 5. Patient hoisted. 6. Cot and carrier being passed outboard.

FROM SHIP TO HOSPITAL: A COT-CARRIER.



WATCHING A GERMAN CRUISER GO DOWN.

The sinking of the 'Mainz" during the action off Heligoland, August 28, 1914.

apt to chafe under restraints placed upon him by his doctor; possessing that knowledge, he gladly accepts them, and may even carry them a stage farther on his own behalf. Sir Arthur May, whose policy was ever to encourage the friendliest relations between patient and doctor, both of whom, he was at pains to emphasize, he regarded as brother "sailor men," was an enthusiastic supporter of the lectures on health subjects which were a feature of battleship life. He reaped a speedy reward, for the men entered into the spirit of their medical officers. They showed their pleasure by taking the advice offered to them, and by spreading it; the effects were soon evident.

The lecturers spoke simply of the great fight with disease upon the issue of which so much depended. They told of the terrible effects of dirt and insanitary condition among men living a life aboard ship in quarters necessarily cramped; they indicated the dangers of bad teeth, of abuse of tobacco and alcohol, above all of venereal disease. Further, they gave instruction in first aid, so that during a battle, when the doctor could not be reached, help might be afforded to wounded comrades. The lectures gave the men a new interest, and helped to brighten the monotony of the long winter evenings, and they sowed valuable seed, the fruits of which were gathered during the course of the war.

But if this method was important, the work accomplished upon ventilation was revolutionary. Ventilation ashore is important, but not perhaps very interesting; ventilation upon a battleship proved to be often a matter of life and death. A battleship lived by her ventilation, for unless the air below decks was kept sweet and pure, disease had an opportunity; and in actual combat efficient ventilation was found to mean clear heads and eyes, and so to double the fighting capacity of the men in the gun turrets, the signallers and the telephone operators who were the nerves between brain and hand, between those who planned and those who executed.

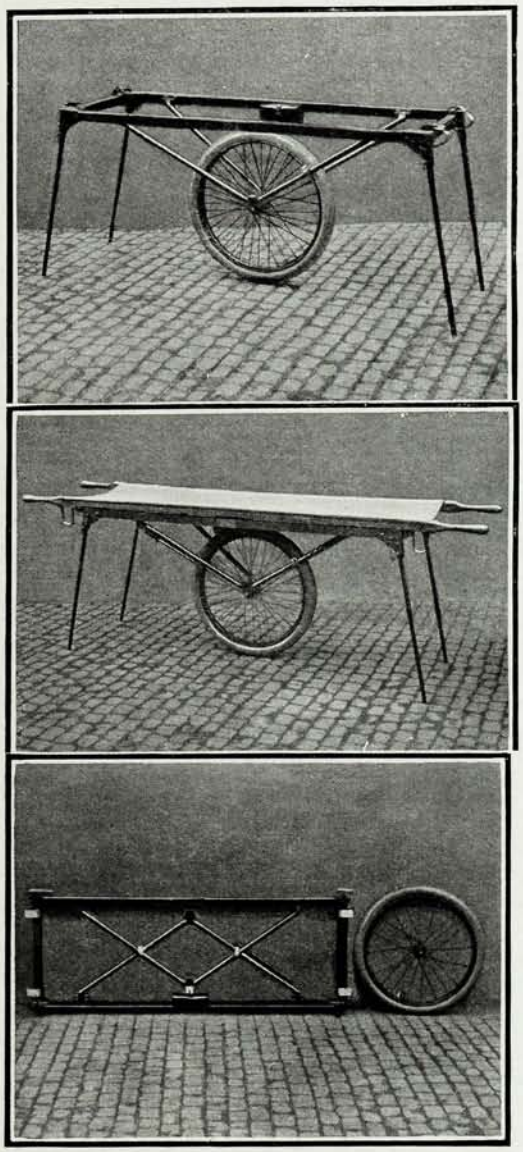
The ventilation of many of the older ships was notoriously bad, and the crews suffered in consequence. In the presence of the fumes of exploded charges good shooting became difficult in the extreme. On the other hand, a man could not remain in that condition of physical well-being which was so essential to modern scientific fighting if he was being "blown away" by a strong blast of air pumped into the room in which he worked. The difficulty had always been to find a method of ventilation which would ensure an evenly distributed supply of fresh air without draughts The air should, it was seen, be "breathed' throughout the ship, not driven in blasts through it.

In 1912 a Committee, with Fleet Surgeon R. C. Munday as Secretary, was appointed by the Admiralty to investigate and report on the best methods of ventilating modern warships. It is no exaggeration to say that the work of this Committee was as important in its way as the work of those who devised the huge guns they did so much to render efficient. A new era in naval ventilation was inaugurated. By means of most ingenious devices a free and full supply of warmed air was secured for every part of the ship; while the ventilation of destroyers was improved to such an extent that even the fastest of them in the roughest sea could have their living spaces supplied with fresh air which might be warmed.

Many men had reason during the fierce hours of the Jutland battle of May 31–June 1, 1916, to bless these ventilation schemes. In the gun turrets lives were saved by them, while down in the bowels of the great ships activities were made possible which otherwise had been stayed from the outset of the engagement.

The Battle of Jutland Bank, however, was not the first engagement in which the naval surgeon had opportunities for practising his craft in actual warfare. In a hundred small affairs he was called upon to play his part, and played it as naval surgeons from the great Beatty, to whom Nelson addressed his last brave words, onwards have ever played their parts. At the Falkland Islands, at the Cocos Islands, in the harbour at Zanzibar, off Heligoland, and elsewhere the same heroism characterized this Service, and the same quiet, brave work was carried on.

It is impossible in a chapter such as this to do justice to all these deeds, and some must be passed over in silence; but a more or less careful survey is essential to a true understanding of the work which was accomplished, for our naval actions were very few as compared with the actions of the armies in the field, and each possessed special features in respect of time, place and circumstance.



AN AMBULANCE TABLE.

The Mono-wheel Stretcher and Carrier devised by the Rev. Bevill Close, Chaplain, R.N. This stretcher was used in the trenches of the Royal Naval Division at Gallipoli.

The naval action off Heligoland in August, 1914, stands first in chronological order and offers a good illustration of the state of affairs in the early days of the war. Happily an excellent record of its medical aspect was preserved by a surgeon who played his part in it.*

"On 28th August (says this writer) 'action' was sounded off. Two cruisers (supposed enemy's ships) having been suddenly observed had caused us to take up 'stations' somewhat earlier than had been anticipated. It was quickly discovered, however, that the cruisers were our own. Shortly after, therefore, breakfast was piped to each watch in turn, and at about 7 a.m. the enemy's ships were actually sighted. From this time on to close upon 2 p.m. successive actions were fought between various opposing forces in the two fleets.

"The day was fine and calm, while the sun gleamed through a very hazy atmosphere in which patches of fog shortened up the visual distance from time to time. I remained on the upper deck during the earlier part of the affair and found it a most interesting and inspiring sight to watch our destroyers and the Arethusa and her divisions dashing at full speed after the enemy, while soon the frequent spurts of flame from their sides, the following reports and the columns of water and spray thrown up by the enemy's shells pitching short or over began to create in most of us a suppressed excitement which we had not hitherto experienced, telling us that the 'real thing' had begun, that an action was actually in progress.

"Shortly our interest was to multiply fourfold when the order to fire our own guns was given. After a time, shells beginning to drop ominously near, I retired to my station, a selected spot just below the waterline in the after bread-room, one of the few available places in a ship of this class where some of my party of first-aid men could be accommodated; the other half of the party, in charge of the sick-berth steward, being situated at a similar station forward. This period one found trying. For knowledge as to how matters were progressing we had to rely upon fragments of information shouted down the nearest hatchway from someone in communication with those on the upper deck.

"The rat-tat-tat! rat, tat, tat, tat, on our sides from time to time as we got into the thick of it told us plainly of shells pitching short and bursting, whose fragments struck but did not penetrate the ship's skin; it was a weird sound, occasionally varied by a tremendous 'woomp,' which once at least made the paymaster, who was reclining near me on a flour-sack, and myself look hard at the side close by us, where we fully expected, for the moment, to see water coming in. As a matter of fact, this shell entered some 40 feet away, bursting an entry into the Lieutenant-Commander's cabin, while its solid nose finally

* *The Naval Action off Heligoland.* By Fleet Surgeon Walter Hopkins, R.N. Journal of the Royal Naval Medical Service.

fetched up in the wardroom, where later on it was christened 'our honorary member.' For this trophy I believe we have the Mainz or the Köln to thank. The wardroom steward found a similar piece of shell in his hammock that night. It had penetrated the ship's side and a bulkhead before finally choosing its highly suitable place of rest.

"The Fearless appears to have borne a somewhat charmed life—a large number of shells pitched just short and just over her—she was hit fair and square by seven, one of which played a lot of havoc with middle deck forward and the mess gear there. Her sides showed some 23 holes of varying sizes, and yet her list of casualties was only eight wounded, none dangerously . . . for suppressed excitement and vivid interest I should say that the seeker after excitement could scarcely ask for more than a modern naval action."

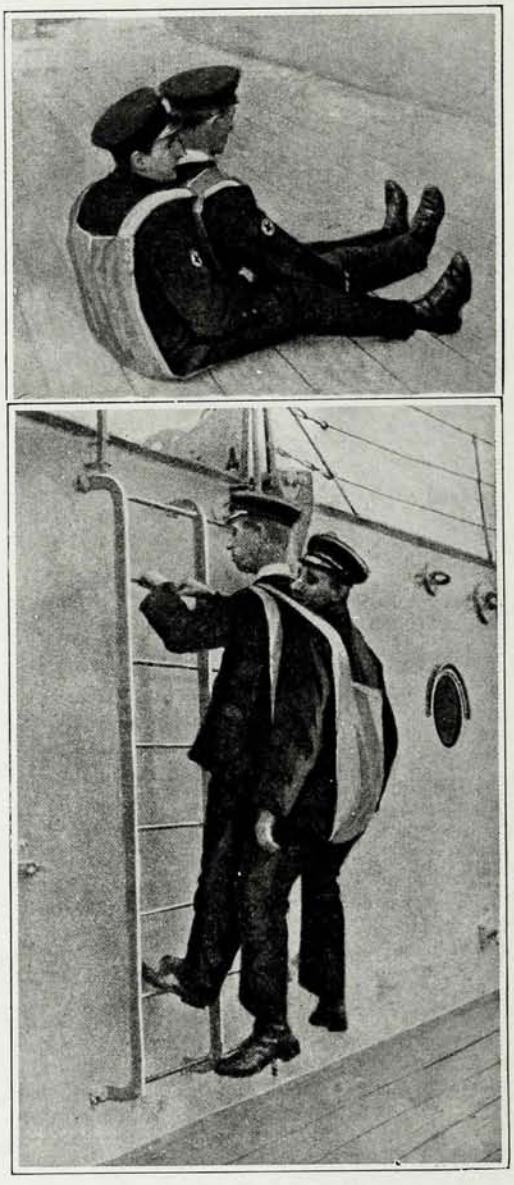
The eight wounded did not give the doctor very much work to do. But the engagement revealed the fact that work in the distributing station of a warship during an action was of a kind to test the strongest nerves, and that many precautions would require to be taken. The doctor was ordered presently to go aboard the Laertes, which had been taken in tow, and there he found some severe cases awaiting him, and he says:

"Arriving on board I found the worst case was that of a young stoker in a serious condition from shock and loss of blood. He had sustained several shell wounds, one of which involved the left tibia and fibula. . . . Around this patient the deck was covered in blood and so slippery that I had to send for cloths to be put down to enable me to keep a footing. Near by were two others, somewhat less severely wounded, lying on the deck, while just beneath me lay two figures covered with the Union Jack."

Thanks to the skill of their comrades the wounded had all received first aid, but still considerable hæmorrhage was going on.

From this engagement dated the knowledge that in modern naval action wounds were either very slight or else terribly severe. Further, the part which burns were to play in swelling the casualty lists became evident. Huge areas of burning were seen, "the whole length of the upper limb from finger-tips to shoulder as well as the face, ears, neck, and upper part of the chest." Many of these burns were inflicted by the flash of bursting shells, yet it was interesting to note that the eyes themselves almost invariably escaped injury by the flame. This happened even in cases in which the eyebrows and eyelashes had been singed and the skin of the eyelids badly damaged. It proved that "instantaneous" as was the flash of the bursting shells, the power of the eye to detect it and protect itself against it was quicker in its action. The eye saw and the brain understood in time to cause the eyelid to shut before the scorching sheet of flame could do its work.

These burns were not the same as those caused by explosions in gun turrets which had been hit, and which will be described below



AN AMBULANCE SLING
Devised by Fleet-Surgeon P. H. Boyden.

"SHE'S GONE, SIR: SHE'S GONE!": THE LAST OF THE "EMDEN," NOVEMBER 9, 1914.
Men of H.M.A.S. "Sydney" cheering after defeating the German commerce raider.

They were usually superficial, and it was to the credit of the naval doctors on board ship and in the shore hospitals that in very many instances injuries that seemed at first sight to be irreparable were so treated that complete recovery took place and deformity was avoided. Dressings of picric acid were found to be most beneficial, though other forms of treatment had their adherents—notably the method of irrigating by salt solution, introduced by Sir Almroth Wright during the war and described fully in an earlier chapter.*

Of the total of 27 cases seen by this doctor there were 5 burns or scalds and 22 shell and splinter wounds, 10 of the latter cases being Germans. The wounds were mostly lacerated and punctured, deep and shallow, of all shapes and sizes; several of them involved bones.

The men bore their wounds with cheerful unconcern. A young sub-lieutenant was found sitting in the wardroom with his leg, which had a shell wound in it, stuck up on a chair. His only anxiety was to get back to his work. Other men showed the same spirit, and the Germans were not behind their captors—and rescuers—in this.

The wounds healed well, but it became clear that the fact of being at sea did not save a wounded sailor from the danger of blood-poisoning—it had been believed that on the sea this danger was small. The problem of the cleansing of wounds which loomed so large in the military hospitals of France and Belgium at this time therefore engaged the attention of the naval service also, and solutions of it were quickly devised.

This battle of Heligoland was a small affair, then, from the doctor's point of view. The list of casualties, when comparison is made with the Army, seems almost ridiculous. Any street accident might yield as many. But it would be a grave mistake to suppose that on this account the lessons learned were unimportant. On the contrary, they were of the highest importance. They showed the doctors what to expect, and they revealed the fact that in any great engagement, where smaller craft might be expected to suffer heavily, the casualties would be severe. New ideas were generated; new possibilities opened up; new methods called for.

The naval medical authorities at Whitehall profited by the lesson in various ways. A Committee presided over by Sir Watson Cheyne was set to work to consider the question of the treatment of wounds; the treatment of burns received attention; the danger from the fumes of bursting shells, which tended to sink down on the decks and penetrate to the cabins below and so to cause suffocation, was considered and the testing of respirators begun forthwith. These steps were doubtless in advance of actual requirements, but on the day of the Battle of Jutland Bank they had their justification.

Experience dictated the modification of other arrangements and more especially of the arrangements for the safety of the wounded during action. The sick bay was the ship's hospital during periods of inaction, and, thanks to the work of Fleet Surgeon D. W. Hewitt and Fleet Surgeon M. C. Langford, these ships' hospitals were splendidly equipped and had been brought to a state of the highest efficiency. No pains had been spared to make them as complete as possible, and it was easy to carry out any surgical measures required in them. But their position on deck, above the armour, rendered them quite unsuitable for use during a battle, and against this contingency other rooms had been prepared and set apart—a precaution the wisdom of which was shown when a sick bay and all it contained was smashed to pieces by a bursting shell.

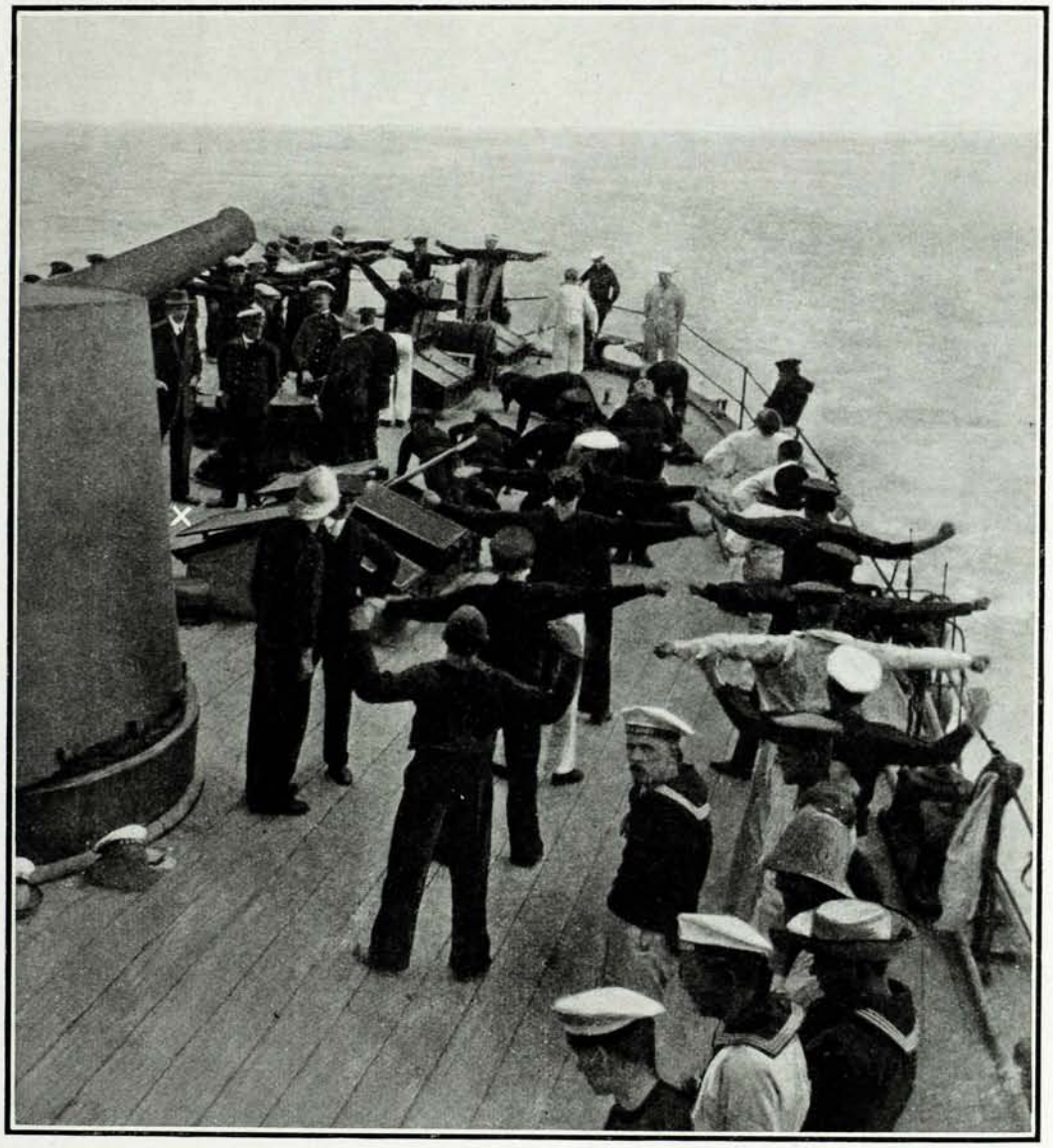
These other rooms were known as distributing stations, and were situated one forward and one aft, under the armour. It was essential that the transference of material from the sick bay to the distributing stations should take place at the earliest possible moment after the call "prepare for action," and as action might be imminent at any moment, day or night, it was necessary that all preparations should be so far advanced that little or nothing remained to be done when the order was given.

As little gear as possible was, therefore, left in the sick bay. Further, those responsible were advised as to their duties and trained in them. When action was sounded, the water-tight compartments were, of course, closed and inter-communication became impossible; therefore mistakes made or omissions committed could not be rectified. A man had then to do the best he could with the material to his hand and he might be situated in very terrible circumstances for the doing of it. Equipment of the distributing stations was, therefore, of paramount importance and received careful thought and consideration.

* See Vol. VI, p. 57.

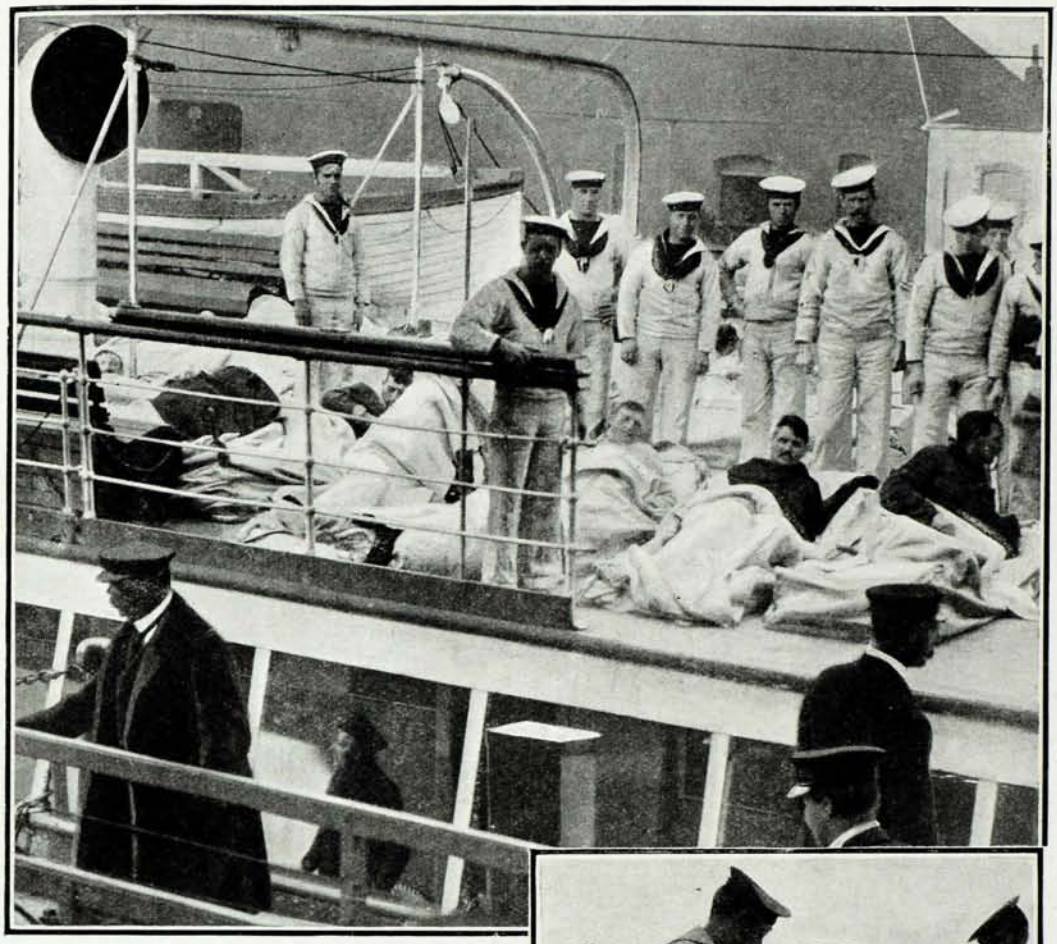
The difficulty was space. But ingenuity solved this and made it possible to have an operating table fully rigged, dressings, antiseptics, and other appliances always ready, and also to prepare accommodation for the wounded. As we shall presently see, these rooms were destined to witness some strange and terrible spectacles during the course of the fighting. For accommodation of the wounded after action, the best available compartments in proximity were used; by special fittings previously prepared the wounded could be slung in stretchers from the roof, one tier of stretchers above the other, and in this way a large number could be taken in at one time.

Ashore, preparations as complete as those made afloat had been instituted, and the wounded from the Heligoland battle were thus soon brought to great comfort in well-equipped hospitals. Some of them came to the Royal Naval Hospital at Chatham, which they reached within 24 hours of being struck down. In each case a dose of anti-tetanic serum was given to secure against possible attack by lockjaw and careful operative measures carried out. An arm, a leg, and an eye were part of the price paid by the sailors for this engagement, and some of the other conditions were of a terrible character, yet the cases did exceedingly well; the great cheerfulness of the men and their



FROM THE GERMAN COMMERCE RAIDER.

Prisoners from the "Emden" going through physical drill exercise on board a British warship. Captain Müller (x), who commanded the "Emden."

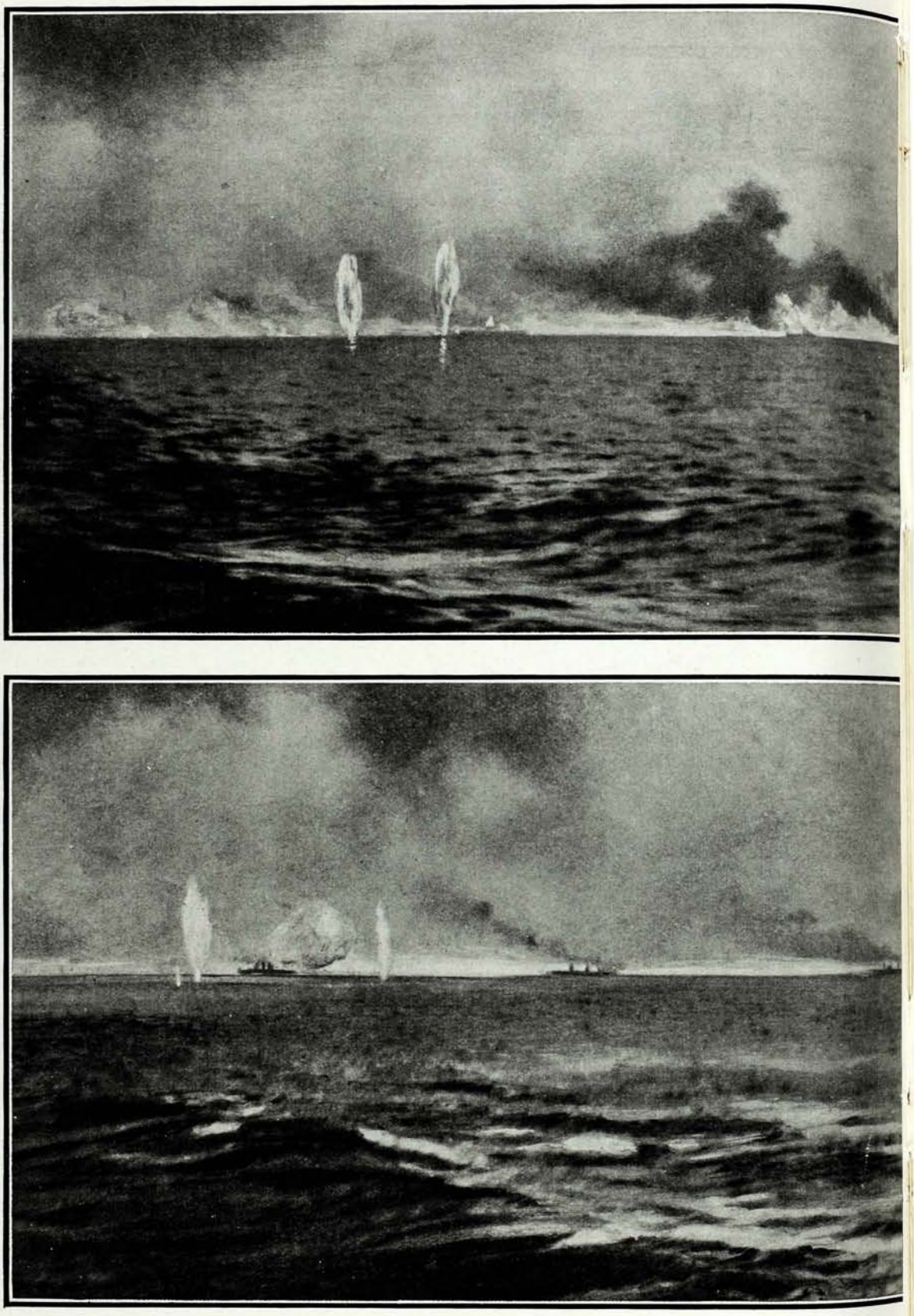


LANDING WOUNDED AT PLYMOUTH.

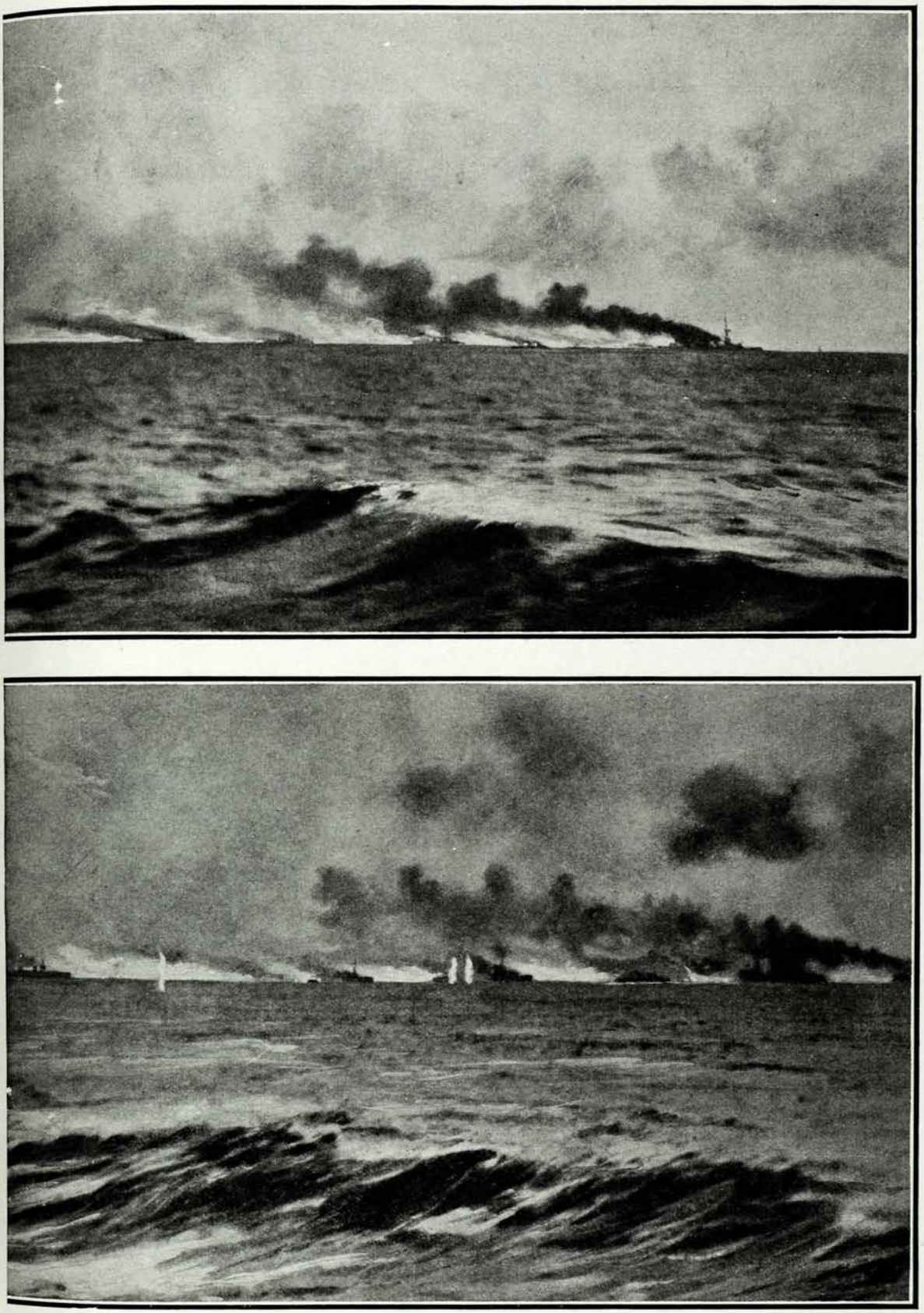
heroic attitude even when suffering the most acute pain won the admiration of doctors and nurses alike.

The hospital accommodation at the disposal of the Navy was not extensive when judged by Army standards, but of its efficiency no doubt could exist. There were, in the first place, the three great naval hospitals—Haslar (Portsmouth), accommodating 1,434 patients; Plymouth, accommodating 1,173 patients; and Chatham, accommodating 1,107 patients. In addition to these, the Navy had numerous hospitals in the British Isles accommodating some 11,129 patients, and further possessed a hospital for mental diseases at Great Yarmouth. Abroad, there were naval hospitals at Gibraltar and Malta and other points.

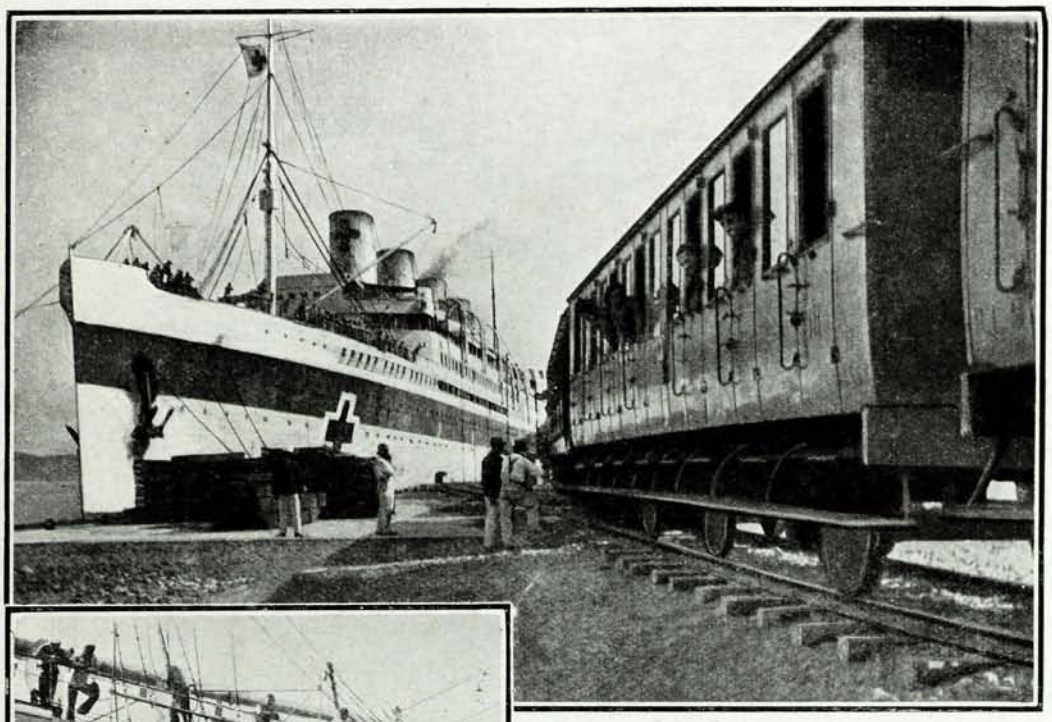
Nor was private help wanting to add to these establishments. Lady Bute converted her house, Mount Stuart, Isle of Bute, into a Naval hospital, and it was fully occupied from the beginning of the war. It had beds for 125 patients and proved a boon, both on account of its beautiful position and healthy surroundings. Lady Nunburnholme also made generous offers of hospital accommodation, and provided for Naval patients a fully equipped hospital for 220 patients in a locality where Naval hospital accommodation was much needed. The British Red Cross Society equipped a hospital for 160 patients at Truro, Cornwall, and the Church Army one for 100



THE BATTLE OF JUTLAND BANK, MAY 31, 1916: ADMIRAL BEATTY'S
(*From photographs taken*



BATTLE-CRUISERS ENGAGING THE GERMAN BATTLE-CRUISERS.
during the battle.)



FOR REST AND TREATMENT.

From hospital ship to train. A train at Toulon with wounded passengers about to start for the Riviera.

patients at Dunvegel, Lanark. Princess Christian provided funds with which the former bed accommodation at Queensferry Hospital was doubled, and Canadian women generously subscribed a sum of £40,000 with which a new block was built at Haslar Hospital. In addition, many kind offers of help flowed in to the Admiralty from all parts of the country, and were accepted.

The wounded men reached these hospitals by hospital ship and hospital train, though in many cases they were landed directly by the warship in which they had been serving. Weather and circumstance were the determining factors, for manifestly in a gale transferences could not be made at sea, and, again, a ship which had been badly hit might not stay in her rush for port to unload wounded. As a rule the Grand Fleet returned to its anchorages with the wounded aboard; these were then transhipped to the hospital ships, which brought them to some landing port whence they were removed to a local hospital, or if able to travel comfortably, put on the ambulance trains for transport to one or other of the naval hospitals.

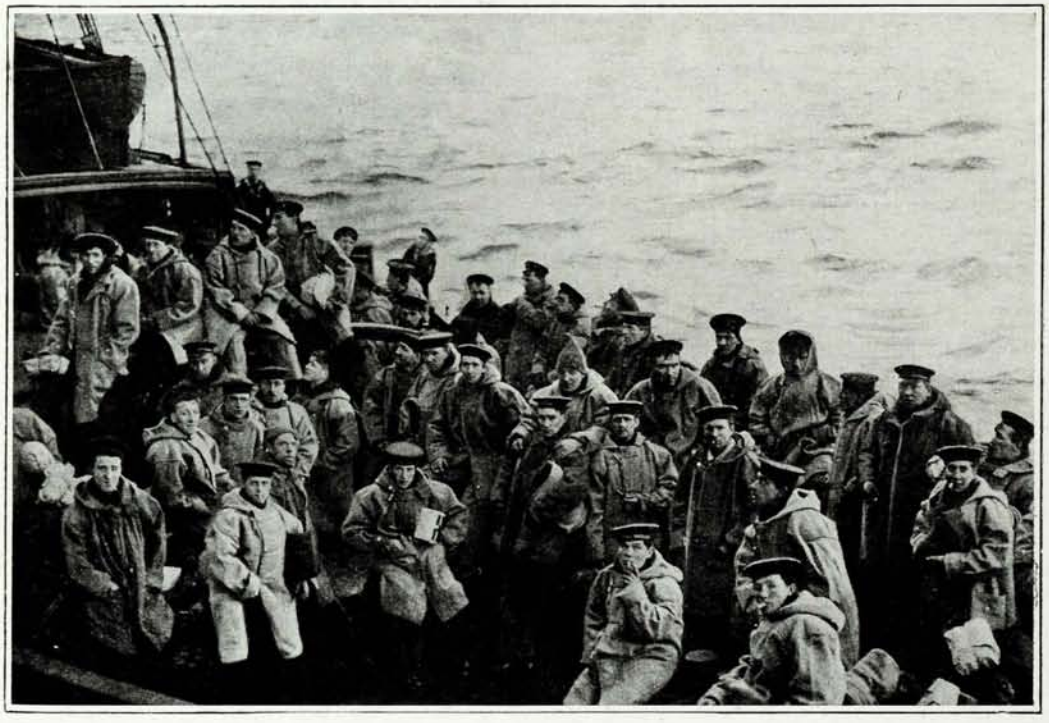
The Navy owned 12 of these hospital ships, splendid vessels fitted with every kind of surgical appliance and fully staffed by doctors. Of these 12, nine were constantly employed in home waters and three in the Mediterranean. The trains were as well equipped as the ships, and the hammock-like cots gave them a distinctly naval appearance. The system was an admirable one, for it allowed of thorough cleansing and ensured that no bumping should disturb the severely wounded. These trains, like those in use for the transport of soldiers, were hospitals on wheels in a true sense, so that it may be said that from the moment he reached the distributing station on his own ship a man was never out of the doctor's hands or cut off

from expert attention. As the distributing station was waiting to receive him, in most cases, the moment he fell, his chances of salvation were excellent. It is not possible to avoid comparing this happy lot with that of the wounded soldier eking out terrible hours upon the No-man's Land, beyond the reach of succour until darkness should have covered him. Yet it must not be forgotten that against that the sailor had to face the perpetual peril of mine and submarine and the chance that at any moment his ship might be sunk and all chance of salvation lost—for how should a sorely wounded man fare in the great hazard of the sea ?

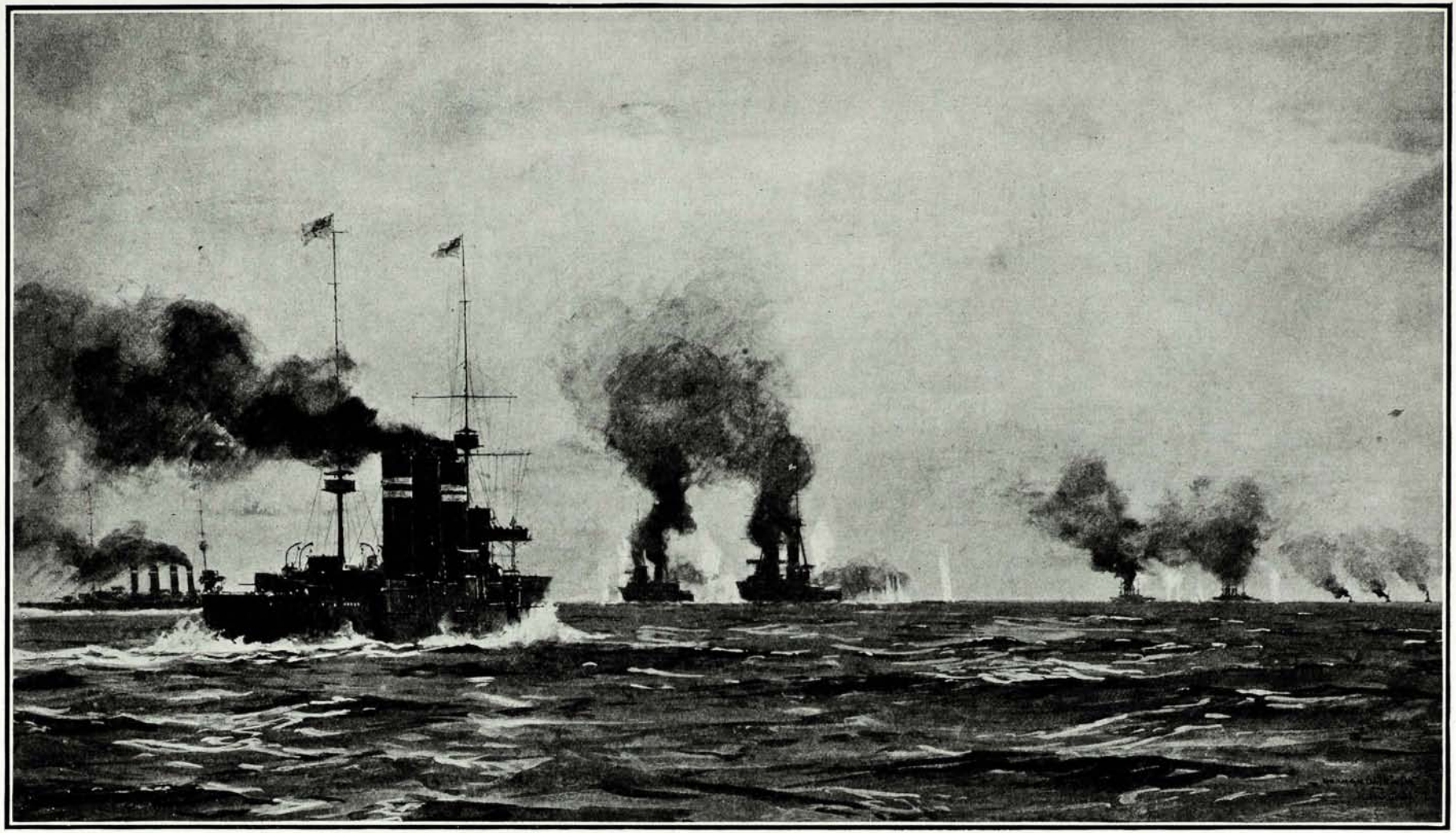
The naval medical service played its part in handling the great exodus from Belgium in August, 1914, and also in treating the wounded from the ill-starred Antwerp expedition. Men from the latter were taken to the Chatham and Plymouth hospitals ; wounded Belgian soldiers were transported across the Channel in the hospital ships Plassy and Magic, and about 2,000 wounded French soldiers from Dunkirk to Cherbourg in the hospital ship China. The medical officers of these ships had their hands very full during the voyages. The wounds seen were of incredible severity in many cases, for at that period field treatment was not in the advanced stage to which it came later.

Before leaving this part of the subject the directions issued to the medical staff of the Neptune in 1913 for dealing with wounded may be alluded to. They serve to show how well the difficulties likely to be encountered had been forestalled ; they show also how true an estimate of the actual needs had been formed. The directions were divided into three parts, those "On Leaving Port," those "During Action," and those "After the Action." With the first two we have already been concerned ; the last provided that as soon as the action was over or there was a lull the stretcher parties would march to the places appointed, as shown by luggage labels attached to the stretchers. They would take first-aid bags of dressings with them and hot coffee or beef-tea and drinking vessels. On arrival they would move the wounded from the turret or other place to the deck and out of the way of the guns. They would render first aid but not otherwise move the wounded.

The senior medical officer would then make a rapid tour of the upper deck to estimate the number and condition of the wounded, and give any necessary hypodermic injections, attaching labels to prevent the possibility of duplication. At the same time the staff surgeon would inspect



THE SURVIVORS OF H.M.S. "NATAL."
About to proceed on leave after receiving new kit.



THE BATTLE OFF THE FALKLANDS, DECEMBER 8, 1914.

First stage of the action between the British Battle-Cruisers and the German Armoured Cruisers.

the main deck. During a lull the surgeons would supervise the removal of the wounded to a place below the armour, where they would remain under care till the end of the action.

Of great naval actions in the early days of the war there were few, if indeed we except the battle in the Pacific and the battle of the Falkland Isles. About the former there is nothing to be said so far as the surgeons are concerned, for unhappily the disaster which overwhelmed our ships was fatal to doctor and patient alike. Of the latter there is only this to be said—the total British casualties in this great battle were 10 men killed and 16 wounded. This battle, indeed, illustrated the tremendous hazard of naval warfare and showed to what an extent the fate of ships and of men is determined by gun power and gun reach.

But if great actions were very few, there occurred a number of small actions of a deeply interesting kind. Of these the two which command attention most evidently were that between the Pegasus and the Königsberg and that between the Sydney and the Emden, for these were fights of a special character, each showing relatively heavy casualties and each revealing the naval surgeon in a heroic light.

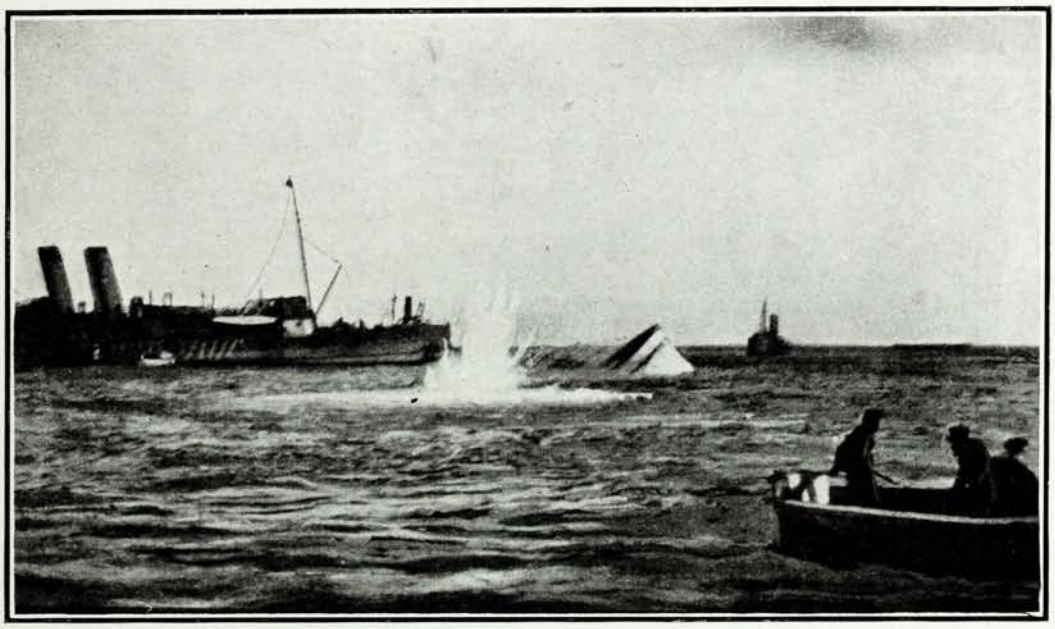
The action between the Pegasus and the Königsberg took place off Zanzibar on the morning of September 20, 1914. The Pegasus was refitting and was therefore taken unawares, and though a brave resistance was offered, she suffered heavily, being literally battered to pieces. In consequence the surgeon, Fleet Surgeon A. J. Hewitt, R.N., found himself faced with the following casualty list—24 men of the Pegasus and 1 native servant killed, 8 officers and 69 men wounded. Of the 3 officers and 25 men admitted to the European hospital 2 officers and 4 men died the same day, and subsequently 8 more men died of their wounds.

When the action began, two collectingstations for the wounded were selected, the stokers' mess deck forward on the lower deck below the sick bay and the torpedo flat aft, on the lower deck below and forward of the ward-room. The deck of these spaces was about four to six inches below the water-line. The sick berth steward had charge of one station and he was assisted by a cook from the galley, the foremost stretcher party and forecastle party, the other station was in charge of the ship's surgeon, who was assisted by one cook and the after stretcher parties and the poop bearer party. On action being sounded the cooks brought with them to their respective stations a " fanny " of hot water and some cold water.

Each gun had been supplied with a canvas bag containing a tourniquet, in case of bleeding, bandages, and other appliances. These bags were secured under the shields of the guns. A similar bag had been supplied to the fore-bridge, and various other precautions, which were now fully justified, had been taken.

In his report on the action published in the " Journal of the Royal Naval Medical Service " Fleet Surgeon Hewitt stated that the most remarkable feature of the wounds was the large number of minute superficial wounds and burns looking like the pitting of black powder, also the small penetrating power of the fragments in open spaces like the upper deck. The danger zone, so far as life was concerned, seemed to be confined to a small area round the bursting space, and although the initial velocity of the fragments appeared to be very great, this seemed to diminish rapidly, perhaps owing to the irregularity of their shape. For example, a large number of fragments were removed at a depth of from two to four inches, some embedded in bone and some in the soft tissues. In two penetrating wounds of the skull the entrance wounds were of identical shape and size with the shell fragments found, but in neither case did the missile penetrate more than four inches. A leading seaman had his right arm so shattered that a primary amputation was necessary, but a fragment of the same shell hit the brass buckle of his belt, breaking it but not even bruising the abdomen. " Small fragments " (continued Fleet Surgeon Hewitt) " were also the cause of the loss of four eyes, and I am of opinion that a pair of motor goggles would have saved all these. A case of aneurysmal varix occurred in the right common carotid and jugular vessels caused by a minute particle of shell which probably could have been stopped by a linen collar. In my opinion a coat of light chain armour, or even leather, with a pair of goggles made from toughened motor screen glass would be invaluable to captains of destroyers, navigators and others in exposed positions who are likely to encounter ships armed with similar guns."

These suggestions were made at a period long before our soldiers and those of our Allies wore helmets in the trenches ; they were reproduced in an article on the need of protective shields and helmets which appeared in *The Times* in the summer of 1915, and the effects of which were soon evident in France. Thus the



SURVIVORS OF H.M.S. "MAJESTIC," MAY 27, 1915.
Eight minutes after the warship was torpedoed by a submarine.

experience gained in Zanzibar was destined to help in the agitation which secured for our soldiers the great additional safeguard which helmets proved to be.

Many of the wounds met with in the Pegasus were of a terrible description and showed the devastating effect of naval gunfire. A leading stoker had his shoulder smashed to pulp, another poor fellow had both eyes and the whole upper part of his face shot away, broken limbs and lacerated flesh were seen on every hand

"Most of the casualties," the doctor wrote, "occurred on the upper deck, and the scene that this presented can scarcely be imagined. Yet there was very little noise on board from the wounded, and one was impressed by the death-like silence between the periods of appalling din caused by the salvoes. Although the ship was in harbour and only a short distance from the shore no one attempted to jump overboard and there was no panic. The *moral* of the men was magnificent."

In this inferno the doctor, Fleet Surgeon Hewitt, went about his work according to the grand tradition of the service he represented. The fumes of the high explosive powder had a stupefying effect, causing a feeling of dizziness; the bursting of the shells smote the decks with blasts of air which had an unnerving effect; but the good work was not suffered to fail on that account. Indeed, the awful scene, so far as it affected himself, was dismissed by the doctor in a line: "I personally had been breathing more deeply than normal in assisting a wounded man up a ladder from the after torpedo-flat where these fumes were particularly dense, and experienced a feeling of nausea and dizziness. For several days afterwards on deep breathing one seemed to exhale the fumes."

The wounded were taken from the Pegasus by boats from the cable-layer Banffshire as soon as the firing ceased. All had first aid dressings applied and nearly all the serious cases had had a hypodermic injection of morphia. All were landed within an hour. The landing was difficult owing to a rapidly ebbing tide and boats being required to return and stand by the ship as soon as the wounded were landed, for it looked as if it would be necessary to abandon the ship.

Probably this action was, individually, the most terrible of the first year of war, so far as the doctor was concerned. Fleet Surgeon Hewitt faced his ordeal single-handed, and splendidly did he vindicate the good name of the medical service. His quiet courage and his ability undoubtedly went far to mitigate a most fearful situation, to save gallant lives, and to relieve the pains of those sorely injured.

The action between the Sydney and the Emden attracted the attention of the whole world. The exploits of the German raider had added to her name a romantic association; her destruction, when it came, was hailed with feelings in which admiration had a large place.

The Emden was sighted about 9 a.m. and the

battle began shortly afterwards. The doctors soon found themselves busy. The senior medical officer had begun a tour of the guns as soon as the raider was sighted.to see if the first-aid bags were ready, but before he could return to his station the guns of the Sydney had opened fire. The Emden soon returned the fire and within five to ten minutes from the beginning of the action the first wounded man was brought below. He had a fracture of the right leg and thirteen shell wounds and was in great pain. Following him came a stream of wounded demanding immediate attention. The second case had been shot in the chest and the apex of the heart was seen beating through a hole in the chest wall. Many of the other wounds were of a dreadful character.

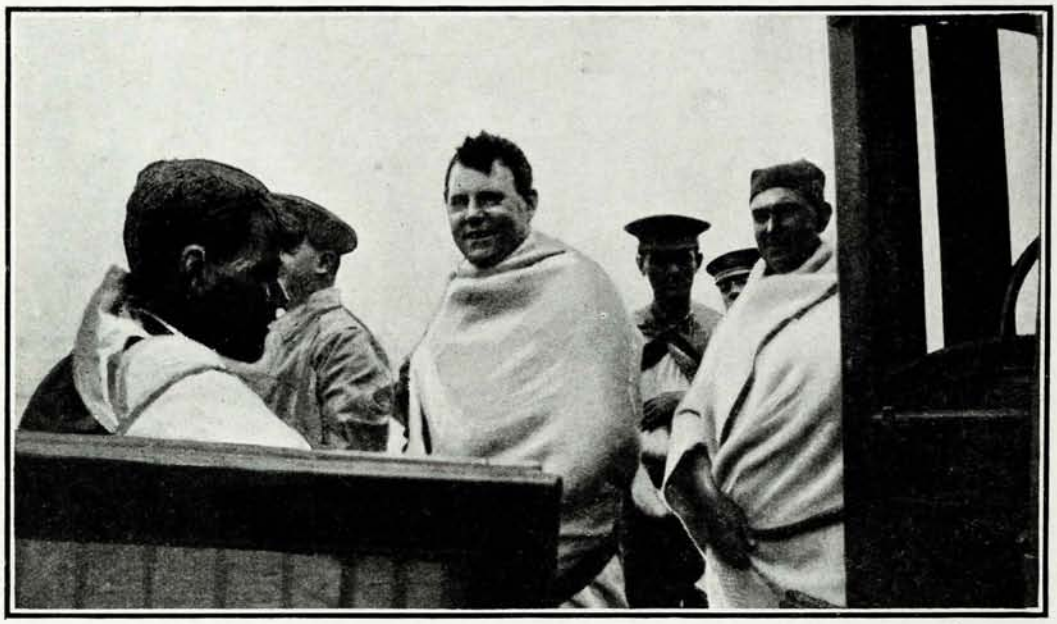
At 11.15 a.m. the order "Cease fire" was sounded. The medical staff had now been working two hours in a confined atmosphere at a temperature of 105° F.

"During the action," wrote Surgeon Leonard Darby, R.A.N., in the "Journal of the Royal Naval Medical Service," "the space below was very congested, the tunnel being full of men belonging to the ammunition and fire parties. At the best of times there is little room here, so the regular transport of wounded was considerably impeded. All the time we knew not how the fight was going—we could only hear orders for ammunition and the continual rapid fire of our guns. At one time, when we heeled over and the operating table took charge, it seemed as though the ship had been badly hit, but we soon found out that this was only due to a sudden alteration of course."

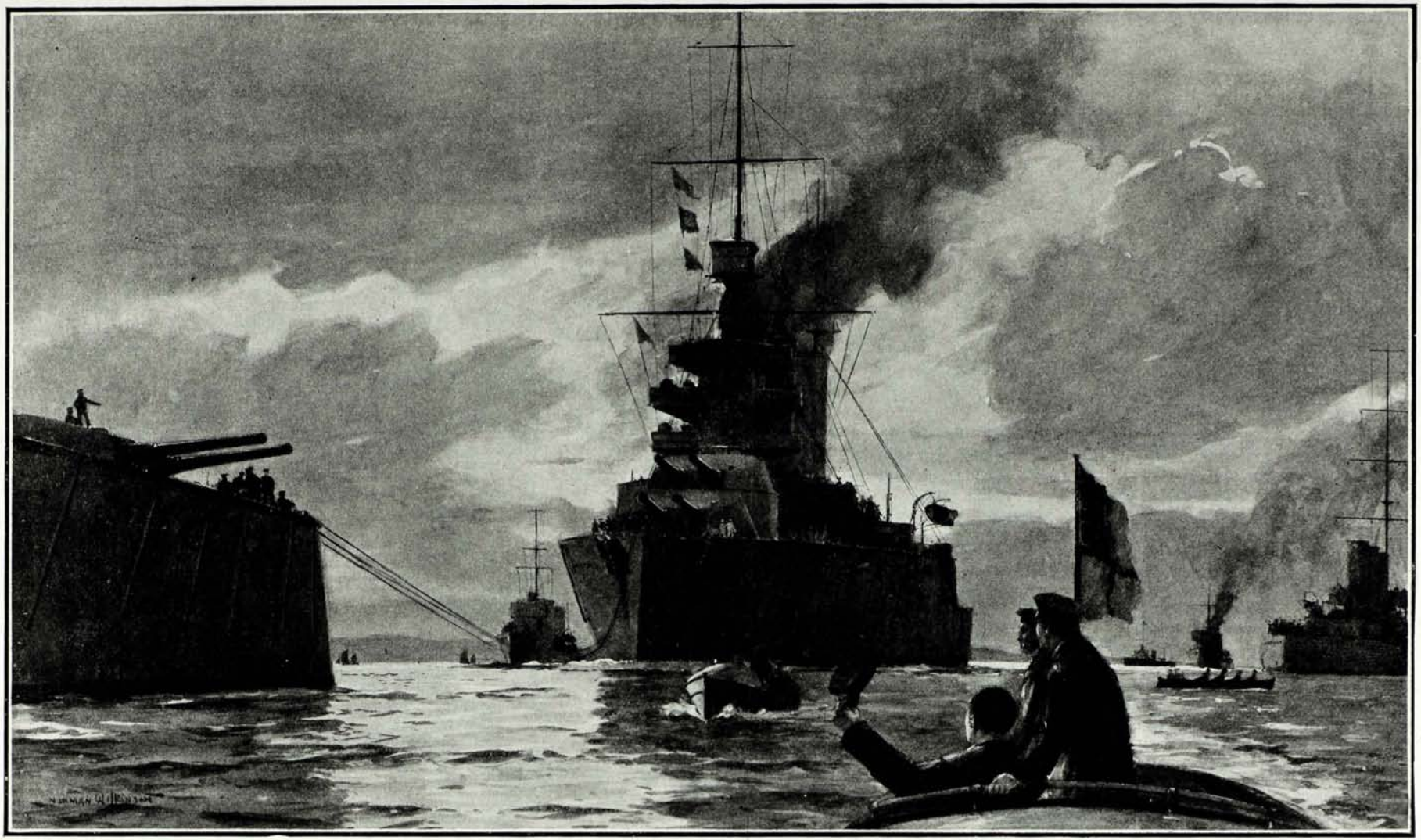
The wounded meantime were in considerable pain and every effort was being made to help them. As soon as possible after the action the sick bay was prepared as an operating theatre. This meant hard work, because during the battle this room had been flooded with water from the fire mains. Moreover, the task of getting the wounded up to the operating room and dealing with them was not made easier by the continual arrival of new patients in the shape of German sailors fished up out of the water, most of whom were in a very collapsed state indeed. One man had been in the shark-infested sea for nine hours, but was brought round after some trouble and next day was none the worse for his immersion.

Operative surgery was therefore not begun in earnest until the day after the battle. This was inevitable, for the wounded demanded constant attention at first. Early in the morning of that day (November 10, 1914) the Sydney had reached Cocos Island and shipped the Eastern Extension Telegraph Company's Surgeon, Dr. H. S. Ollerhead, to help with the German wounded. This addition to the staff was welcome—the Sydney carried two medical officers of her own—and operations began at once.

"Our chief difficulties" (wrote Surgeon Darby) "were lack of space and trained



SURVIVORS IN BLANKETS AFTER BEING RESCUED FROM THE DISASTER.



AFTER THE NAVAL ACTION OFF DOGGER BANK, JANUARY 24, 1915.
Vice-Admiral Beatty's flagship "Lion" towed into port after the British victory in the North Sea.

assistance, and we had used up all the sterile towels on the day of the action; also there was much delay in getting instruments re-sterilized . . . Late in the day we organized a theatre staff from volunteers. They helped to clear up, held basins, handed stores and dressings, and did much remarkably useful work with a composure that was astonishing, as they were present at many bloody operations to which none of them previously had been in any way accustomed. Surgeon Wild acted as anæsthetist and Dr. Ollerhead assisted me with the operations."

The operations went on all day, the doctors as usual refusing to spare themselves until their patients had been given every possible attention. Next day the Sydney returned to the Emden, which was flying signals of distress, and arrangements began for transferring about 80 German wounded. All available stretchers, hammocks and cots were sent to the Emden with a party under Dr. Ollerhead, who did not return till the last patient left the ship some four hours later. Even then some men who had got ashore could not be brought off till next day, November 12.

This transhipping was an exceedingly difficult business, as there was a huge surf running on the beach where the Emden was ashore; the collecting and lowering of the wounded into the boat was attended, unavoidably, by a good deal of pain. The wounded were taken aboard the Sydney in the cots and stretchers by means of davits, but there was no davit available in the Emden. One German surgeon was uninjured, but he had been unable to do much, having had 24 hours with so many wounded on a battered ship, with none of his staff left and with very few dressings, lotions, or instruments.

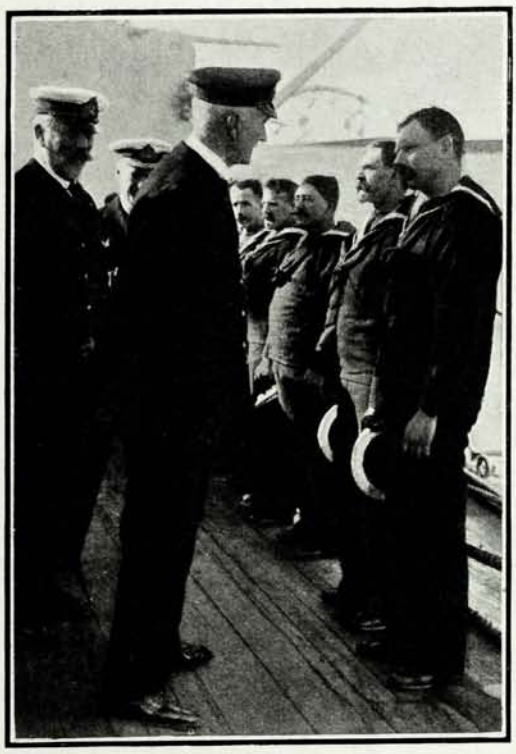
"The Emden," says Surgeon Darby, "was riddled with gaping holes; it was with difficulty one could walk about her decks, and she was gutted with fire. The wounds of the Germans who were brought off to the Sydney by this time, only 24 to 30 hours after injury, were practically all very septic, with maggots ¼ in. in length crawling over them. Little had been done for them, but now they were attended to by our party and transhipped to us as quickly as possible."

This fresh rush of cases soon crowded out the wardroom and the sick bay had to be used as a dressing station. Soon there was scarcely any room to move, for besides the 70 wounded received that day there were over 100 prisoners and 20 Chinamen from the sunken collier which had been attending on the Emden. Operations had thus to be discontinued at noon on November 11, but they began again at 6 p.m. and did not stop till 4.30 a.m. on November 12—a period of 10½ hours of continuous operating. The German surgeon stood at the table beside his English professional brethren and took his share of the work.

"All this time," Surgeon Darby concluded, "we had to organize and arrange a hospital with its equipment and the feeding and nursing of patients; up to now this was turned over to the first-aid and volunteer nursing party, and they received the cases straight from the theatre. In the case of the Germans we had a party told off from the prisoners to help our staff. We had two large wards, the wardroom and the waist deck, and various special wards, a few cabins being given up by officers. . . . By nightfall (November 12) one could look round with a feeling that some impression had been made on the work, and later that evening the German surgeon and myself went round sorting out the cases we could send off next day to the Empress of Russia, an armed liner which had been dispatched to help us with the wounded and relieve us of our 230 extra men. It would be difficult," added this gallant medical officer, "to imagine a more severe test for the medical staff of a cruiser." All credit then to those who faced the test and emerged from it triumphantly.

These two isolated actions show clearly of what splendid material our Naval Medical Service was constituted. Aboard ship the doctors combined with their professional knowledge a seaman's power of adapting himself to circumstances and of adapting circumstances to the need of the moment.

This spirit was shown again and again, but never more conspicuously than on board the Tiger during the North Sea action of January 24, 1915. The Tiger went into action on that day at 7.15 a.m., and at 9.3 the first shot was fired. Fleet Surgeon John R. Muir had originally intended to deal with the cases seriatim as they came to him, operating on each one at once; he soon found that this was an utopian idea. The violent concussion from a gun turret near by made operation an utter impossibility and necessitated the use of first-aid methods only. At 10.50 an urgent telephone message came down to the doctor from "Q" turret asking for a medical officer and an ambulance



AT THE DARDANELLES.
Admiral de Robeck inspecting sailors on board H.M.S. "Canopus."

party. The doctor, however, knew that it was impossible to handle men in stretchers through the working chambers and going on deck was not to be thought of. He refused the request and soon found he had done wisely. The wounded readily found their way to the dressing stations themselves.

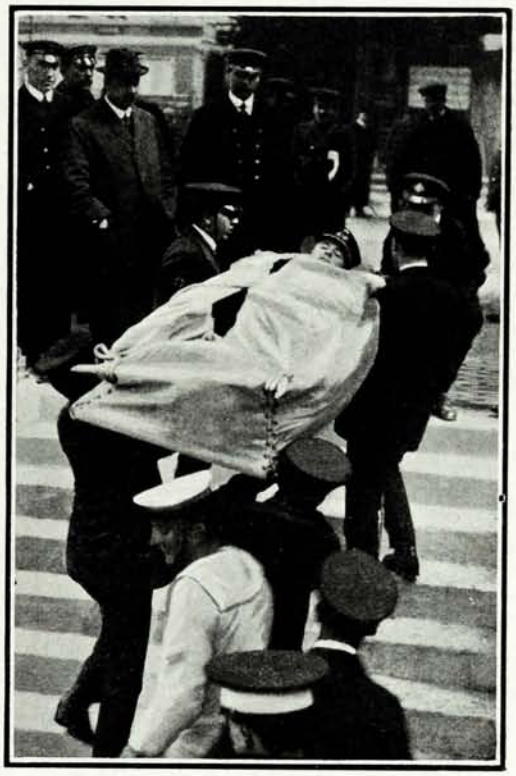
About 11.30 a 12 in. shell entered the distributing office on the upper deck. This shell was very destructive because it exploded upwards.

"It blew up the trap hatch in the roof of the distributing office," wrote Fleet Surgeon Muir ("Journal of the Royal Naval Medical Service"), "which communicated with the gun control tower, killed one officer who was standing on the hatch, seriously wounded another, and severely scorched the face of a third, all of whom were in the gun control tower. In its explosion in the distributing office it killed six men and wounded five men. In the port 6 in. gun control the same shell killed a boy and injured a midshipman and two boys.

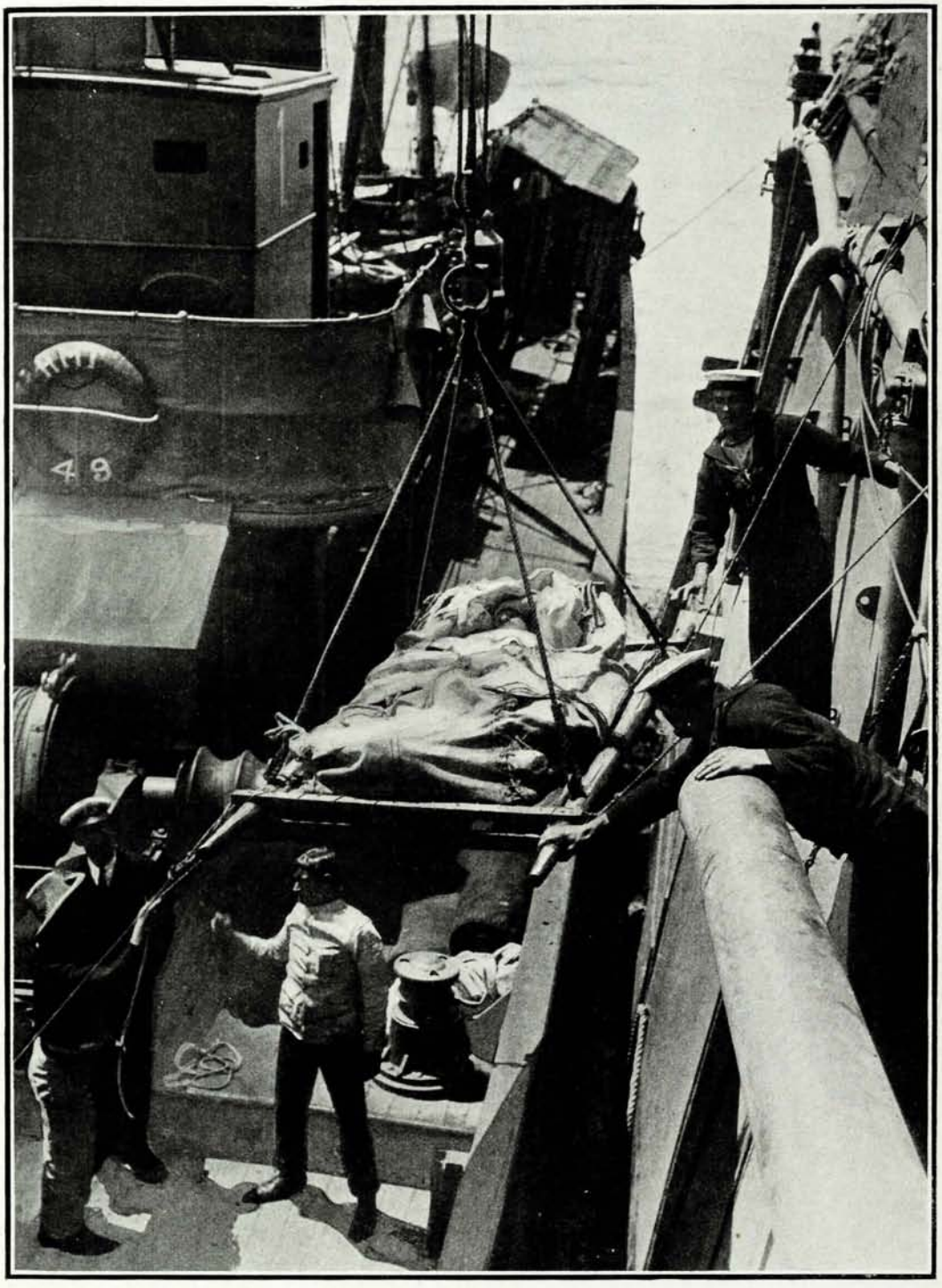
"An urgent telephone message was received from the gun control tower and an ambulance party was sent off in charge of a surgeon to see what could be done. This party had considerable difficulties, as the lights had all gone out, the alley way was wrecked and the escape up past the distributing office, which was the only possible route, was blown to bits and threatened by fire from the intelligence office, which was immediately below the distributing office. Thanks to the heroism and bravery displayed by a sick berth attendant and two boys all the cases mentioned except one, who was discovered after the action was over, were brought down to the forward distributing station.

"When they arrived seven were dead or expired as they were laid on the floor. The dead were laid on one side as decently and quickly as possible, covered with a flag, and the wounded attended to. . . . There was complete absence of moaning or complaints. The explosion of the shells caused a black, oily, sooty deposit in the skin of nearly all these patients. This was readily removed with turpentine, but nothing else seemed to have any effect. Soap and water and spirit were useless."

During the summer and autumn of 1915 the naval doctor had opened up to him a new field of operation in the Dardanelles. Throughout the Gallipoli campaign the naval medical service cooperated with that of the Army,



FROM THE DARDANELLES.
Wounded being landed from a hospital ship at Plymouth.



AT THE DARDANELLES.

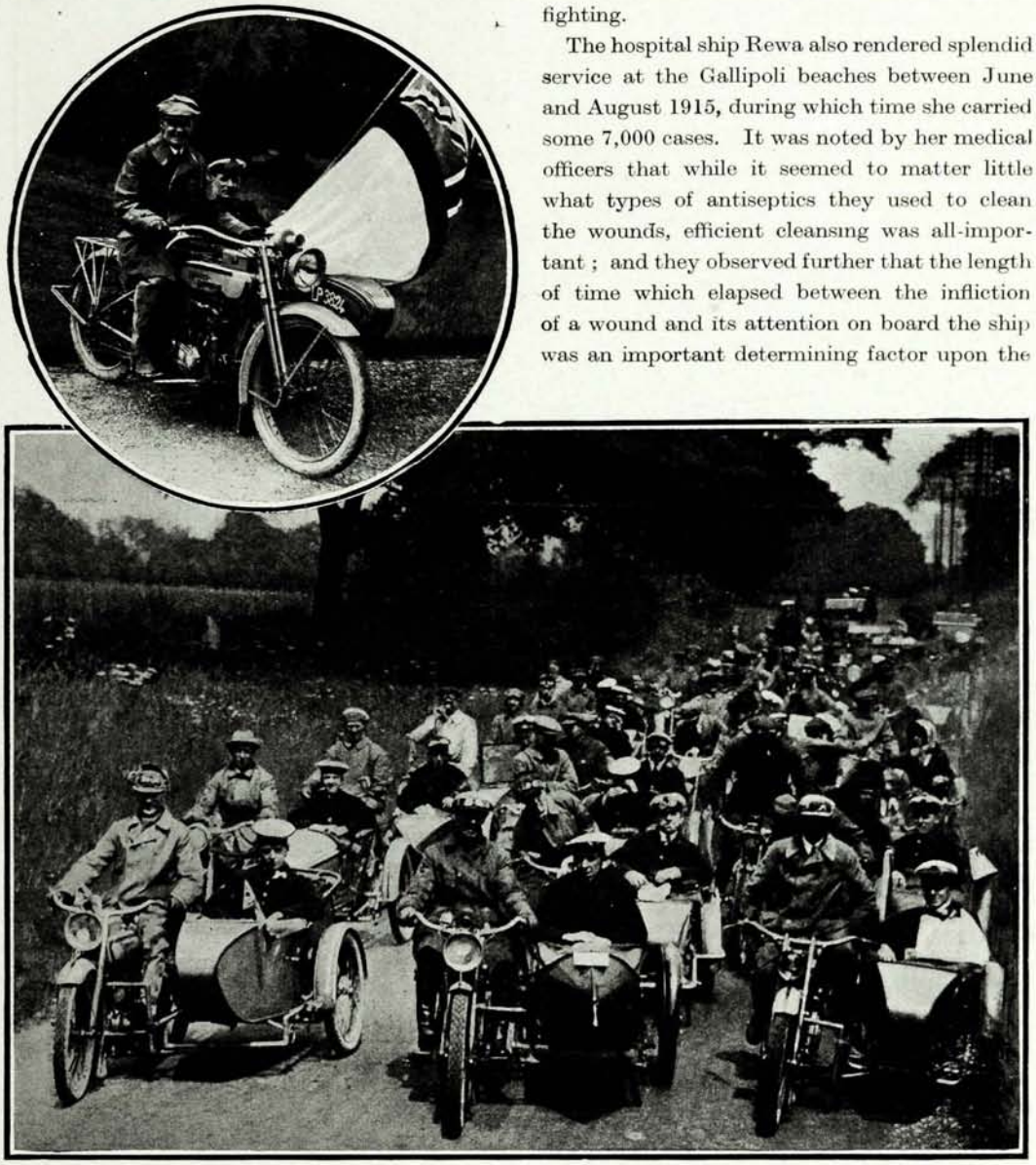
Transferring wounded from a British warship.

rendering most valuable assistance and, indeed, so far solving the difficulty of the transport of wounded from the shore as to convert a situation of grave anxiety into one of comparative security. Naval hospital ships were in attendance, and one of the largest of these was the Soudan, of which Fleet Surgeon Trevor Collingwood, R.N., was the Senior Medical Officer. On February 25 this ship arrived at Tenedos, and in the evening of the same day seven wounded were transferred to her from the Agamemnon, which showed signs of having been hit by a shell. The following day a party of men landed from the Vengeance

and the Irresistible and more wounded arrived. Other wounded came in, and then, on March 6, two flight officers fell from a considerable height into the sea and had to be succoured. Wounded were taken in from time to time until March 22, when the Soudan left for Malta and landed 113 cases. It is interesting to note that there were no cases of gangrene and only one case of tetanus, which resulted from shell wounds; this must be considered somewhat exceptional.

This first voyage of the hospital ship took place before the great landing on the beach, and it compares strangely with the second voyage, which ended on April 25, when the Soudan appeared again off the entrance to the Dardanelles. By the evening of that day no fewer than 10 military officers and 342 soldiers had been received; by 8 p.m. a total of 430 cases were aboard, and the ship drew off in order to allow the staff to work in quietness. They performed numerous operations, and then on April 27 all the wounded were transferred to a so-called "hospital carrier ship" and taken to Alexandria. Subsequently, in May, 411 Anzac soldiers were treated in five days. During this period only four naval wounded were received from the Amethyst, which had been under fire at Smyrna—a fact which emphasized once more the difference between sea and land fighting.

The hospital ship Rewa also rendered splendid service at the Gallipoli beaches between June and August 1915, during which time she carried some 7,000 cases. It was noted by her medical officers that while it seemed to matter little what types of antiseptics they used to clean the wounds, efficient cleansing was all-important; and they observed further that the length of time which elapsed between the infliction of a wound and its attention on board the ship was an important determining factor upon the



HEROES OF THE JUTLAND BANK BATTLE.
Wounded seamen enjoying a trip in Surrey.

result of treatment. The doctors had an interesting proof of their view, for they had cases sent to them from three different beaches, each one situated at a different distance from the ship than the others.

Hellas Beach provided by far the most septic type of case. The average time which elapsed between wounding and arrival on board was from 22 to 24 hours, some cases spending as long as three days on the journey. The reason lay in the distance of the front-line trenches from the beach and also the exposed character of the intervening territory. These patients too suffered much from insects and were hoisted aboard, in the words of the medical staff, "black with flies," and very soon after the first load or two had been received "the decks and wards are also black with flies." Many wounds were found on arrival to be already swarming with maggots. Gas gangrene came from this beach and from this beach only.

The best beach was the Anzac Beach, where the front line of trenches was near the shore, and the average time taken to put men on board after they had been wounded was five to six hours. Also the Anzac soldiers were very fine men physically; and the flies were fewer. Suvla came between Hellas and Anzac, the time here being between nine and ten hours.

This experience corresponded with the general experience of the war and made rapid evacuation of wounded a matter of paramount importance everywhere. It bore out the view stated by Sir Almroth Wright that it was not the wound which killed, but the dirt—bacteria and flies' eggs—introduced into the wound.

The experience, however, meant that when a batch of wounded arrived in this and other hospital ships the staffs had to work, literally, till they dropped. Every moment of delay meant so much more danger for the wounded—not merely so much more discomfort. Great as the tasks were which often faced these doctors, they did not spare themselves; in four trips they actually performed 383 operations of various kinds, and that number does not include a host of smaller measures: for example, easy removal of bullets. A number of interesting facts emerged from this huge body of work, not the least of which was that the men as a whole took anæsthetics exceedingly well. The reason was, perhaps, that alcohol had not been consumed in any quantity for a long time.

IN A SUBMARINE.
Men from the engine room enjoying the sunshine.

"Most text-books," wrote one of the doctors, "give tobacco as a reason for anæsthetic difficulties, but this did not seem to be the case, as smoking amongst all of them is quite heavy, especially cigarettes, and indeed a good proportion of them arrived on the table with a cigarette in their mouth."

Nursing sisters of the Queen Alexandra's R.N. Nursing Service rendered splendid help in these hospital ships which lay off the terrible Gallipoli beaches, and their task was no less onerous and exacting than that of the doctors. They did not spare themselves in any way, and an idea of what they had to do may be gathered from the following account written by one of them, Nursing Sister Hilda F. Chibnall ("Journal of the Royal Naval Medical Service"):

"Our chief difficulties are the endless struggles to get them (the patients) properly clean and decently clothed, to endeavour to combat the acute collapse, exhaustion, and mental shock from which many of them are suffering when they reach us—especially those from Hellas Beach, who have often been lying out for 24 or 36 hours without food, exposed to the sun and tormented with flies—and the hopelessness of trying to make comfortable the men who are wounded in so many different places that they can find no easy position in

which to rest. They all arrive on board in the clothes they have worn for many weeks or months; these are usually quite stiff with blood and sand, alive with vermin, and almost black with flies. . . . The dressings are done under some difficulty, especially in rough weather, and the most fortunate people are those who are slightly built and can easily squeeze between the cots; light wooden dressing tables have been made by the carpenter's crew, easily carried along the gangway but large enough to hold all that is necessary

"Work in the operating theatres is very different from anything we have ever seen before. . . . The patients have had no previous preparation. They are carried straight on to the table and their dirty blood-stained clothes have to be cut right off and the skin scrubbed clean before any actual surgery can begin.

"Owing to the tremendous number of dressings done in the ship each day we fir d that keeping up the stock is a very big item in our work. There is no time to cut up dressings when the ship is full of patients, but after landing them at a port on our return voyage to the Peninsula we all work hard to make up and sterilize sufficient dressings for the next trip. As our numbers are limited only one night sister can be on duty at a time, and with so many cases in the ship her task is not particularly easy. However, on one point we are all agreed—that we have never before nursed men who suffered so much and complained so little nor seen patients show so much unselfishness towards each other and gratitude to those who are nursing them."

These nursing sisters thus rendered noble service and took great risks, for it is the way of the Navy to discount danger in the discharge of duty and the hospital ships came very close to the Beaches. They were not attacked from the shore, for the Turk fought cleanly; but the presence of German submarines was an ever present danger, the German being a very different kind of opponent from the Turk. Moreover there was danger from the air. On one occasion the hospital ship Soudan, to the work of which reference has already been made, had a most unpleasant experience. Two trawlers were alongside taking away minor cases when a hostile aeroplane appeared overhead and dropped four bombs quite near the ship; two of the bombs indeed "straddled" her, throwing up fountains of water on explosion. There were no other ships near at the time and the Soudan was lying outside the temporary boom well away from the transports. On another occasion bombs from an aeroplane fell near this vessel and it was considered advisable to have two large red canvas crosses sewn on to the upper surface of the fore and aft awnings in the hope that they might be seen and respected.

It is impossible in this chapter to deal with the activities of the naval doctor in other spheres than those which have been indicated, but mention must be made in passing of the British Naval Mission to Serbia and of the heroic work accomplished during the epidemic of typhus which raged in that unhappy country. A very full report on this epidemic was presented by Temporary Surgeon Merewether, R.N., who saw it for himself and took part in the brave efforts to cope with it, thus incurring the gravest personal risk.

Mention must also be made of the work done by naval doctors in connexion with the Royal Naval Air Service. This work was exceedingly interesting because experience soon showed that a high measure of physical fitness was essential to a successful pilot and hence upon the doctor devolved the heavy responsibility of selecting or rejecting candidates for the service. Some curious conditions were also met with, not the least of these being "Aerosthenia," to use the word coined for it by Staff Surgeon Hardy Wells. It was found occasionally among aerial pupils; the pupil pilot was not comfortable in his flying; he had not got that self-confidence which was so necessary. He was perhaps too keenly apprehensive lest he might make a bad landing or might get an engine failure over bad landing ground and smash the machine. He went on flying, nevertheless, hoping that he might overcome this feeling. But he did not overcome it; instead he slept badly, worried, and eventually got into a really nervous state. It was found that there was only one thing to be done in those cases. The pupil had to give up flying; he was not suited for it. Men of proved courage sometimes suffered from this trouble, and the conclusion was that "it is not given to every man to fly; and to be left alone in the wide air-world with no one to consult is a strange feeling."

Height effects were another type of condition upon which the naval air service doctor had to keep a watchful eye. The trouble arose usually through too rapid a descent being

AFTER THE BATTLE OF JUTLAND BANK.
Wounded Heroes in a Hospital Ship.

made. In regard to the question of age, it was found that 30 was the highest limit advisable in selecting pilots. At first 23 was fixed as the lowest because it was feared that boys under that age would be reckless in their handling of the machines, but this rule was later relaxed, and indeed experience showed that lads of 18 and 19 are most excellent material and that very few of them were rejected subsequently owing to failure to show aptitude for flying.

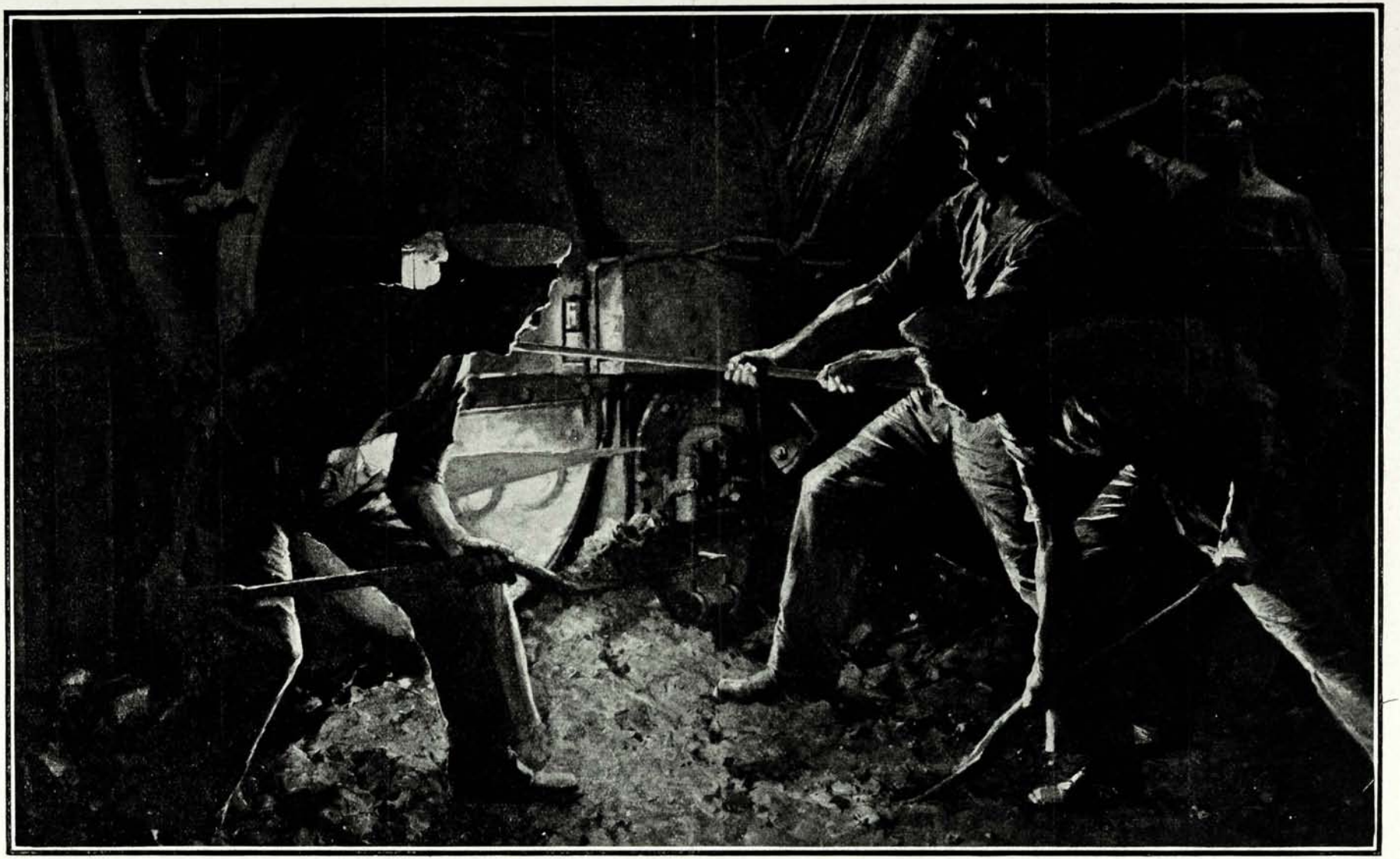
These many activities gave to the naval medical service a broad and catholic character, but the actual work upon the fighting ships remained the chief claim to honour. How supremely heroic that work was was not revealed until the terrible day of May 31, 1916, when the Battle of Jutland Bank, the greatest naval engagement in history, was joined.

It is clearly impossible to do full justice to the work of the naval doctors in this engagement, but quite enough material is available to justify unstinted admiration and to evoke heartfelt gratitude in every mind. In all the great traditions of the service no nobler record can be found than the record of the men who, in darkness and danger, laboured without thought of self or safety for the benefit of their friends and the honour of their uniform.

Of all the wonderful deeds of that great day perhaps those enacted upon the Warrior were the most wonderful. The Warrior belonged to Sir Robert Arbuthnot's squadron, and at 6.16 in the evening with the Defence was observed passing down between the engaged lines under a very heavy fire. The Defence, flying Rear-Admiral Arbuthnot's flag, disappeared and the Warrior passed to the rear disabled. They had only a short time before been observed in action with an enemy light cruiser which was subsequently seen to sink. The ships' companies of both the Defence and Black Prince were lost, but that of the Warrior was saved by the Engadine.

On the afternoon of May 31 the doctors of the Warrior were in their dressing stations making ready for the grim work ahead. After the first few minutes of the action, however, a terrible catastrophe occurred which in an instant cut down their effectives and threw upon those who survived a terrible new burden of responsibility. A shell crashed into the ship and destroyed utterly the after dressing station ; other shells followed, and finally a fire broke out resulting in many casualties.

As soon as possible, and while firing was still in progress, one of the surgeons went along the



AT WORK IN A STOKEHOLD IN A BATTLESHIP.

upper deck and the after part of the ship and rendered first aid, and in this he was assisted by the doctor in charge of the wrecked station, who had escaped miraculously. The wounded were carried along the decks from the scene of the disaster to the forward station, and this dangerous work was carried out in most efficient and speedy fashion.

Then, to add to the terrible character of the situation, the electric lights went out and gas and smoke began to fill the mess decks and especially the forward dressing station; and although candles and an electric torch had been provided it was very difficult to see owing to the dense smoke and consequent irritation of the eyes.

These various circumstances rendered the dressing station a kind of inferno. But courage and devotion discounted even so great troubles. As soon as the watertight doors, which shut off one part of the ship from the other parts, were opened, the doctors went forth again with their stretcher parties to collect wounded from the various parts of the ship and to carry them to the sick bay and forecastle mess deck, which were still intact. Mess tables were rapidly cleared away and the wounded brought to a place of comfort with all speed.

But down in the forward dressing station the conditions had meanwhile become so bad that the atmosphere was dangerous by reason of the gas and smoke in it. One of the doctors was actually "gassed," but soon recovered; on recovery he began his work again without a moment's delay or hesitation, for there was much work waiting to be accomplished.

When the wounded were collected all serious cases were placed in beds on deck and in cots in the sick bay. Some of the wounded died here, but none from bleeding, for efficient dressings had been applied. About 9.30 the Senior Medical Officer was ready to begin his operating work.

A bathroom forward of the sick bay was selected as an operating theatre. As soon as it was ready the surgeons set to work, for several men required their attention very badly. All through the long hours they toiled, knowing little or nothing of what passed upon the sea about them, of the position of their own ship, of the chances of personal safety; perhaps caring little; toiling with dogged perseverance towards the aim of bringing help and comfort to their fellow sailors.

The work went on without a break, and by the light of candles, till 4 a.m. of June 1, when all the wounded had been attended to and made comfortable. Indeed, at this time many of them were asleep. But the work was as yet only half done, for just as the surgeons completed their task orders came to abandon the ship; the Warrior, which was then being towed by the Engadine, was sinking.

It was well that this order came after a measure of comfort had been restored, and after the patients had recovered from the effects of the anæsthetics administered to them, for there was a heavy sea running and the ship was moving restlessly as she went to her doom. Fierce was the ordeal awaiting the doctors, who must transfer their thirty-one patients in that maelstrom.

Yet the task was carried out, in spite of the sea and the rolling and plunging ships. Life-belts were put on the patients and in cots, stretchers, and sick-bay iron cots they were moved from one vessel to the other. All watertight rooms were then rapidly closed. The Warrior by this time was very low in the water, and might sink at any moment; numerous seas swept the upper deck as she lay secured to the Engadine. It was difficult work to prevent the wounded from being soaked through. The stretchers and cots were held up by men, walking on either side of them; but the movements of the ships rendered this task exceedingly dangerous and difficult, and unfortunately one man fell overboard owing to the breaking of a stretcher. He was, however, rescued by an officer of the Engadine, but subsequently died. The heroic character of that rescue between the bumping, plunging ships may be left to the imagination.

The injuries received by members of the Warrior's crew were of the most terrible kind. Several bodies were rent in pieces; many limbs were torn from bodies; some men were stripped naked. Among the operations performed by the light of the guttering candles, upon a sinking ship in a gale of wind, were amputations, ligaturing of bleeding vessels, and removal of shell splinters.

Magnificent as was this conduct, it was typical of that prevailing throughout the whole fleet; indeed on such a night of heroes discrimination between gallant deeds was almost impossible. Nevertheless a few other cases may be mentioned in order to show how universal was the response to duty by the medical service. In the Lion, for example,

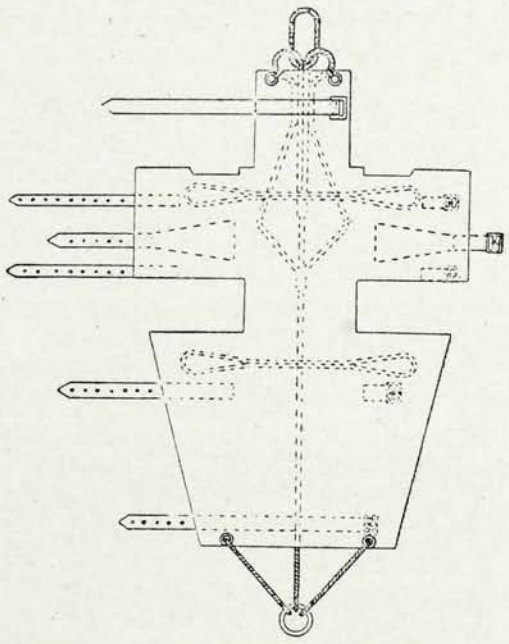
the trouble from gas fumes was experienced just as it had been on the Warrior. Respirators and anti-gas goggles were issued to each turret, compartment and mess deck As a result of this precaution no case of "gassing" occurred. Nearly all the casualties occurred within the first half-hour of action. During the first lull the medical officers emerged from their stations to make a tour of inspection. The scenes that greeted them beggar description. Most of the wounded, however, had already been dressed temporarily. Tourniquets had been applied in one or two cases, and hæmorrhage thus arrested. But many of the wounded were terribly mutilated and broken.

Happily in this ship the light did not go out—though precaution against this eventuality had been taken—and so it was possible to get to work in comparatively good conditions. As usual, morphia was administered at once, and acted like a charm, relieving the terrible sufferings of the stricken men.

Thrice during the evening the battle was renewed so far as this ship was concerned, but as each lull came it was found possible to remove the wounded to a place of safety by means of the admirable Neil Robertson stretcher (devised in 1910 by the late Fleet Surgeon Neil Robertson, R.N.) which proved so great an addition to the equipment of the naval doctor.

After the action was over the injured were nursed carefully throughout the night, and were supplied with warm blankets, hot-water bottles and hot beef-tea and medical comforts. Some of the men were terribly burned and others mutilated, so that all hope of saving life was vain.

The burns, as has already been indicated, were of two kinds, both of which were seen in large numbers in the Jutland battle—burns from exploded gun-charges and burns from bursting shells. The former type were occasioned when an enemy shell managed to ignite some of our explosives in gun turrets. In these cases the bodies of the unhappy victims were often charred instantly so that they resembled mummies; it was an instantaneous process of death, and but rarely cases of this kind concerned the surgeon. The other type of burn was due to a shell bursting near the victim, and often involved large areas of his skin. It was, however, a superficial burn and very amenable to treatment. Various forms of treatment were employed, but probably that by picric



THE NEIL ROBERTSON HAMMOCK STRETCHER.

acid was the most successful. The objection to picric acid, however, was that it adhered, rendering dressing difficult and painful. So a trial was given to the method of using liquid paraffin, recommended by Dr. Sandfort, Médecin-Major in the French Army. The preparation was used at a high temperature; it solidified and formed a coating which excluded the air, stopped pain in ten to fifteen minutes, and afforded painless redressings.

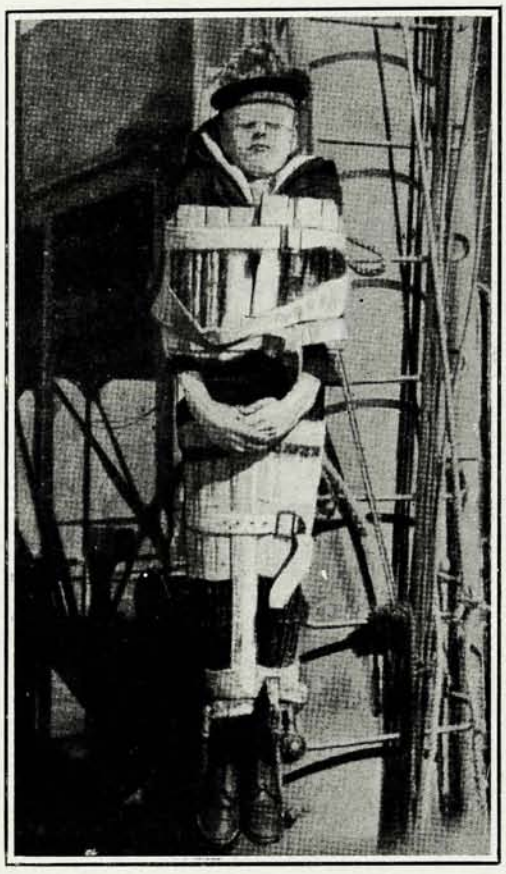
Not until 7.30 a.m. on June 1 was it thought safe to bring the Lion's wounded up from below. The Vice-Admiral's and Captain's cabins were accordingly cleaned, dried, and thoroughly ventilated, a process which occupied a considerable time as they were both full of water and smoke, and the Captain's bathroom was rigged up as an operating theatre. By 8.45 a.m. operations began, and 51 cases were dealt with. Almost 50 per cent. of these cases had burns of the face and hands alone, the reason being that the clothing completely protected the rest of the body against the momentary flash of the bursting shells. The staff worked continuously in the operating theatre till 12.15 a.m. on June 2—some 16 hours—when all the wounded had been attended to.

"The cheerfulness and pluck of the wounded," an observer stated, "were simply magnificent. Content to be alive, they waited to be dressed with a silent patience admired by all. In every case we found that the wounds were

far more severe than we had been led to anticipate by the attitude of the patient."

This heroic attitude was commented upon by all the doctors; one of them also told how on glancing over the side of the ship when going into action he saw a raft crowded with "sailor-men" from one of the sunken vessels. As the raft floated by the men gave three lusty cheers, and then began to sing "Keep the Home Fires Burning" until the battleship was out of earshot.

These terrible series of operations, coming upon the top of the fierce strain of action, were



THE NEIL ROBERTSON STRETCHER IN TOPS.

the doctor's most severe test. On some of the light cruisers 10 and 11 hours were spent by the surgeon in disposing of the mass of work awaiting him; during this period there was no pause, a new case being hurried on to the table as soon as the case just finished with had been removed. Nor was this a mere mechanical exercise. The doctor had to exercise judgment upon matters affecting the whole future life of young men in their prime. Upon the answer to the question, Must this limb be amputated at once or can it be saved? depended often the issues of life and death.

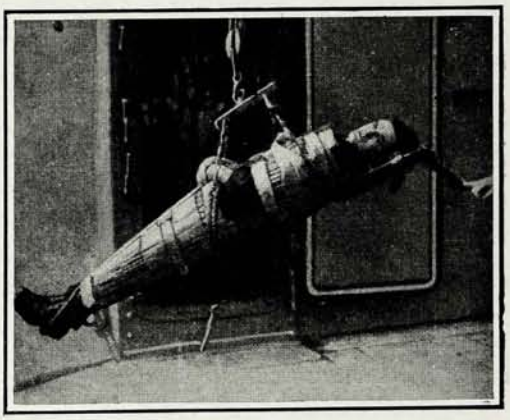
It is, indeed, remarkable that these men were able to carry out their work with so great success, and the value of a piece of advice given to his colleagues by one of the surgeons who bore the brunt of the action is obvious:

"It is necessary," he declared, "that every Naval Medical Officer should keep himself physically fit, as the strain of a prolonged night action is severe."

It was found that hospital ships could hope to play but a small part in a great naval battle, for those ships which had most wounded aboard were necessarily those which had been most severely handled. Those ships were forced in some cases to return quickly to their bases and there was no time to unload wounded, nor, indeed, any necessity since they could be unloaded in much greater comfort in port. Nevertheless, many incidents of the Jutland fight pointed to the conclusion that "rescue ships" might fulfil a useful purpose by picking up men out of the water and restoring them. In the heat of action fighting vessels could not, of course, undertake this work.

The true sphere of the hospital ship, as has already been indicated, was found to lie between the anchorages of the Grand Fleet and the home ports. Many ingenious devices were in use for conveying the wounded from the battleship to the hospital ship (several of which are illustrated in the present chapter). The hospital ships performed splendid service, and to their good equipment and excellent organization it was due that the horrors of the great fight were not prolonged an hour more than was necessary.

Of the men themselves, the doctors, little



THE NEIL ROBERTSON STRETCHER IN STOKEHOLDS.

requires to be said. Their work, indeed, revealed them and was their true mirror. No less was it the mirror of the staffs who co-operated with them, the sick berth stewards, the cooks, the firemen. Nor must the surgeon probationers be passed without mention. Medical students, they showed again and again superb qualities of courage and endurance and much more than justified those who had tried the experiment of appointing them. Finally, the Admiralty surgeons and agents, civil practitioners appointed at most large and small ports round the British Isles, rendered valuable service, one of them treating no fewer than 43 wounded from the Battle of Jutland Bank. There were some 1,122 medical officers serving in the British Navy, including 528 entered for temporary service; and in addition there were 370 surgeon probationers who held the relative rank of Sub-Lieutenant R.N.V.R.

In the list of naval honours appended to Sir John Jellicoe's dispatch on the Battle of Jutland Bank the doctors were well represented. Fleet Surgeon Alexander Maclean was recommended for promotion because of his gallant conduct when "the medical staff was seriously depleted by casualties, and the wounded and dying had to be dressed under very difficult conditions on the mess deck, which was flooded with a foot of water from damaged fire mains." Fleet Surgeon Penfold, though knocked down by a bursting shell and severely bruised and shaken, went on with his work "for forty hours without rest." He also was recommended. Surgeon Quine, R.N.V.R., received mention because of his "assiduous care of and attention to the wounded, of whom he was in sole charge for over forty hours," the Staff Surgeon having been severely wounded. Staff Surgeon Bickford had actually to be ordered to place himself on the sick list, and his superior officer declared of him that "though severely wounded by a shell splinter, he persisted in attending to the wounded, only yielding to a direct order from myself." A surgeon probationer who amputated a leg in the dark also received honourable mention.

These cases, as will be evident from what has been said, represent the hundreds of others of which no record has been preserved; they show that from top to bottom the Royal Naval Medical Service, like the Royal Navy itself, was sound, a splendid organization with splendid traditions of service, and with a sense of duty and of honour which was stronger than death. This grand body of men placed England in its debt a hundred times; to its Chief, Sir Arthur May, and his staff, the Empire likewise owed her thanks. Upon these men devolved indeed a heavy responsibility. They were the guardians of the guardians of the Empire; day and night their vigil continued, for to their hands had been entrusted the health, the well-being and the happiness, and so the efficiency, of the Royal Navy during the years of its supreme trial.

ON BOARD A PATROL SHIP.