

FIG. 9.



Showing the depression of the chest and roundness of the back in the felt jacket.

FIG. 10.



Showing the effect rapidly produced by the adaptable metal splint

adverse circumstances a deformity can be stopped from increasing and relief given to the patient's suffering.

With regard to the plastic felt jackets which are so commonly used in the present day when a support is required, I would remark that they are not satisfactory in their mode of action; they press on the chest, but do little towards holding back the shoulders; they interfere with the use of the muscles, they interfere with the evaporation of perspiration, and they fail to give efficient support. The following figures show the ineffectiveness of the ordinary felt jacket in controlling the position of the spine and the immediate effect of applying the adaptable metal splint.

The metal splint has the following advantages: 1. It leaves room for action of the muscles. 2. It develops the chest and does not press upon it. 3. It prevents the spine from subsiding into bad positions. 4. It forms a fixed basis from which to apply pressure upon lateral curves. 5. It enables the surgeon to see the effect upon the spine while the apparatus is *in situ*. 6. It is made of steel, the lightest material for the purpose, which is so tempered that it can be bent into any form by the surgeon himself. 7. It is comparatively light and is so helpful to the patient that a weak child can do more with it on than without it. It may be accepted as an axiom that whatever position the spine is held in by means of the adaptable metal splint that position will in time become permanent.

NOTE ON THE WOUNDED IN THE NAVAL BATTLES BETWEEN JAPAN AND CHINA DURING 1894-95, WITH SOME CONSIDERATIONS OF SANITARY CONDITIONS PREVAILING DURING THE WAR.¹

BY S. SUZUKI, M.R.C.S. ENG., L.R.C.P. LOND.,
FLEET-SURGEON, IMPERIAL JAPANESE NAVY.

IN the Japan-China war during 1894 and 1895 the naval battles at Phung-do and Yalu, the attacks upon Tangchow, Wei-hai-wei, and the Pescadores were the principal engagements; the bombardments of Hwa-yuan-kow, Talien Bay, Port Arthur, Yingching Bay, and Keelung, Takau, and Anping in Formosa are also reckoned as sea-fights of importance. The naval battle of Phung-do on July 25th, 1894, was fought between the *Yoshino*, *Naniwa*, and *Akitsuushima*, forming the first flying squadron of Japan, on one side, and the *Tsi Yuen*, *Kwang-yi*, and *Tsao-kiang* of the Chinese fleet, on the other side, the *Yoshino* receiving two shells in her side and the *Naniwa* receiving one, also in her side; but no material damage was done, neither was any one killed or wounded. From other cause, however, three persons on board the *Yoshino* had their membrana tympani perforated, and three on the *Naniwa* were slightly injured by burns. Attacks upon Tangchow were made by the Japanese warships on three occasions; firstly by the *Yoshino*, *Naniwa*, and *Akitsuushima* on Jan. 18th and 19th, 1895; secondly by the *Tenryu* and *Kaimon* of the Third Flying Squadron, on Jan. 26th; lastly, by the *Tenryu*, *Yamato*, and *Musashi* of the above squadron on Feb. 21st. The forts on Tangchow replied to our attacks with volleys from their heavier or lighter guns. Though the *Kaimon* received two shells in her side there was no actual damage to our squadron and no case of killed or injured. The attack upon the forts on the Pescadores occurred on March 23rd, 1895; the Japanese combined squadrons, composed of the *Matsushima*, *Itsukushima*, *Hashidate*, *Naniwa*, *Takachiho*, and *Akitsuushima* leading the transports carrying a mixed detachment, subjected the Kon-peh-tai fort to a fierce bombardment. The Chinese garrison replying to this with volleys from their heavy guns, the engagement continued for five hours. But no shell struck our warships and the guns on the Fort were silenced after having been nearly destroyed. During this engagement the mixed detachment landed on Li-sei-kakû and marched to the interior. At dawn the next morning each war-ship ordered a landing

¹ A paper read before the Twelfth International Medical Congress held at Moscow Aug. 19, to 26th, 1897.

party to advance as a reinforcement to the army. On March 25th the whole of the islands surrendered to the Japanese. During the course of the fighting only one person on the *Nanima* was wounded receiving a fracture of the lower jaw and a lacerated wound of the neck from the deliberate aim of the enemy. He was immediately treated by a surgeon belonging to the landing party and afterwards sent back to the naval hospital of the Port Admiralty at home, where he quite recovered, a deformity of the lower jaw being left. In regard to the above-mentioned battles there were no actual damages on our side as I have already narrated, I shall therefore only give the surgical statistics of deaths and injuries resulting from the Battle of Yalu, and the attack on Wei-hai-wei with a general review of sanitary conditions. When the "History of the Health of the Imperial Japanese Navy in Relation to the Japan-China War," which is now being compiled, is published we shall be able to see the details of the sanitary conditions during the war.

THE BATTLE OF YALU.

It was on Sept. 17th, 1894, that the Japanese combined squadrons, composed of the Principal Squadron, which comprised the *Matsushima*, *Itsukushima*, *Hashidate*, *Fuso*, *Chiyoda*, and *Hiyei*; the First Flying Squadron, which comprised the *Yoshino*, *Nanima*, *Takachiho*, and *Akitsuishima*, and the gunboat *Akagi* with the ex-merchant steamer, *Saikyomaru*, transformed into a cruiser for the time being, fought on the Yellow Sea with the Chinese fleet, consisting of the *Ting Yuen*, *Chen Yuen*, *King Yuen*, *Lai Yuen*, *Ching Yuen*, *Chih Yuen*, *Ping Yuen*, *Tsi Yuen*, *Yang Wei*, *Chao Yang*, *Kwang Chia*, *Kwang Ping*, and two torpedo boats. The great battle was commenced at 12.50 P.M. and closed at 5.30 P.M. Our warships received more than one hundred shells in various parts and the number of persons killed or injured amounted to 298. The tables which follow give the details for the number of persons killed or injured in this battle. The highest numbers of killed or injured were on board the following vessels: (1) the *Matsushima*, (2) *Hiyei*, (3) *Itsukushima*, and (4) *Akagi*, &c.; but if we consider the ratio of killed or injured we find the numerical order to be as follows—viz.: (1) the *Matsushima*, (2) *Akagi*, and (3) *Hiyei*, with the *Saikyomaru*, *Itsukushima*, *Akitsuishima*, *Fuso*, *Hashidate*, *Yoshino*, *Takachiho*, *Nanima*, &c. From the fact that the numbers of killed or injured on board the *Matsushima*, *Akagi*, and *Hiyei* were especially numerous it is easy to imagine what an important part these three warships played in the action. Comparing the number of killed or injured according to their rank, the most numerous are seamen, being 57.38 per cent.; next come petty officers and officers, with 16.44 per cent. and 10.07 per cent. respectively; the lowest are the civilians, with 2.35 per cent.; while the other non-combatants account for 6.38 per cent. in each class. As the number of persons in each rank differs much it is difficult to estimate the real ratio from the above percentages. The percentage-ratio of killed or injured to the number of persons engaged, however, shows little difference between the different ranks, except that the non-combatants indicate the maximum, while the stokers and blacksmiths represent the minimum. In all engagements on land the infantry had always more killed or injured than the artillery, engineers, and sanitary corps, because the former approach nearer to the enemy than the latter. In sea-fights, however, any person above the water line of a warship may be easily injured by the enemy's shells irrespectively of his work; thus seamen who are exposed on barbettes to the discharge of shells, or non-combatants working on the main deck—in fact, all those who are working above water line—are equally liable to be killed or wounded. As our ships were not perforated by any shell below the water line during this war those who were working below it were safe; the natural result is, therefore, that the number of persons killed or injured belonging to the engineering class, who were always working below the water level, is the smallest. On board the *Itsukushima* five persons of the engineering class were killed or injured at one time owing to the explosion of a 15-centimetre shell, which perforated a starboard coal bunker in midships 3 ft. above the water line and crushed a ladder in the boiler-room of the afterpart.

The number of killed or injured includes those who were injured by the vibration of air caused by the firing of their own guns—viz., five men on board the *Itsukushima*, one on the *Hashidate*, one on the *Yoshino*, two on the *Nanima*, and one on the *Takachiho*. It is not proper to make calculations

based on an inclusion of persons killed or injured in this way. Therefore, subtracting these cases from the number of killed or injured the following ratio is found—that is, the *Itsukushima*, 3.3 per shell; the *Hashidate*, 1.1 per shell; the *Yoshino*, 1.4 per shell; the *Nanima*, 0.0 per shell; and the *Takachiho*, 0.4 per shell. The order arranged according to the magnitude of ratio of the number of killed or injured to the number of shell hits is as follows: the *Matsushima*, *Akitsuishima*, *Itsukushima*, *Hiyei*, *Fuso*, *Yoshino*, *Hashidate*, *Akagi*, *Saikyomaru*, and *Takachiho*. On board the *Nanima* and *Chiyoda* there was no case of killed or injured by the shells of the enemy. The order simply calculated according to the magnitude of the number of shell hits is *Akagi*, *Hiyei*, *Saikyomaru*, *Hashidate*, *Fuso*, *Nanima*, *Matsushima*, *Itsukushima*, *Takachiho*, *Akitsuishima*, *Chiyoda*, and *Yoshino*. But the number of killed or injured is not necessarily proportionate to that of shell hits. Of shell hits, some were from heavier and some from lighter guns; some burst and others did not burst; while others were only pieces of shells. Thus the degree of damage is different according to the kinds of shells or the result of bursting. When the shells burst the damage was always greatest, the *Matsushima* having 30 persons killed at one time and 70 persons injured (half of these owing to the explosion of gunpowder itself) by a 30.0 centimetre shell, the *Hiyei* 14 persons killed and 27 persons injured by a well-directed shell of the same kind, the *Itsukushima* 8 persons killed and 3 persons injured by a 21 centimetre shell, and the *Akitsuishima* 5 persons killed and 9 injured by the same kind of shell. On board the *Itsukushima* 4 persons were killed and 6 persons injured by the bursting of even small shells of 50 millimetres. Though the *Saikyomaru* was hit with 30.5 centimetre shells on her side and the *Chiyoda* with 21 centimetre shells in the same part, yet little damage was done, because the shell only perforated the ships' sides without bursting. Quoting one more example: in the naval battle of Phung-do a 15 centimetre shell hit the *Yoshino's* deck-house and passed down to her engine-room rolling about there around the men, but it did not burst fortunately, so no one was killed or injured. Thus we may see how much the number of casualties depends on whether the shells burst or not. The reason why the number of exploded shells is not proportionate to the number of killed or injured is conditional upon circumstances; for example, if there was no one near the place where the shell burst there was no case of killed or injured, but when the opposite was the case the result was a great number of casualties. It must be remembered that, moreover, fragments of ships' planks, &c., or "indirect-shot" gave heavy damage to our ships. For example, the funnel of the *Fuso* having been perforated by a shell the fragments of it dispersed around and either killed or injured ten seamen. The bursting of the shell of the *Hiyei* either killed or injured forty-one seamen; of this number more than ten men were either killed or injured by the indirect shot.

TABLE I.—The Seat of Injuries.*

Seat of injury.	Number of killed or injured.	Ratio of seat of injury according to number of killed or injured.
Greater part of the body	57	19.13
Various parts of the body	24	8.05
Head	66	21.15
Neck	7	2.35
Chest and back	19	6.38
Abdomen and lumbar region	25	8.39
Upper extremity	55	18.46
Lower extremity	45	15.10
Total and ratio	298	99.01

* As most persons injured had several wounds the above table classifies according to the severity of the wounds. But it is impossible to classify the complete destruction of the body and extensive burns as one particular part of the body. These fatal injuries are analysed in Table III.

Of the total number of 298 killed or injured the part of the body most liable to be wounded is shown in Table I. thus. The number of head wounds was the greatest, the ratio being 21.15 per cent. of the total number. Next in

order came the wounds of the greater part of the body, of the upper limbs, of the lower limbs, of the abdomen and lumbar region, of the various parts of the body, and of the chest and back, while the fewest injuries were in the neck. Leaving out the number of wounds of the greater part of the body and the various parts of the body from the total number, the number of wounds of the head stands first, followed in order by those in the extremities, the abdomen and lumbar region, the chest and back, the last and fewest being those of the neck. In a land-fight the number of wounds of the lower extremity is commonly greatest and that of the upper extremity and head next; then come the chest and back, abdomen and lumbar region, and the neck wounds are the fewest. Now, comparing the number of wounds received in a land-fight with those received in a sea-fight it is found that they are almost identical. The only marked difference between them is that in the former case the greatest number of wounds received are those of both extremities, the head wounds coming next, while in the latter case the head wounds are the most numerous, and those of both extremities come next. This difference is but natural, because in land-fights soldiers are injured only by shells and bullets (though there are some exceptions), but in sea-fights all materials around the combatants, as ship's planks and rigging, &c., being blown to pieces by the bursting of shells, increase the causes of injury.

TABLE II.—Result of Various Injuries.

Seat of injury.	Killed at once.		Died.		Recovered.*		Totals.
	No.	Per cent.	No.	Per cent.	No.	Per cent.	
Greater part of the body... ..	34	59.65	21	36.84	2	3.51	57
Various parts of the body	—	—	—	—	24	100.00	24
Head	22	53.66	3	7.32	16	39.02	41
Face... ..	—	—	—	—	25	100.00	25
Neck... ..	3	42.86	1	14.29	3	42.86	7
Chest and back	6	33.33	1	5.56	11	61.11	18
Abdomen and lumbar region... ..	16	64.00	3	12.00	6	24.00	25
Spinal column and spinal cord	—	—	—	—	1	100.00	1
Upper extremity... ..	—	—	1†	1.82	54	98.18	55
Lower extremity... ..	9	20.00	3	6.67	33	73.33	45
Totals	90	30.20	33	11.07	175	58.72	298

* Including invalided.

† Died from erysipelas.

By Table II. it will be seen that the greatest number of immediate deaths, or deaths shortly supervening, occurred from injuries under the title of injuries to the greater part of the body. This is a natural result, because the destruction of the body by burns which extended over one-third of the body are included in this column. The sum total, viz., 57 cases in this column (with the exception of 2 cases of burns over one-third of the body), terminated in death. The numerical order of immediate death or death shortly supervening is as follows: of the head, the lumbar region and abdomen, the lower extremity, the chest and back, the neck, and the upper extremity. Under the headings of the various parts of the body, the face, spinal region and spinal cord, there were no deaths, but under the headings of chest and back, abdomen and lumbar region and lower limbs, the number of immediate deaths is comparatively great, because, unlike wounds perforated by rifles, the greater part of the body was crushed or destroyed or the viscera and the large blood-vessels were destroyed by the pieces of shell. As the wounds were so severe some died a few minutes after the injuries received, none surviving more than four days. The details will be found in Table III.

These deaths took place before admission to hospital. I will now say a few words about those who died after admission to hospital. 1. Of three persons who were burned over one-half of the body two died three days after admission and six days after receiving the injury, and the third nine days after admission and twelve days after the injury, the mode of death being by coma in each case. 2. One person whose skull was penetrated by a fragment of a shell above the right frontal eminence followed by symptoms of

compression of the brain died from coma, notwithstanding trephining fifty-three days after admission to hospital and fifty-six days after the injury. 3. Of two persons who received a penetrating wound of the abdomen the ribs of the one were fractured by the fragment of a shell which passed through the left false rib and penetrated the thoracic and abdominal cavity crushing the abdominal viscera; when admitted to hospital peritonitis

TABLE III.—Analysis of the Injuries Resulting in Death.*

Nature of injury.	Killed at once.	Died.		—
		Before admission.	After admission.	
Complete destruction of the body	32	—	—	32
Burns of greater part of the body... ..	2	18	3	23
Mutilation of head	11	—	—	11
Compound fracture of skull	3	2	—	5
Penetrating wound of skull	7	—	1	8
Perforated wound of skull	1	—	—	1
Lacerated wound of neck... ..	1	—	—	1
Penetrating wound of neck	2	—	—	2
Perforated wound of neck	—	1	—	1
Penetrating wound of chest	—	1	—	1
Perforated wound of chest	4	—	—	4
Lacerated wound of chest	2	—	—	2
Penetrating wound of abdomen	1	—	2	3
Perforated wound of abdomen	4	—	—	4
Destruction of abdominal wall	3	—	—	3
Lacerated wound of abdomen	4	—	—	4
Perforated wound of lumbar region	3	—	—	3
Compound fracture of pelvis... ..	1	—	1	2
Compound fracture of upper extremity	—	—	1	1
Compound fracture of lower extremity	4	1	1	6
Mutilation of lower extremity	5	1	—	6
Total... ..	90	24	9	123

* Except two the whole number of complete destruction of the body belonged to the *Matsushima*. Though this number was returned by the surgeon on board we believe there may be included in it some who were thrown out into the sea by explosion of ammunition and lost their lives.

had already commenced, making his condition unfit to undergo laparotomy, and he died from exhaustion five days after admission and nine days after injury. The other one received a penetrating wound of the left umbilical region from a fragment of shell injuring the intestinal canal at several points; the intestinal contents passed out into the abdominal cavity causing peritonitis, and he died from exhaustion thirty-eight days after admission and forty-one days after injury. 4. One person had a compound fracture of the lumbar region from the fragments of the planks of the ship penetrating the sacro-iliac joints into the pelvic cavity and rupturing the bladder; he died from exhaustion thirteen days after admission and seventeen days after the injury. 5. One person, who had severe compound fracture of the right scapula and humerus, nearly recovered after admission, but unfortunately was attacked with erysipelas six months after and died within a fortnight after the complication, the whole course of illness lasting 179 days after admission and 181 days after injury. 6. One person had a compound fracture of the right thigh by a shell, destroying the thigh bone below the great trochanter, severing the soft tissues, and rendering it hopeless to attempt conservative treatment, so amputation at the upper part of the thigh was performed, but he died from exhaustion complicated with traumatic delirium twelve days after admission and fifteen days after injury.

All injuries, except the cases of gangrene resulting from injuries of blood-vessels in compound fractures and wounds of joints, were treated with antiseptic precautions and as a consequence no infectious diseases of wounds occurred except in one person, who died from erysipelas.

KILLED OR INJURED DURING THE ATTACK UPON WEI-HAI-WEI.

After Jan. 30th, 1895, our combined squadron and torpedo flotillas moved against Wei-hai-wei with a strong force. The enemy's forts, coöperating with their squadron in the port, defended themselves to the utmost; but they were no match for the furious attacks of our squadron or the bold attack of our torpedo flotillas, and the bombardment from the captured forts at last led to the surrender of the enemy on Feb. 12th. In this battle our war-ships received twenty-eight shells, and sixty-six persons were killed or injured. (Tables IV., V., and VI. show the details.) Forty-six shells which struck above ships were discharged from the forts of Jih and Liukung Islands. While our landing party on the captured battery of Lau-cha-tsao at Wei-hai-wei was bombarding the enemy's warships which were anchored in the port the party received a 30.5 centimetre shell discharged from the *Ting Yuen* and the two shells discharged from the *Tsi Yuen*, by which seven men were either killed or injured. During the attack by our torpedo flotillas on Feb. 5th No. 9 boat received thirteen shells from the enemy, and as one of them struck the boiler of the boat eight persons were scalded. During the next day's attack No. 22 struck against a reef below the Lung-miao-tsai Fort on her way to the anchorage. At this critical moment two persons on the boat jumped into the sea, hoping to reach the shore by swimming, but the extreme cold prevented their bodily motion and they were drowned. Three of the others tried to reach the shore in a canvas boat, but on their way the boat was upset and one man died from the extreme cold; the other two, though suffering from severe frost-bite, reached the shore by swimming.

TABLE IV.—The Seat of Injuries.

Seat of injury.	Number of killed or injured.	Ratio of seat of injury according to number of killed or injured.
*Greater part of the body ...	12	18.2
†Various parts of the body...	3	4.5
Head ...	15	22.7
Neck ...	—	—
Chest and back ...	3	4.5
Abdomen and lumbar region ...	6	8.1
Upper extremity ...	8	12.1
Lower extremity ...	19	28.8
Total and ratio...	66	99.9

* Under this heading "Greater part of the body" six cases of scalds, two of frostbite, one of laceration of the trunk, and three by drowning are reckoned.
† Under this heading "Various parts of the body" a case of scald of the face, upper and lower extremities, and two cases of contused wound of the face, upper and lower extremities, are reckoned.

TABLE V.—Result of Various Injuries.

Seat of injury.	Killed at once.		Died.		Recovered.*		Totals.
	No.	Per cent.	No.	Per cent.	No.	Per cent.	
Greater part of the body ...	8	66.67	3	25.00	1	8.33	12
Various parts of the body ...	—	—	—	—	3	100.00	3
Head ...	6	75.00	1	12.50	1	12.50	8
Face ...	—	—	—	—	7	100.00	7
Neck...	—	—	—	—	—	—	—
Chest and back ...	2	66.67	—	—	1	33.33	3
Abdomen and lumbar region...	4	66.67	1	16.67	1	16.67	6
Spinal column and spinal cord	—	—	—	—	—	—	—
Upper extremity ...	—	—	—	—	8	100.00	8
Lower extremity...	—	—	2	10.53	17	89.47	19
Totals ...	20	30.30	7	10.61	39	59.09	66

* Including invalided.

TABLE VI.—Analysis of the Injuries resulting in Death.

Name of injury.	Killed at once.	Died.		—
		Before admission.	After admission.	
Destruction of head ...	1	—	—	1
Compound fracture of skull ...	5	1	—	6
Complete laceration of trunk ...	1	—	—	1
Perforated wound of chest ...	2	—	—	2
Perforated wound of abdomen ...	1	1	—	2
Complete laceration of abdominal region ...	3	—	—	3
Mutilation of both thighs ...	—	1	—	1
Mutilation of legs ...	—	1	—	6
Scald of whole body ...	4	2	—	1
Death from extreme cold ...	—	1	—	1
Drowning ...	3	—	—	3
Totals ...	20	7	—	27

THE SANITARY CONDITIONS DURING THE WAR.

The sanitary improvements which we have been gradually effecting for many years have always borne good fruit in the decrease of patients statistically and the annual increase of body weight; but this was especially the case during the late war. From the beginning of the Imperial Japanese Navy up to 1883 the sanitary condition of the navy was in a very slow state; for example, the men-of-war sent to distant seas or those despatched to Corea during the outbreak of troubles in that country (1882) produced many patients, especially those suffering from kak'ke, an endemic disease in the east. Kak'ke was predominant from 1878 to 1883, there being 30, or 40 per cent., of cases of kak'ke among seamen, which produced the deaths of forty or fifty seamen every year. Had there been a collision with any other nation at that time it would have been very perilous for us to open war under such circumstances. Since 1882 a committee for preventive measures against kak'ke was appointed, and after thorough investigation it was decided that kak'ke originates from improper administration of food—that is, too large a quantity of carbohydrates, as rice, and too little of albuminoids, as meat; so since 1884, by diminishing the quantity of rice and increasing that of meat for the seamen's rations, an improvement in the scale of diet was put into practice. Since then, as we anticipated, the cases of kak'ke suddenly decreased, and the health of the seamen in general being promoted, not only kak'ke, but all other diseases of seamen were diminished. Thus kak'ke was nearly extirpated in 1886. At the same time that the improvement in the scale of diet was effected a rule was made that the body-weight of seamen should be taken in March and September every year, with a view to ascertaining the sanitary conditions of seamen as affected by the new scale of diet. Previously to the improvement of diet the average individual weight of body was 52.50 kilogrammes, but after the improvement the weight increased considerably year after year. Though the general health of our navy had made such excellent progress as a result of the improvement in the scale of diet, yet some fears were expressed with regard to the health of the navy at the commencement of the war, on account of our having had no experience of sanitary conditions during war-time. But trusting to our sound principles, already put into practice for many years, we maintained routine regulations as to diet with most successful results, as will be seen in the following table of patients (Table VII.). The number of killed or injured is excluded from the table, which shows the number of patients in the navy in general from July, 1894, to December, 1895. During this time the total number of cases of diseases was 7106, the average cases of disease per day being 12.94. Those patients who were employed under actual service are included in this number of cases, so that the number of patients who lost their duty entirely is less than the number above mentioned. The average percentage of days' sickness

cases of the disease occurred on other vessels or at some other stations. Of 167 cases of malarial fever, 8 or 4.79 per cent. of the total number died. The disease principally occurred on board the *Yamato* (23), *Yoshino* (21), *Akitsuishima* (10), and *Yayeyama* (10) which were despatched to Formosa, and on the *Chokai* (13) which was sent to Peh Yang or the northern sea of China; a few cases of the disease occurred on board some other vessels. Seventeen cases of fever occurred in the stations of Sasebo, six in those of Kure, seven in those of Yokosuka, and three in the special service party on the captured territory at Liaotung peninsula. With regard to small-pox we were quite victorious, as there was no single case notwithstanding our forces have traversed Chinese or Korean territory where sporadic cases of small-pox are always to be found; this is undoubtedly due to our strict rule of revaccination for all seamen, &c., every five years. Of the 43 cases of kak'ke 3 died, the ratio of cases per 100 of force being 0.21. The forty-three cases of kak'ke occurred on board the following vessels, viz.: the *Takachiho* (12), *Matsushima* (3), *Atago* (3), *Omimaru* (2), *Akashimaru* (2), *Akitsuishima* (1), *Kongo* (1), *Katsuragi* (1), *Yamato* (1), *Tenryu* (1), *Kaimon* (1), *Amagi* (1), *Maya* (1), *Shinagawamaru* (1), *Genzanmaru* (1), *Yedomaru* (1), and *Genkaimaru* (1). The others occurred at the following shore stations, viz.: the Naval Barracks at Kure (3), the Naval Barracks at Sasebo (2), the Gunners training ship (1), the Naval Barracks of Yokosuka (1), the Naval Barracks of Port Arthur (1), and the Base station of Long-reach in Corea (1). As already mentioned, an improvement in the scale of diet was effected after 1884, and in consequence this disease had diminished year after year until it had been nearly extirpated in the navy. The disease, however, broke out afresh. Let us examine why this was. In April, 1894, the *Takachiho* was despatched to Hawaii, and as soon as she returned she was repaired with extraordinary speed. After her repairs were finished she immediately sailed for the expedition. As the seamen of the ship suffered from a comparatively poor supply of fresh food they ate too large a quantity of rice. Of the twelve patients of the *Takachiho* ten were stokers, whose hard work in the boiler-room at a high temperature in a hot climate caused them to drink water to excess, in consequence of which they disturbed their digestive organs. Under such circumstances it was that so many cases of the disease occurred on the ship. The three patients of the *Matsushima*, suffering from a poor supply of fresh food and eating too large a quantity of rice, overworked themselves in the hot climate of Formosa. The two patients of the *Omimaru* and the one of the *Akitsuishima* did not eat too large a quantity of rice, but both suffered from a poor supply of fresh food and overwork in the hot climate of Formosa. The one patient of the *Maya* always disliked meat and was fond of liquors; as the one patient of the *Kaimon* had a great taste for sweet articles he celebrated his return home by eating sweets to excess and disturbed his digestive organs. The three patients of the *Atago*, one each of the *Kongo*, *Katsuragi*, *Amagi*, and the Base station were obliged to take preserved food for a long time during the expedition, and took a dislike for preserved meat and hard biscuits toward the end of the expedition. The two patients of the *Akashimaru* and the one each of the *Shinagawamaru*, *Genzanmaru*, *Yedomaru*, and *Genkaimaru*, with the two of *Sasebo* and one of Kure Barracks (the last three men were from the crews of transports who were enlisted after the occurrence of the disease), did not take regular food while on board the transports because these vessels are not war-ships and not under navy regulations. The other case from the Kure Barracks was a second-reserve man who had already suffered from the disease before the call. The one patient of the naval barracks of Port Arthur was attacked by kak'ke after the occurrence of rheumatism. One patient from each of the *Tenryu*, *Yamato*, and the Yokosuka Barracks disturbed their digestive organs by over-eating and over-drinking after returning home after a long stay in camp. The cause of two cases of kak'ke—one in Kure Barracks and one on the *Yokosuka* gunners training ship—is not certain. Summing up the above mentioned I conclude that the cases of kak'ke directly originated from want of proper food and indirectly from the impossibility of taking proper food which resulted from injury of the digestive organs from certain cause. Hence the principal cause of this disease is undoubtedly due to improper and bad food. To ascertain how the war affected the constitution of the forces the body weight of the force was calculated. Its result was that in 1894 the average

individual body weight of the force amounted to 58.238 kilogrammes, but in 1895 it had increased to 58.463 kilogrammes. Comparing these weights with those already mentioned it is found that the body weight during war showed a greater increase than before. This, I take it, is a proof of the excellent health of our naval forces.

Tokio, Japan.

TWENTY-SIX CASES IN WHICH AN ABDOMINAL SECTION HAS BEEN PERFORMED A SECOND TIME.¹

By JOHN D. MALCOLM, M.B., C.M., F.R.C.S. EDIN.,
SURGEON TO THE SAMARITAN FREE HOSPITAL.

IN this paper I include every case in my practice in which an abdominal section has been performed a second time,² with the exception of six cases already recorded.³ I have selected these cases for publication together because their histories illustrate a considerable number of complications, accidents, and causes of death which may occur in abdominal surgery, and because very few of them are without special points of interest. The cases may be divided into three groups. In the first eight the second operation was performed on account of a return of disease after a period of good health. The second group consists of five cases in which the first operation was insufficient to effect a cure. In the remaining thirteen cases the second operation was required on account of some complication arising as an immediate or a remote consequence of the first.

GROUP I.

CASES 1, 2, and 3.—The first three cases were examples of the growth of an ovarian tumour in the second ovary after the removal of an ovarian tumour. In Case 1 the second ovary had completely separated from its normal connexions, probably by twisting, and was nourished by adhesions in its abnormal position. The patient is alive and well. In Cases 2 and 3 the patients very nearly died from obstruction of the bowel during convalescence. The former is alive still; the latter died from pneumonia at the age of sixty-five years, nearly five years after the second operation.

CASE 4.—In this case an ovarian cystic tumour had been removed by another surgeon three and a half years before I saw the patient. I diagnosed a second cystoma, but on opening the abdomen I found a very large collection of ascitic fluid, encysted by peritoneal adhesions. The left ovary and tube were absent. The right appendages were dotted over with a granular growth which might have been either tuberculous disease or papilloma. I removed the ovary and tube and the patient made a good recovery.

CASES 5 and 6.—In these cases it was supposed that both ovaries had been completely removed for neoplasms before the patients came under my care. In each case I was informed of this by the gentleman who had operated. Nevertheless, I performed in each case an operation in no way differing from an ovariectomy with deep enucleation of the growth except that the Fallopian tubes were absent. Both cases recovered. These two cases show a local recurrence of an ovarian growth. The condition is in marked contrast to the secondary development of malignant disease which took place in the following case.

CASE 7.—In this case I performed a fairly easy ovariectomy on June 6th, 1893. The patient made an uncomplicated recovery and continued in good health until October, 1895, when she began to suffer from an increasing difficulty in keeping the bowels open. I saw her on Jan. 26th, 1896, and she then had an almost complete intestinal obstruction with abdominal distension, pain, and vomiting. I recommended an exploration with the formation of a fistula to relieve the vomiting and the pain due to peristaltic efforts, if no more

¹ Abstract of a paper read before the Medical Society of London.

² The operation of paracentesis abdominis has not been considered an abdominal section, although it might be maintained that the abdominal cavity is opened thereby.

³ Illustrations of Some Modes of Death from Ovariectomy: Transactions of the Royal Medical and Chirurgical Society, vol. lxxviii.; Two Cases of Rupture of Intestine caused by the Separation of Adhesions to Diseased Ovaries: THE LANCET, Sept. 26th, 1896; and Cases of Liver and Gall Duct Surgery: Transactions of the Medical Society of London vol. xviii.