The title of this address may not, at first sight, appear suitable for the War Section of this Society. While the importance of keeping alive the surgical problems and lessons of the Great War should not be forgotten, so much has been written about it that there is little I could add to your knowledge on that subject. To be a useful military surgeon in war it is essential to be a trained surgeon in peace.

The Royal Army Medical Corps exists to be prepared for war, and while the treatment of the sick in military hospitals in peace time, so as to return them quickly in a fit condition to carry out their duties, is of great importance, it is only one aspect of Corps work, which is essentially a training ground for the surgeon himself and for all the staff of assistants, anaesthetists, sisters and orderlies who make up an operating team, and for all the auxiliary branches represented by the bacteriologist, radiologist and electro-therapeutist from whom the surgeon seeks assistance in the investigation and treatment of cases. Consequently every operation carried out in peace time in a military hospital is just as essential a part of Army training as the artillery practice camp or the musketry course of the infantry man. Further, it is only by surgical experience gained in peace time, added to the knowledge derived from actual field service, that our administrative officers can decide on suitable arrangements to approximate
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as closely as possible the conditions which will prevail in the war area to peace time surgical conditions.

My object is to give you some idea of the peace time surgery of the Army at present and you will be able to judge of its value to the Army: (i) As a life-saving measure. (ii) Financially by rendering men fit to continue as satisfactory soldiers. (iii) By affording a satisfactory training for a surgical staff to render them fit for their duties in the field.

In order to obtain information on this subject I have selected the surgical work carried out in the Home Commands and the Colonies during 1925. The important operative work carried out in India is excluded, because the details of this work were not accessible to me.

The total figures I deal with are derived from returns sent to me every month by all surgical specialists in the Home Commands and from the annual reports of the various commands and colonies.

The detailed analysis of certain groups of cases was obtained from the case cards supplied by A.M.D.2. I specially emphasize the value and importance of these cards; if only officers realized their after-value, more care in their compilation might be exercised. Very frequently they are the important factors in deciding claims for pension by discharged soldiers, and if carelessly prepared injustice to the individual may occur, or, conversely, financial loss to the State.

I have selected two groups of surgical operation cases for analysis: one, because of the importance of the operation as a life-saving measure as well as a means of restoring men to full health; the other because it indicates how frequently operative measures are necessary in the Army, and the large number of men who are rendered efficient soldiers by means of surgery.

The extent of surgery done in the Army in peace will be indicated if I mention that, exclusive of India and of operations carried out in our Military Families' hospitals, 6,108 surgical operations were performed in one year, which is an average of 509 per month.

Of these operations 1,257 were intraperitoneal abdominal operations and from these I have selected the two groups of cases I wish to bring to your notice: (1) Gastric and duodenal ulcer; (2) appendicitis. I meant also to deal with hernia, joint operations and the operative treatment of fractures, but I soon realized that there would be no time for this.

(1) Gastric and Duodenal Ulcer.

The treatment of patients suffering from gastric and duodenal ulcer is shared by the physician and surgeon, and I do not intend to attempt to draw any conclusions from the figures I put before you as to which of these methods is the best. The numbers are certainly not sufficient to attempt this.

The prominent feature of both gastric and duodenal ulcer from the patient's point of view is some disturbance of his digestive function,
usually in the form of pain or discomfort at varying periods after the ingestion of food. Consequently, in dealing with this subject one has to consider the total number of cases in which the patients have suffered from stomach symptoms, and the actual number of these cases that have been proved to be gastric or duodenal ulcer.

During the year, for the whole Army, 1,181 admissions for inflammation of the stomach occurred and 296 in which the diagnosis was dyspepsia. It should be noted that these are admissions, and that the figures do not accurately represent the number of cases.

An analysis of the case cards for officers and men, exclusive of India, shows that forty-five cases were definitely diagnosed as gastric ulcer and fifty-nine as duodenal ulcer. Of these, twenty gastric ulcers and thirty-one duodenal ulcers were treated surgically during the year. This gives a total of fifty-one operations for these two conditions. Twenty-six of these operations were for perforation of an ulcer, and one death occurred, while twenty-five were for non-perforative lesions with two deaths. The total mortality of cases of gastric and duodenal ulcer submitted to operation was therefore 5·8 per cent.

Although the numbers are small it will be clearer if I deal with gastric and duodenal ulcers separately:

(a) GASTRIC ULCER.

Out of forty-one cases amongst N.C.O.'s and men which were definitely diagnosed as gastric ulcer, sixteen were submitted to surgical operation, and in addition four officers were operated upon, making a total of twenty operations for this condition.

Mortality.—One death followed on these twenty operations, giving a mortality of five per cent for all operations for this condition. This one death did not actually occur until 1926, but as the patient's gastric operation took place in 1925 it must be included in the mortality figure.

The patient was an officer, and subsequently to operation he developed symptoms pointing to obstruction at the site of anastomosis. A further operation was done in 1926 when the proximal loop was found to be kinked and obstructed, and in spite of a cross anastomosis he succumbed.

After-History of Cases operated on for Gastric Ulcer.—Two cases were not restored to complete health and were invalided. In one a perforation was dealt with as an emergency in a civil hospital, but a few months later, as the patient was still suffering from gastric symptoms with hematemesis and only weighed eight stone two pounds, was unlikely ever to be fit for the duties of a soldier, he was discharged. The other made a complete recovery from his gastric symptoms, but as bronchitis and a ventral hernia supervened, he also was invalided. Seventeen cases were reported as free from dyspeptic symptoms. Three of these operated upon near the end of the year still remained in hospital, but were nearly fit for duty. The remaining fourteen patients all returned to duty and none of them required re-admission during the year.
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It is too early to regard all these cases as finally cured, the test of recovery in the Army is severe, necessitating the return to full military duty and a barrack room diet, which is certainly not an invalid dietary.

Perforated Gastric Ulcer.

No fewer than ten out of the twenty operations for gastric ulcer were emergency operations for perforation. As you all realize, this is a very serious condition, and according to Mr. Sherren involves a mortality of at least 95 per cent unless treated surgically.

For the fifteen years up to 1904, St. Thomas’s Hospital showed a death-rate of 55 per cent for perforated gastric ulcer. At St. Bartholomew’s there were sixty-nine cases from 1897 to 1905; of these 49 per cent died. At the London Hospital Mr. Sherren had sixteen cases, operated upon within twenty-four hours; all the patients recovered, but in twenty-eight cases where more than twenty-four hours had elapsed since the perforation the death-rate was 50 per cent.

The mortality for ten cases operated upon in the Army during the year was nil. In our cases, in addition to closure of the perforation by suture, in two cases posterior gastro-jejunostomy was carried out at the same time. In three cases the vermiform appendix was also removed, and in five drainage of the peritoneal cavity was instituted. All were operated upon within twelve hours of the perforation, which accounts for the fact that none died.

Non-perforated Gastric Ulcers.

Ten cases were operated on. In all of these the ulcer was situated at the pylorus, and the operation consisted of a simple posterior gastro-jejunostomy. One death occurred in the case of an officer already referred to. All the other patients were completely relieved of their symptoms. Eight returned to duty and one, already referred to, was invalided for bronchitis and ventral hernia.

If any conclusions can be drawn from so few cases it would appear that a simple gastro-jejunostomy is a satisfactory method of treating a pyloric gastric ulcer, and that excision of the ulcer or partial gastrectomy is hardly indicated for simple ulcers in this situation.

In two of these cases the patients had been operated upon the previous year for closure of a perforated gastric ulcer, but a recurrence of gastric symptoms in the current year necessitated the performance of a posterior gastro-jejunostomy with completely satisfactory results.

These cases suggest that a careful watch should be kept on those cases in which suture of the perforation alone was carried out this year, and that when the condition of the patient warrants it the performance of a gastro-jejunostomy at the time the perforation is closed is good practice.

One case is worthy of special mention for it illustrates the occurrence of a duodenal ulcer and, later, of a gastric ulcer in the same patient. Early in the year this patient was successfully operated upon for a perforated
duodenal ulcer which was closed by suture, but no gastro-jejunostomy was carried out. Dyspeptic symptoms recurred, and this time I had the opportunity of operating myself, and found a well-marked pyloric gastric ulcer. A gastro-jejunostomy restored him to complete health.

Previous History of Gastric Ulcer Cases.—From the history of these cases it would appear that gastric ulcer may give rise to very slight symptoms and that the process of ulceration may be rapid and lead to early perforation. Thus, in one perforated case there was no history of indigestion preceding perforation. In one case the patient admitted to slight pain only, one patient had indigestion for two months, and in one perforated case the patient gave a history of long-standing dyspepsia.

Haemorrhage.—In only three cases is haemorrhage shown to be the most prominent feature.

Age Incidence.—The average age of patients operated on for gastric ulcer was 30 years, ten being between 30 and 40 years.

Nine of the patients were of the rank of sergeant or above, and three were corporals. It might almost be described as a disease of non-commissioned officers.

(b) Duodenal Ulcer.

During the year fifty-three cases, non-commissioned officers and men were diagnosed as duodenal ulcer; of these twenty-five were treated surgically and twenty-eight medically, and in addition six officers were operated on for this condition.

Mortality.—Out of the thirty-one cases operated upon two deaths occurred, giving a percentage mortality of 6·4 per cent. In one of these death was due to haemorrhage from the ulcer after operation, and in the other to subphrenic abscess twenty-three days after a perforated ulcer had been closed by suture. Two men died without any operation being performed. In one case a man who had never reported sick was found dead in his bed in barracks, and post-mortem examination showed that a perforated duodenal ulcer was the cause of death. In the other case the patient was admitted to hospital deeply jaundiced, delirious and critically ill. He died next day, and post-mortem examination showed a duodenal ulcer and subphrenic abscess.

Perforated Duodenal Ulcer.

Of the thirty-one cases submitted to operation for duodenal ulcer sixteen required operation on account of perforation. In fifteen of these cases the perforation was situated on the anterior surface of the first part of the duodenum and in one case on the second part.

In five of these cases, in addition to closure of the perforation by suture, a posterior gastro-jejunostomy was carried out at the original operation; in three the appendix was removed, in one of which the appendix was gangrenous.
The ages at which perforation occurred were as follows: Two at 20, eight between 20 and 30 years, and five been 30 and 40 years.

One death followed operation for a perforated duodenal ulcer. This man developed a subphrenic abscess, and a further operation to drain this was carried out twenty-three days after the primary operation, but he died from toxemia. The mortality from perforated duodenal ulcer was therefore 6.2 per cent.

In 1899 Pagenstecher reported the first series of twenty-nine cases of perforated duodenal ulcers treated by operation, and his mortality record was 86 per cent. MayoRobson reported 155 cases with a mortality of 66 per cent. In the London Hospital from 1899 to 1908, forty-two cases occurred with a mortality of 80 per cent.

The next period from 1909 to 1919 showed a marked improvement and the mortality of 218 cases was 49 per cent. Mr. Sherren operated on forty-six cases with thirty recoveries, a mortality of 34 per cent.

The Army figure of 6.2 per cent for sixteen cases is better than any of these, as I consider it ought to be, for we are dealing with a selected young male, who, as soon as he is seized with abdominal pain, is promptly rushed into hospital. And again, all our cases are operated upon early, which is the essential factor in success. In three, the operation was carried out within three hours of the perforation. In only one case had twenty-four hours elapsed. All the others were operated upon within the twelve-hour period.

A point of interest in these statistics is the question of the subsequent history of patients who have recovered after simple suture of the perforation and for whom a gastro-jejunostomy has not also been done. When a gastro-jejunostomy has also been performed, the smooth convalescence, the earlier feeding that can be carried out, and the removal of the dread of another possible operation, are all points in favour of this procedure. It is clear that in a fair number of cases in which simple suture alone was carried out the patients were free from symptoms and returned to duty and a full diet.

On the other hand, in three cases in which a perforation had been closed by suture, one in 1921, one in 1924 and one in the present year, the patients required subsequent operation in 1925 on account of persistence or recurrence of symptoms. In two of these a posterior gastro-jejunostomy was carried out, and in the other adhesions were dealt with; all made good recoveries.

One other case I have already referred to, in which the patient had a perforated duodenal ulcer closed by suture early in the year, and at a subsequent operation was found to have developed gastric ulcer. If the conditions favourable to ulcer formation could have been corrected by a gastro-jejunostomy at the first operation, it is unlikely that this gastric ulcer would have developed.

Some cases are in such a serious condition when perforation has occurred that closure of the leaking point is all that should be attempted, but cases seen early and in good surgical condition should be given the benefit of an immediate gastro-jejunostomy. This procedure only adds about ten minutes to the operation.

Final Results.—The final condition of the men who recovered after perforation must be considered as satisfactory. They all returned to duty, and, as I have pointed out in dealing with gastric ulcer, this involves a barrack room dietary.

Operations for the Cure of Duodenal Ulcer in Cases that had not Perforated on Admission to Hospital.

Fifteen cases were operated on for conditions which were diagnosed on clinical, laboratory and radiological examination as duodenal ulcer.

In one case the diagnosis was not confirmed at operation. The appendix had been removed in 1923, but pain persisted and the results of an opaque meal examination pointed strongly to duodenal ulcer. At operation a careful examination failed to reveal any ulcer and the abdomen was closed. His pain was completely relieved and he returned to duty.

There was one death amongst this group of cases. This man, who had complained of dyspepsia for three weeks, looked pale and ill, and had occult blood in his stools. At operation a duodenal ulcer was demonstrated. A gastro-jejunostomy was done, a chronic appendix removed, and a well-marked Lane's band and also adhesions between the gall-bladder and stomach divided. After operation severe hæmatemesis occurred, and in spite of blood-transfusion he never rallied. No post-mortem examination was permitted, but it is believed that the bleeding took place from the ulcer, as the suture line at the anastomosis was carefully done, and no bleeding occurred when the light clamps were released.

This case suggests that safety in this direction might be increased by cauterization and suture of the ulcer.

In two cases operation was undertaken for bleeding, one four days after admission and the other after one month of medical treatment. In both, a simple gastro-jejunostomy was done; the men made good recoveries and returned to duty.

The remaining cases operated upon presented the classical clinical and laboratory signs of duodenal ulcer, and all made straightforward recoveries with the exception of one.

In this case vomiting commenced after operation, and persisted in spite of washing out of the stomach. The abdomen was again opened and it was found that owing to a hæmatoma between the layers of the transverse mesocolon the proximal and distal loops were glued together. The stoma was patent into the distal loop but the proximal loop was blocked. A cross-anastomosis between the proximal and distal loops was carried out and the patient made a perfect recovery.
With regard to the operative technique employed:—

(a) It is noted that suture of the perforated ulcer succeeded in stopping the leak in all but one case. This case, referred to as a failure, terminated fatally from subphrenic abscess, but even in this case it is not certain that further leakage from the perforation occurred after suture.

(b) In all cases in which gastro-jejunostomy was performed the posterior no-loop method was adopted, and catgut only was used as suture material.

(c) The tendency has been to discard heavy and complicated types of clamps and to rely on very light clamps to avoid danger from injurious pressure, especially to the loop of jejunum.

(d) It is noteworthy that no case of gastro-jejunal or jejunal ulcer has been seen in military practice during the year, and this I attribute to non-removal of any mucous membrane before the anastomosis is made.

(e) No local treatment to the ulcer was undertaken in any of the non-perforated cases.

(f) The value of cauterization and suture is recognized, and the death which occurred from bleeding from the ulcer following operation might have been obviated if this procedure had been adopted.

While the general results obtained during the year by operation for these two serious conditions, gastric and duodenal ulcer, are satisfactory, it is nevertheless a little disquieting to reflect that out of fifty-one operations performed no less than twenty-six, or over half the total, had to be undertaken for the serious condition of perforation. For ulcer cases to be left until this grave catastrophe occurs suggests a lack of investigation or defective diagnostic powers, and the question arises, in how many other of the 1,487 cases diagnosed as gastritis or dyspepsia the patients are really suffering from true ulceration. Perforation may have been a blessing in disguise for some of the cases, for it led to operation, and in a large proportion to complete relief from their trouble.

(2) Appendicitis.

When I tell you that 942 admissions occurred for appendicitis during the year, with seventeen deaths, and in the Home Commands and Colonies 604 operations were found to be necessary for this condition, you will agree that the subject deserves consideration.

It would be interesting if we could glean any information as to the incidence of appendicitis among the civil population to compare with the incidence of this disease in the Army. Unfortunately there is no method of acquiring this knowledge as the returns of the Registrar-General deal only with deaths from this condition. But the records show that in 1913 the deaths amounted to sixty-nine per million, while in 1923 they had risen to seventy-four per million for the whole population.

In the Army, the year 1925 showed an increase of admissions over the previous year, 942 as against 881 for 1924.
With regard to operative mortality there are published figures with which comparison can be made, and this comparison is useful provided we make allowance for many factors which favour the Army, the most important being that all cases, with few exceptions, are sent to, and treated in, hospital from the outset, and that the great majority are operated upon in the early and favourable stage.

During the year, in the Home Commands and Colonies, 604 operations for appendicitis were performed with a mortality of six, a total percentage death-rate of 0.96 for operations at all stages of the disease. But as all the deaths followed operations for acute attacks at various stages, it gives a fairer comparison if we deal with acute attacks alone; 208 were recorded as acute; 121 are shown as chronic and 275 are not classified. If we accept all the deaths as occurring amongst the 208 recorded as acute, which is certainly over-stating the case, we get a percentage mortality of 2.8 per cent.

Mr. Adams, in a valuable paper read before the Section of Surgery of this Society last year, gave the figures for the London Hospital and St. Thomas’s Hospital. These figures dealt with the mortality following operation at the various stages of the disease, and time will not permit me to go into all these, nor have I data from Army records which would usefully compare with the data from these stages.

The total mortality for all operations, including all stages of the disease, was 5.8 for the London Hospital and 8.4 for St. Thomas’s Hospital. Where operation was done within twenty-four hours of the onset of the disease, the London Hospital cases show a mortality of 0.9 per cent, and those at St. Thomas’s 2.3 per cent.

Mr. Sherren has drawn attention to the fact that pain in the right iliac fossa does not necessarily signify appendicitis, nor is it interpreted in this way in the Army. From personal contact with the patients I can assure you that the cases shown as operated upon for appendicitis in the Army really suffered from the disease.

Much has been written about unnecessary operations for supposed affections of the appendix, especially directed towards the removal of the appendix for the symptom of pain in the right iliac fossa, and drawing attention to the large number of cases which are not benefited by the operation; 121 cases were shown in the operation returns as chronic appendicitis, and if these had been wrongly diagnosed and the cases had been unrelieved by operation, a higher invaliding rate than eight would be expected. This figure (eight) of course refers to all cases of appendicitis acute and chronic.

The method of the approach to the appendix has varied. In a very few the old muscle-splitting operation has been employed. In a slightly larger number Battle’s incision placed at the outer margin of the rectus has been employed, but by far the most common is a paramedian incision. The facilities this incision gives for a general examination of the whole abdominal
vessels has frequently been of value and other morbid conditions have been discovered.

Whilst no ill results following the other incisions have been noted in cases operated upon in the Home Commands, two cases invalided from India show the bad results of extension of an incision placed at the outer margin of the rectus, and consequent damage to the nerve supply of the muscle.

Following drainage of appendix abscesses twelve cases of ventral hernia required operation during the year, but some of these original operations had been carried out in previous years.

All the deaths from appendicitis were due to an extension of the peritoneal inflammation. In three of the fatal cases the patients underwent subsequent operations performed for obstructive symptoms. In two cases an enterostomy and an entero-anastomosis were done, and in one case a cecostomy.

The final results of operation for appendicitis were satisfactory and the total number of cases invalided for this disease was eight.

As the total number of deaths from appendicitis is shown as 17, and as only 6 of these followed 604 operations performed outside India, it is clear that the percentage mortality following operation in India must have been higher. I have no very special reason to account for this except that cases in India are liable to be complicated by intercurrent diseases such as malaria and dysentery, and the climatic conditions in the plains of India during the hot weather are less favourable to surgical operation.

I must omit reference to many types of operation, but the two groups I have so inadequately described may help in giving a general idea of the extent of military surgery in peace time and enable you to judge of its adequacy as a training ground for the surgery of war.

In considering results, and in comparing them with civilian statistics, where comparison is possible, it must be borne in mind that these operations described have been carried out by a number of young general surgeons who must be prepared to undertake any type of surgical work, and that they differ in this respect from the work of abdominal or orthopaedic specialists devoting the greater part of their time to their own speciality.

Had time permitted I would have alluded to the work of many of the special departments without the aid of which good surgery would not be possible or good results obtained; of such may be mentioned the radiological, the massage, and electro-therapeutic departments.

**DISCUSSION.**

Surgeon Commander H. E. R. Stephens referred to the close collaboration between the medical and surgical sections in naval hospitals during the investigation of cases of gastric and duodenal ulcers. Statistics from the Royal Naval Hospital, Haslar, corresponded closely with those given by Colonel West (p. 91).

From a Service point of view he considered that the results of gastro-duodenostomy were superior to those of gastro-jejunostomy. He did not
agree that gastro-jejunostomy should be performed as a routine measure in cases of perforation. Many perforations, he considered, were caused by acute ulceration; many of the chronic cases were cured by simple suture; also, in the event of symptoms recurring, there seemed no valid reason why gastro-jejunostomy should not be performed subsequently. He looked upon the operation for perforated gastric or duodenal ulcer essentially as a life-saving measure, and if gastro-jejunostomy was performed at the same time he felt that the mortality rates would increase. Unless the case was seen early and the condition of the patient exceptionally good, he did not think the increased risk to the patient's life was justifiable. The similarity of the statistics he attributed to the similar conditions under which naval and military surgeons worked. Patients were of excellent physique, and in the majority of cases they were brought under the care of the operating surgeon with the least possible delay.

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Total number</th>
<th>Deaths</th>
<th>Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gastro-enterostomy</td>
<td>34</td>
<td>2</td>
<td>6 per cent.</td>
</tr>
<tr>
<td>Gastro-duodenostomy</td>
<td>14</td>
<td>0</td>
<td>nil</td>
</tr>
<tr>
<td>Perforated gastric ulcer</td>
<td>25</td>
<td>1</td>
<td>4 per cent.</td>
</tr>
<tr>
<td>Perforated duodenal ulcer</td>
<td>10</td>
<td>0</td>
<td>nil</td>
</tr>
<tr>
<td>Appendicectomy</td>
<td>341</td>
<td>3</td>
<td>0·9 per cent.</td>
</tr>
</tbody>
</table>

Air Vice-Marshal D. Munro said that he was specially interested in the statistics of post-operative gastric and duodenal cases in which the patients were returned to full duty. Presumably these were men who were considered fit for military service at home, and in all overseas climates in peace and war. The numbers caused him surprise. He would ask one question, viz.: if any of these men relapsed whilst serving in a hot climate and eating what Colonel West had termed "barrack diet," and were afterwards invalided from the Service, what view would Colonel West take as to the part played by these factors in making the invaliding disability attributable to Service conditions? On this decision—in making which he (Air Vice-Marsh Mal Munro) was the final authority—payment of disability pensions depended and he was thus particularly concerned.

Colonel West, in reply to Surgeon-Commander Stephens, stated that the operation of gastro-duodenostomy had not been employed in any of the cases recorded. He considered it a valuable method, but gastro-jejunostomy had proved so satisfactory in the Army that the necessity for the other method had not arisen. With regard to the performance of a gastro-jejunos tomy at the same time that a perforative lesion was dealt with, he agreed that this should only be attempted in selected cases in which the patients were seen early after the perforation and were in good surgical condition. If these conditions were fulfilled he had no hesitation in recommending that the operation should be done.

In reply to Air Vice-Marsh Mal Munro, Colonel West said that there was no reason why patients who had been successfully operated upon for gastric or duodenal ulcer should not be passed fit for foreign service, but in the event of these men being later discharged as unfit for service such foreign service might have to be considered as aggravating their condition.