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Journal of the Royal Army Medical Corps.

Original Communications.

REHABILITATION.

By Lieutenant-Colonel Stanley D. Large, D.S.O., M.C., Officer Commanding Convalescent Depot.

(Continued from p. 123.)

Premises are a basal consideration and the following data are based throughout upon a Convalescent Depot for 1,000 trainees.

It is obvious that the soldier's training is best conducted in a military setting and that the camp should be a model of Army smartness and cleanliness. But there is no reason why it should not be so chosen and developed as also to conform to aesthetic standards which react so favourably upon the susceptible's sense of well-being and "worth-while." Experience suggests that huts are preferable to both houses and tents; that the site should be on the outskirts of a town affording leisure-hour interests and diversions; that it should be—or be made by its occupants—a place of beauty affording them both pleasure and pride. In this respect it is amazing to see what can be achieved, and how rapidly, by men—under good leadership—working so zealously as not to realize that scenic gardening is an organized part of their rehabilitation. The ideal locus is an estate of some 50 acres with an old mansion as an administrative block; with a hard surfaced parade-ground and playing fields; with cultivable areas to supply table needs; and with room for a scenic garden with a lake to serve as a swimming-pool also. This would provide the following necessities—still on the 1,000 trainee basis:—

Central Administrative Block.

With offices, stores and staff quarters in or around the old mansion.
Training Area, comprising:

Parade-ground—100 yards square; level; better central and flanked by gymnasium.

Gymnasium—100 × 40 feet; with wall-bars, climbing ropes, balance beams, a box horse, coir (or sponge rubber) mats, horizontal bars, etc.; and with showers and dressing-rooms attached.

Drill-shed—150 × 30 feet; flanking parade-ground; essential if rainy.

Swimming-bath (or pool)—100 × 30 feet.

Sports field—of area to take 2 football and two basket-ball pitches as the minimum.

Assault course—of such importance that it is dealt with in detail in a following section on training.

Remedial gymnasium—a vital necessity, 50 × 30 feet.

Physiotherapy department—40 × 30 feet beside the remedial gymnasium.

Living Area, providing:

Dormitory huts—each taking a group of 24 men; 10 taking a company; 44 housing 1,000, with 2 spares for emergency needs. Each group has its separate lavatories but it is better to have only one bath-house for the whole camp.

Kitchens and dining-rooms—2, each dining-room to seat 500.

Recreation hut—serves as canteen during the day.

Games hut—for indoor games.

Reading hut—housing the library.

Reception station for minor sick—as little in evidence as possible but providing the essentials for out-patient casualties and suspect infections—for which 10 beds suffice.

Staff per 1,000 Trainees, as Desirable but not yet Officially Authorized.

Officers.

Commanding Officer—a senior officer from the Royal Army Medical Corps.

1 The remedial gymnasium serves the 20 per cent. of cases who need special, individual attention. It must be well equipped (vide Appendix) and in charge of a specially-trained, resourceful instructor of outstanding personality and endless patience in the task of mobilizing stiff and painful joints. One M.O. should be constantly supervising the work and encouraging the case. The importance of this remedial factor cannot be over-estimated: a short account of its equipment—much of which can be improvised for special cases—is therefore given in Appendix II.

2 The physiotherapy department is so situated that men can go direct from massage or heat treatment to do their special exercises. It should be staffed by well-trained masseurs—with the C.S.M.M.G. qualification—in the proportion of 1 per 20 daily treatments. As many medical cases also benefit from this treatment the average number of daily treatments may be taken as about 100. Appendix III gives a list of the infra-red, heat, ultra-violet ray and electric current apparatus required.
Medical Officers.—1 per grade of trainee equals 4, with 1 for routine.

Dental Officer—at least one is necessary.

Administrative Officers—as enumerated below, are all necessary and should be capable, versed in their own work, accustomed to control of men and ready to lend a hand as and when required—especially re social and recreational activities. Four Company Officers, 1 Adjutant, 1 Quartermaster, 1 Specialist Messing Officer (most valuable) and 1 Pay Officer, making a total of 8.

Other Ranks.

Remarks under this heading may advisedly be restricted thus:

Serjeant-Majors.—Should be of attractive personality, excellent disciplinarians and actively athletic. They must have at heart the interests of the depot and particularly the esprit de corps of their company. One per company (4) and 1 Regimental Serjeant-Major, a total of 5.

P.T. Instructors.—One is needed per 100 trainees.

Masseurs.—Hold the C.S.M.M.G. certificate and work in the physiotherapy department under supervision of a Medical Officer. As each can do some 20 treatments a day a staff of 5 should suffice.

A.T.S.—Are now replacing men as much as possible in such posts as cooks, store-keepers and clerks and it is interesting to note that in one depot the change from men cooks to A.T.S. cooks proved a very great success. At first they were regarded with suspicion, but it was soon found that they were not only better cooks but did the work in half the time with half the numbers and with much less fuss, noise and untidiness.

Routine must needs be based upon the essentials that depot life must be attractive and so organized that it runs with efficient precision in an atmosphere of keen discipline maintained by all in the general interest. Inertia and slackness cannot survive when the days are filled with active training and organized games and the evenings are given over to cheery entertainment to suit all healthy tastes. In the well-willed, such a well-filled life creates an alert contentment of mind to balance the increased vigour which is an actual joy to the active body. The depot in which there

1 Medical Officers.—If of age 30 to 40, they should have the essential energy, experienced common sense and capacity to handle men. They should be changed as seldom as possible, for—owing to their special knowledge—they are the stable pillars of success.

2 P.T. Instructors.—They must be most carefully selected and trained in remedial gymnastics; highly intelligent and of very attractive dynamic personality. Their force of character and capacity for leadership are far more important than their special training for, if they have the right personality—and most of them have—they are worth their weight in gold; the ideal man will have his class full of enthusiasm, dashing about, laughing as they work most strenuously without realizing that what seems exhilarating play is part of an exacting programme. They all know their work from A to Z; they have to exercise all their wit and wiles to get the best out of men who are not quite fit and have become slack; and as a rule they succeed so well that the trainees have such liking and admiration for them as to go all-out in response to their every appeal. One of the most popular instructors it has been my good fortune to have under my command was a first-class professional footballer whom they nearly worshipped. All are Army Physical Training Corp. instructors, picked men from a selected corps.
Rehabilitation is failure to perceive and preach and practise that gospel is unlikely to be a success. Whatever other work is done—and however disguised—there should be frank recognition by all that the core of each day’s effort is—an hour of P.T.

But physical development will be slowed and ill-balanced if the mind be not also expanded by stimulus and exercise. It is also certain that active exercise of body and brain cannot be continued at high pressure unless good nutrition be assured by excellent, well-cooked and well-served food. And, finally, it is obvious that such strenuous efforts cannot yield their best results unless there be adequate spells of rest by day and sleep at night. Rehabilitation thus rests upon the four corner-stones of bodily effort, mental exercise, meals and rest. While each affords an alluring theme for a separate chapter, it suffices here to note that these essentials may be utilized as the bases of a daily, general time-table which allows for progressive increase in the intensity of physical effort until the trainee becomes once more a soldier—and, we hope, a more perfect soldier—on passing the final, exacting tests to be presently described.

**Typical Daily Time-table in use.**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>06.30</td>
<td>Reveille</td>
</tr>
<tr>
<td>07.30</td>
<td>Breakfast</td>
</tr>
<tr>
<td>08.30</td>
<td>Company Parade</td>
</tr>
<tr>
<td>09.00</td>
<td>C.O.’s Parade</td>
</tr>
<tr>
<td>09.15/10.30</td>
<td>P.T.</td>
</tr>
<tr>
<td>10.30/11.00</td>
<td>Interval</td>
</tr>
<tr>
<td>11.00/12.15</td>
<td>Fatigues or light work</td>
</tr>
<tr>
<td>12.15/12.45</td>
<td>Interval</td>
</tr>
<tr>
<td>12.45/14.15</td>
<td>Dinner and rest</td>
</tr>
<tr>
<td>14.15/15.15</td>
<td>Education</td>
</tr>
<tr>
<td>15.15/16.30</td>
<td>Organized games, or route-march</td>
</tr>
<tr>
<td>16.30</td>
<td>Tea</td>
</tr>
<tr>
<td>19.00</td>
<td>Supper</td>
</tr>
<tr>
<td>23.00</td>
<td>Roll-call</td>
</tr>
<tr>
<td>23.00/06.30</td>
<td>Sleep</td>
</tr>
<tr>
<td>08.30</td>
<td>Education</td>
</tr>
<tr>
<td>12.15</td>
<td>Physical exercises</td>
</tr>
<tr>
<td>12.45</td>
<td>Meals and intervals</td>
</tr>
<tr>
<td>14.15</td>
<td>Recreation</td>
</tr>
<tr>
<td>16.30</td>
<td>Roll-call</td>
</tr>
<tr>
<td>19.00</td>
<td>Supper</td>
</tr>
<tr>
<td>23.00</td>
<td>Roll-call</td>
</tr>
<tr>
<td>23.00/06.30</td>
<td>Sleep</td>
</tr>
</tbody>
</table>

Hours per day: Education: 1, Physical exercises: 4½, Meals and intervals: 5½, Recreation: 5½, Sleep: 7½

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Three items of routine, as distinct from training, call for special note.

*Feeding*—closely concerns psychological as well as physical reactions; the badly-fed man becomes so disgruntled that his training flags, and so discontented that his discipline and morale deteriorate. Consistently bad messing and cooking are unnecessary, uneconomic and inexcusable.

*Entertainment* has established its claim to be deemed a necessity demanding close attention and well-camouflaged organization. To counter the demoralization of idleness, every effort should be made to fill the leisure evening hours with pleasant and stimulating entertainment—such as dancing, concerts, cinema shows, whist-drives or popular lectures. Dancing—always popular—also gives exhilarating exercise, which is of special value for men with leg injuries. It is a revelation to see men who have limped about all day with limbs too stiff and painful to exercise in the gymnasium vying with the most active rival on the dance-floor in the evening. In one depot a normal week’s entertainments on successive nights may run thus...
a gramophone recital, a concert party from outside, a cinema show, a dance, "Housey-housey," and end with another dance. But although there is some entertainment every night of the week the men are at liberty to go into the town and amuse themselves as they like, from 17.00 to 23.00 daily and from 13.00 to 23.00 on Sundays.

Education—perhaps more than anything else—illustrates the Victorian fallacy that, in training, it is advisable to make all that is necessary also nauseating. An hour daily is devoted to efforts to satisfy or stimulate the citizen's desire to know his country's present needs and triumphs and the world's hopes for the future. That hour might be well-filled by an almost limitless variety of means to make such education as interesting as valuable. Illustratively one might mention the day's news, war strategy, a brains-trust (elected), applied science, nature problems, debates on ten-minute papers.

TRAINING AND TESTING.

Training.

The C.O. of a Convalescent Depot is happy in having a war-time objective as to which no dubiety is possible and hence no discussion is profitable. It is to get convalescents physically and psychologically fit for active service. But he is less happy in the human material entrusted to him for that purpose and the utmost value may attach to discussion of the means to that end and the pooling of practical experience of the process.

Material.—It is only when new arrivals parade in shorts and gym shoes—their working dress—that their defective physical quality becomes fully apparent. The few who are well-built and have a good carriage stand out conspicuously. They form less than 10 per cent of a mass of human material so poor that the inexperienced might well despair of salvaging from it many reinforcements for which any front-line C.O. would be grateful. A second disconcerting discovery is made when their movements are watched: even in quite simple exercises many reveal a general stiffness and awkwardness while most lack both agility and grace. But there is nothing wrong with their spirit: they are willing and eager to learn. It is just that their development has been badly neglected: they have never—not even in the military and/or auxiliary hospitals through which they have passed—been taught the physical training which would have so reduced their stay for rehabilitation in a C.D. There is obvious need—in civilian as well as military interests—for a radical increase of physical training at school and its extension into convalescence. The urgent problem which faces us at present is, however, to get this eager but impaired human material back into the Army in good fettle. That brings us to a third important fact. It is that—although convalescing from so wide a variety of causes as injury and functional, infective or degenerative illness—most of them still suffer, however unconsciously, from the complex of being an unfit incubus at the base instead of a fit soldier in the field. That leads to two very practical conclusions: (a) that this complex must be eliminated forthwith, and (b) that
the primary essential for natural cure is an atmosphere of good-will and
good-cheer in which self-effort can create self-confidence. As those factors
enable the bulk of such cases as are capable of becoming fighting-fit to do
so happily as well as rapidly they are vital to rehabilitation in a C.D. It
may perhaps be noted that if results useful in civil life occur incidentally
so much the better—provided that they neither lessen nor retard military
rehabilitation, for which the C.D. exists.

Means and Methods.—Amongst means available, perhaps priority
should be given to production of the atmosphere mentioned in the preceding
paragraph. That will be assured as and when each trainee finds that some
member of the staff has a friendly, personal interest in him and his condi-
tion, for that assurance creates responsive readiness to tackle with zeal the
exercises necessary to attain physical fitness.

Next in order of importance comes the physical training which must be
made the core of the daily routine. It is designed to exercise all muscles;
to increase mobility, agility, strength and endurance; and to promote that
sense of physical and mental well-being which only the physically fit enjoy.
Added zest is provided by the spur of competition—as between individuals,
groups and companies—while ennui is prevented by the utmost profitable
use of games and of variety such as is provided by swimming or even danc-
ing. For P.T. twenty-four is regarded as the optimum number of trainees
in a section, as large enough to provide the desirable stimulus of numbers
in competition without being so large as to make it impossible for an
instructor to give every individual the personal attention needed in a course
so intensive as to be completed in from four to six weeks.

While this subject is too vast to be dealt with adequately in an article
a few notes on some specific means may be welcome to some whose experi-
ence has yet to be gained. It is perhaps best to commence with the neces-
sary daily time-table and then take some of its components seriatim.

The physical training tables are constructed in a sequence to suit the pro-
gress of rehabilitation through the four grades mentioned—from the
newly-arrived weakling in Grade I to the matured warrior in Grade IV.
There being three groups in each grade, a dozen such tables are required.
These must not only be most carefully thought out individually, but be so
"staggered" and dovetailed as to give every trainee a complete, pro-
gressive training and make the fullest possible use of both premises and
instructors. One such table is given, illustratively, in Appendix V. It is
based upon Army P.T. Tables and compiled from the following sources:—

(a) Games and Sports in the Army, 1943.
(b) Physical and Recreational Training, 1941.
(c) Small-side Team games and Tabloid Sports (Army Sports Control
Board).
(d) Recreation and Physical Fitness, Youths and Men (Board of Educa-
tion Physical Training Series, No. 15).
(e) Purposeful and Basic Physical Training, 1942.
In general the object of such tables is to provide a scheme for an hour's P.T. devoted to certain purposes and stages thus:—

(a) Seven minutes of warming-up and loosening exercises,
(b) Twenty minutes on exercises to increase strength and endurance,
(c) Twenty-five minutes' development of agility and dexterity,
(d) Eight minutes cooling-off while practising marching and correct stance.

The latter tables gradually lead up to the more arduous and realistic training of route marches, cross-country runs and finally the "assault course" which is so important as to call for some detailed account (infra).

Apart from P.T., the employments of the day should be so varied and interesting as to be almost recreational but the hours should be so well filled as to form a mosaic with few interstices wide enough to afford a stance to the grouser. In dry weather the training is carried out on the parade ground but on wet days in the gymnasium and drill-shed—the latter of which must therefore be of adequate size.

Of the organized games little need be said. Football, hockey, tennis-quoits, basket-ball, etc., are played on the sports-ground—of dimensions noted above. One most popular and valuable variant is "mass football" which is played by any number up to 50 or 60 a side—with half-a-dozen balls, one goal at each end and no rules. Special strengthening is assisted by tugs-of-war, one amusing variety being provided by four teams pulling on two ropes joined at the middle. Swimming is invaluable, especially water-polo and, if a swimming bath cannot be provided, the men should make their own swimming-pool.

Cross-country runs are given once a week for the three higher grades, the length increasing from 2 miles for Grade 2 to 6 miles for Grade 4. It is usually possible to mark out a suitable course of 1½ miles on the periphery of the Convalescent Depot. Route marches are given once weekly to all save Grade 1; the length is increased from 3 miles for Grade 2 to 12 for Grade 4, and the load is gradually raised to that of the marching infantryman.

Throughout, the spirit of competition is fostered in every possible way and not only by games. In assessing company priority, marks are given for smartness on parade and on the march, for tidiness and cleanliness of company huts and for beautification of the company area. To encourage this spirit of competition and *esprit de corps*, a cup is presented to the winning company every month, and the winning company's flag is flown on the parade ground flagstaff. The keenness of competition is most valuable and gratifying.

The *Parade Ground* calls for special mention in the conclusion of this section. Its size may seem excessive to the uninitiated but it is one of the most useful and most used features of Convalescent Depots fortunate enough to have one. It serves for all daily parades and drills, for hockey,
Rehabilitation

basket-ball and sometimes football and, in fine weather, for physical
training.

It is an inspiring sight on a fine day to see drill going on on one part
of the parade-ground and group physical training activities of several
different kinds on others, the groups changing from one kind of activity to
another on the blowing of a whistle.

One group may be learning the correct way to pull on a tug-of-war rope
tied to a large tree, some groups on exercises with heavy logs, other groups
learning the correct way to lift, carry and set down heavy weights, one
group learning unarmed combat, another doing high jumping and so on.

There is an air of purposeful activity about the scene which stimulates
the imagination of both participants and onlookers.

Testing.

In each grade every man must pass definite standard tests before he is
promoted to a higher grade. Regrading occurs weekly, as noted (supra).

In Grade 1, the tests are based upon the man’s general response to P.T.
ln Grade 2, in addition to having given satisfaction to his P.T.
instructors, tests are based upon his completing the cross-country run and
route march in reasonable time and without falling out or being distressed.

In Grade 3, the tests are based upon the longer weekly cross-country
run and route march, which he must complete to the instructor’s satis­
faction.

In Grade 4, besides being tested on cross-country runs and route
marches as noted, the man must be able to go around the assault-course at
the double and surmount all its obstacles with ease. When fit to pass out
of this grade he is fit to join any unit—no matter how well trained it may be.

That brings us to a description of the assault course which thus plays so
important a part in determining the efficiency of the training as well as the
final fitness of those who have passed through it.

The Assault Course of one Convalescent Depot is thus described:

"This lies on undulating rough parkland studded with large trees and
covered with bracken. Various obstacles to test strength, agility, stamina
and nerve have been placed at intervals throughout the area and the men go
over the course in groups of 6 or 8. The obstacles are comprised as
follows:—

(1) The men start from a trench; run 50 yards uphill to a belt of barbed
wire, through zig-zag lanes in which they thread their way; leap over a
6-foot-wide trench twenty yards further on and throw themselves down
behind a bank.

(2) When all have arrived, they leap up and run to an 8-feet-high embank­
ment in front of which a deep pit 8 yards wide has been dug. From the
limb of a large tree overhanging the pit two ropes are suspended and the
first two men clamber down into the pit and pass the ropes up to the next
two waiting on the bank. These grasp the ropes as high as they can, tuck
Stanley D. Large

up their knees and swing across the pit, not letting the ropes go when they land. When they are steady they swing the ropes back across the pit to the next two, and so on.

(3) After crossing the pit the group collects again, runs downhill to a second deep and wide pit which the men cross either by running along a springy plank or by sliding their feet along one loose wire while they hold on to another wire above their heads. Neither way is very easy.

(4) Is a 10-feet-high brick wall which they surmount as taught, i.e. the first man faces the wall with legs braced and hands upstretched. The next two grasp him by the feet and heave him up. He catches the top of the wall, pulls himself up and drops over. The third last man remains on top of the wall to help the last two over. The last man stands with his back to the wall and locks his hands. The second last man faces the wall, steps into the last man’s locked hands and is heaved up to the top where he lies over beside the third last man. These two then lock their own hands and the last man leaps up and with each hand grasps a pair of locked hands and is pulled to the top, when all three drop on the other side.

(5) Consists in climbing an inclined rope to a 12-feet-high limb of a tree; transferring by a horizontal rope therefrom to another tree 10 yards away; and then sliding down a third rope to the ground. This is quite difficult and calls for both strength and stamina.

(6) Includes an easy leap over a brushwood fence; a run up a ramp to a rail and a leap thence over another rail supposed to be "live" so that the leap must clear it.

(7) Is another run uphill to a trench, six yards in front of which is a house-front with window frames in position. The men lob dummy hand grenades through the windows; climb out of the trench; clamber over a fence; jump another trench and climb through the windows of the house.

(8) There follows a crawl along narrow, barbed-wire tunnels 18 inches high. The crawl has to be done with the elbows and toes (not hands and knees) to avoid being scratched by the barbed wire "roof." Then comes a run down hill, a double jump over two trenches from above and a run uphill to the last obstacle.

(9) The last obstacle is a long aerial glide down a wire cable stretched from high up on one tree to high up on another 100 yards further down the slope. A pulley-wheel with a handle runs on the wire—the man mounts a ladder to a platform on the first tree; grasps the handle; steps into space; and sails away at a good speed. The wire sags a little and when the man is about three-quarters of the way down and his feet are about 6 feet from the ground, he can either jump off there at speed into soft earth and do a forward roll when he lands or he can go on to the end at a lessening speed and fend himself off with his raised feet when he reaches the tree. This obstacle tests the nerve more than any of the others."
Results and Prospects.

Results may be considered under two headings: (1) Psychological; (2) Physical.

Psychological.—Every detail of life in the Convalescent Depot is carefully planned to create an atmosphere of happy efficiency, vigour, and manliness and, as the individual instinctively tends to adapt himself to his environment, a period of four to six weeks in such an atmosphere invariably produces a marked improvement in morale. In fact the change for the better in the average newcomer during the first forty-eight hours is both striking and gratifying. As his outlook on life grows brighter he enters into the spirit of the place and begins to carry out his training with zest and enjoyment, taking a pride in his own person and in his surroundings and thinking less and less of his disability until by the time he leaves he feels—and is—a fit and a new man physically and mentally. The obvious pleasure with which the various groups do their exercises and their delight in going over the assault course give one an easy mind about the tone of their morale. They thoroughly enjoy their stay in the depot and, although they are naturally anxious to get back to their units, when the time comes for them to leave they do so with regret.

Physical.—Four weeks' steady physical training arranged by experts and designed not only to overcome any residual local disability but to tone up all the muscles of the body is bound to—and does—do good, and gives the men more speed, strength and stamina than they had before. In fact it is quite often possible as a result of the training to raise a man's medical category above that which he had with his unit. The pitch of physical fitness reached may be shown by the fact that recently a group of commandos who came to practise on a C.D. assault course were challenged to a contest by a group of Grade IV trainees—and beaten.

With the orthopaedic cases the patient and painstaking individual attention given in the early stages and the group activities later produce results which are invariably good. It is not uncommon for surgeons who know the depot to send a man with a doubtful knee to be tried out on the assault course and cross-country runs; if it does not give way under this trial it does not require operation. When it is remembered that of the 10,000 cases which pass through a 1,000-bedded Convalescent Depot in a year, 85 per cent are returned to their units in category A, 11 per cent in category B and 4 per cent in category C, and all of them at least as fit as before they entered hospital, it will be appreciated that the C.D. fulfils a most useful function in the conservation of man-power.

Prospects.—Were there no such units as Convalescent Depots there would be a great wastage of man-power. As it is, 300,000 man-days per year are spent in each 1,000-bedded C.D. in the final stage of rehabilitation. If the earlier stages in hospital and auxiliary hospital were carried out as universally as they should be, an appreciable saving could be effected in this enormous figure but, until the necessary personnel are made available and
trained, and every large hospital has its rehabilitation medical officer and P.T. instructor, there is not likely to be much improvement.

If only a system of rehabilitation on Army lines were introduced into civil life it would do incalculable good. The saving to the sick or injured individual in suffering, misery, and prolonged—if not permanent—disablement, would be enormous. The saving to the State in man-power and in money paid in compensation would be beyond computation. Such a system should not present insuperable difficulties in organization. Experience gained in the Army has been so extensive and so universally good that the projected civilian scheme might well follow the same lines. The smallest Convalescent Depot in the Army has 250 beds, the largest over 2,000, and in them all the cases are mixed. I have no doubt whatever that it is better, both in the Army and in civil life, to have very large units with mixed medical and surgical cases rather than to have a host of small units confined to members of one trade all suffering from the same complaint. The large unit is more economical, easier to administer and more efficient, while the mixing of cases prevents the individual from dwelling on his own particular form of disablement. At present trained medical men and P.T. instructors are not available in sufficient numbers for such a scheme to be started in civil life, even on a small scale. It is most strongly urged that consideration be given to training them now, so that there will be a sufficient number of trained personnel for use after the war.

It is earnestly hoped that the lessons relearned in this war of the great value of rehabilitation treatment in returning the unfit individual to work, fully recovered, in the shortest possible time, may not be relegated to the same oblivion as the same lessons learned in the last war.

Fortunately the Ministry of Health is fully alive to the need and is now making wide scale and far reaching efforts and plans to establish rehabilitation for civilians throughout the country.

For much wise advice and material help in compiling this article I am deeply indebted to Colonel P. S. Lelean, C.B., C.M.G., Professor of Public Health, University of Edinburgh.

APPENDICES.

Appendix I.

Hernia Exercises Practised at a Military Hospital.

(1) Rectus abdominis.—Lying on the back, draw the knees up, sliding the feet along the bed; as a progression of this exercise the feet can be lifted off the bed for a moment when the knees are fully bent. Further progression should be made by lifting the feet from the bed with the knees less bent until finally it becomes a straight leg raising to vertical. This should take from three to four weeks, the time depending entirely on the individual strength of the patient.

(2) Obliquus externus and obliquus internus.—Lying on the back, knees fully bent, grasping the sides of the bed. Roll the knees to left and right
as far as they will go without discomfort, keeping the shoulders flat on the bed. Progressed by lifting the feet off the bed before starting the exercise. Further progression made by performing the exercise with the legs straighter until finally they are quite straight.

(3) Transversalis.—Lying on the back. Deep inhalation followed by full exhalation. When the lungs are empty contract the abdominal wall and pull it in as far as possible. A few normal breaths should be taken between each repetition.

These exercises should be performed before the operation if possible in order to teach the patient the movements. They should be started again a few days after operation. The number of repetitions will depend on the individual but experience has shown that six times for each exercise is usual. The whole group should be done four times a day and continued after the patient is out of bed.

Further abdominal exercises will be found in the Official Army Pamphlet on Remedial Exercises—"Physical Medicine Remedial Exercises for the use of A.P.T.C. Instructors." 1943.

APPENDIX II.

THE REMEDIAL GYMNASIUM EQUIPMENT.

(1) Ankle Rockers.—Made by nailing a cylindrical stick (sizes varying from 1 inch to 3 inches in diameter) to the centre of the under side of a board 6 inches by 12 inches. When the man stands with his foot on the board and rocks it backwards and forward it gives flexion and extension of the ankle.

(2) Ankle Rollers.—Made by screwing half of a 4 inch diameter wooden ball to the under side of a flat circular board 15 inches in diameter. The man stands on this board with both feet and rolls it in all directions.

(3) Chair, with straps to fix the legs, for weight-and-pulley exercises for the feet only.

Lower Leg.

(1) A series of 12 hurdles, from 4 to 18 inches in height.
(2) Low rowing-machine.
(3) Two foot-benches.
(4) White lines leading to mirror to teach correct walking.

Thigh.

(1) Cycles (stationary).
(2) Bench for weight-and-pulley exercises for quadriceps.
(3) Rowing machines, fixed and portable.
(4) Wall bars.
(5) Step ladder of special design.

Hand.

(1) Roller machine, with varying sizes of rollers,
(2) "Sorbo" rubber rings, for finger grip.
(3) Tennis balls, for grip.
(4) Portable miniature ladder (made by nailing 1 inch rungs at ¾ inch intervals to 3 inches by 3 feet board) for finger-climbing.
(5) Tenni-quoit rings, for finger grip.
Wrist.
(1) Wrist roller-machine.
(2) Indian clubs.
(3) Skipping ropes.
(4) Fixed miniature ladder, for finger-climbing.
(5) Mariner's wheel, with break resistance.

Elbow Joint.
Various weight-and-pulley machines, fixed to wall and floor.

Upper Arm.
(1) Portable and fixed adjustable rowing-machines.
(2) Weight-and-pulley machines.

Shoulder.
(1) Mariner's wheel.
(2) Suspended trapeze.
(3) Suspended rings.
(4) Wall bars.
(5) Climbing ropes.

Spine.
(1) Pommel horse, for fixing pelvis.
(2) Benches, for lying across in extension exercises.
(3) Wall bars.
(4) Weight-and-pulley machines.
(5) Medicine balls.
(6) Weights, for lifting.
(7) Indian clubs.

APPENDIX III.

EQUIPMENT OF PHYSIO-THERAPY DEPARTMENT.

(1) 10 couches.
(2) 3 trestle tables.
(3) 4 infra-red lamps.
(4) 4 small radiant-heat baths.
(5) 4 large radiant-heat baths.
(6) 2 Mercury Vapour U.V.R. lamps.
(7) 1 carbon arc U.V.R. lamp.
(8) 2 combined tables.
(9) 6 Faradic batteries.
(10) 4 arm baths.
(11) 2 leg baths.

APPENDIX IV.

A TRAINING PROGRAMME.

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Rehabilitation

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**APPENDIX V.**

**FIRST OF A SERIES OF TWELVE PHYSICAL TRAINING TABLES OF GRADUATED EXERCISES FOR TRAINEES IN A CONVALESCENT DEPOT.**

**GRADE I.—GROUP (C)—GENERAL.**

**Part I.—Mobility (6 minutes).**

1. **Running Activity.** Running, medium pace, interspersed by one of the following: (i) Here, there, where; (ii) Small groups; (iii) Free touch.

2. **Arm and Shoulder.** (Astride, one hand on hip) One arm circling backward.

3. **Trunk.** (Astride, one hand on hip, one arm crossed.) Trunk and head turning with one arm swinging midway-upward.

4. **Leg.** Skip jumping to knee full bending forward, with finger support on given count.

5. **Arm and Shoulder.** Arms bending upward, stretching sideways, and swinging sideways-downward.

6. **Trunk.** (Astride.) Relaxed trunk bending downward to touch ground (1-4) trunk unrolling (5-8).

7. **Leg.** (Astride.) Jumping with arm swinging sideways.

8. **Correct Standing and Breathing.**

**Part II.—Strength and Endurance (25 minutes).**

1. **Strengthening and Competitive Team Games.** One of the following: (i) Line tug-of-war; (ii) Poison; (iii) Tunnel ball variations; (iv) Team passing.

2. **Trunk.**

   (i) (a) (Back lying, knees raise, neck-rest, elbow support). Knees lowering sideways to touch ground (in pairs).

   (b) (Astride, back to back, one yard apart.) Figure-of-eight passing backward to partner (in pairs) (medicine ball).

   (c) (Side standing, foot rest, hands on hips.) Trunk bending sideways towards raised foot (bench or improvised apparatus).

   (ii) (a) (Back lying, arms sideways.) Trunk swinging forward-downward with hands assisting, reaching as far forward as possible.

   (b) (Sitting, facing same direction, one yard apart.) Leg raising and passing ball under knees to partner (in pairs) (medicine ball).

   (c) High front support; arm bending (1-4), one foot placing forward, left and right (5-8) (bench or improvised apparatus).
(iii) (a) Prone lying (hands on hips). Trunk bending backward.
   (b) Astride, facing. Relaxed trunk bending downward and stretching forward throwing forward to partner (in pairs) (medicine ball).
   (c) High prone lying (hands resting on ground). Legs action for breast-stroke swimming, later (high prone lying, toes resting on ground, arms upwards, thumbs touching). Arm action for breast-stroke swimming (bench or improvised apparatus).

(3) Pulling, Lifting and Carrying:
   (i) Technique and practice of pulling (rope attached to tree or derrick).
   (ii) (a) Technique and practice of lifting and carrying various shaped objects 50-60 pounds in weight.
   (b) Two-, three-, and four handed method of carrying an injured man (in threes).

(4) Marching and Running:
   (i) Marching, with co-ordinated breathing.
   (ii) Running, cruising action.

Part III.—Agility (25 minutes).
   (i) Climbing, using arms and legs (free style) (vertical rope).
   (ii) Running side vault (benches or improvised apparatus, waist high).
   (iii) Running through vault to high, standing and immediate downward jump off both feet (benches or improvised apparatus crosswise).
   (iv) Forward roll (mat).
   (v) Backward roll (mat).
   (vi) Running forward high jump (jumping stands or low obstacles).

Part IV.—Final (3 minutes).
   (1) Marching with special attention to poise and carriage.
   (2) (Astride, hands on hips.) Breathing (full range).
   (3) Position of attention.