

# AN EXPERIMENT IN INDUSTRIAL REHABILITATION

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The objects of rehabilitation are many and varied and are interpreted in different ways, so that it is advisable to define what is meant by it in a particular context. For the purpose of this paper I am using E. A. Nicoll's interpretation:<sup>1</sup>

"The object of rehabilitation is to cure or reduce disability resulting from trauma or illness so that the injured or ill person is enabled to return to his ordinary work in the industry in which he is employed or, failing that, to alternative work in the same industry."

## HISTORICAL SURVEY

### *Pioneer Work*

Sir Robert Jones is rightly considered by both British<sup>2</sup> and American orthopaedic surgeons<sup>3</sup> as being the founder

of rehabilitation. He was the first, in his fracture service for workmen constructing the Manchester Ship Canal between 1887 and 1894, to introduce the idea of organized treatment of injuries. In the words of Frederick Watson, "it was like a rehearsal in miniature for what was then a cloud not even the size of a man's hand".

In the military orthopaedic centres established during World War I, it was again Sir Robert who introduced curative workshops, the most famous of which was founded at the Hammersmith Hospital, Shepherd's Bush, London, in 1916. Forty-three years ago, Sir Robert Jones, 'the greatest man in orthopaedic surgery' (to quote Sir Walter Mercer<sup>4</sup>), wrote the following explanation of the meaning of rehabilitation in his *Notes on Military Orthopaedics*,<sup>5</sup> thus setting a standard which the profession as

well as employers of manpower have, even today, been able to achieve in relatively few instances:

'In the orthopaedic centre the patient finds his fellows busily engaged in employments in which they are doing something useful. In the Military Orthopaedic Hospital at Shepherd's Bush, out of 800 patients, 500 are employed at some regular work which fosters habits of diligence and self respect.

'When the preliminary stages of operative and surgical treatment are over, there is a steady gradation through massage and exercises to productive work. If the patient's former trade or employment is a suitable one, he is put to use tools he understands, otherwise some occupation suitable for his disability and curative in character is found for him.

'Men with stiff ankles are set to drive a treadle lathe or fretsaw. If put on a treadle exercising machine the monotony soon wearies the mind, but if the mind is engaged, not on the monotony of foot work but on the interest of the work turned out, neither mind nor body becomes tired.

'Those of us who have any imagination cannot fail to realize the difference in atmosphere and morale in hospitals where patients have nothing to do but smoke, play cards, or be entertained, from that found in those where for part of the day they have regular, useful and productive work.

'Massage and exercise is no longer mere routine: it all fits in and leads up to the idea of fitness to work and earn a living.'<sup>6</sup>

#### Rehabilitation in North America

Between the wars there was a remarkable lack of interest in practical rehabilitation. In the USA acts were introduced which aimed primarily at vocational counselling and training with no provision for physical restoration or reducing physical disabilities. A few rehabilitation centres were established before 1920, but practically none between 1920 and 1940.<sup>6</sup> With the advent of World War

II, more centres were opened, but even in 1958 the 100 centres in the USA were concentrated in 26 states, the remaining 22 having none.

In Canada the world-famous Workmen's Compensation Centre at Malton, Ontario, began in a single room in Toronto in 1933. It expanded steadily, including occupational therapy in 1935, but it was only in 1947 that a residential centre was established on its present site.<sup>7</sup> The value of this centre is borne out by the fact that in Ontario only 3.77% of injuries covered by compensation are permanent. In New York the figure is 35-40%.<sup>8</sup>

#### Rehabilitation in Britain

In Great Britain, in 1925, Sir Robert Jones had the disappointment of seeing Shepherd's Bush revert to a Poor Law Hospital. In the same year, however, H. E. Moore established the Railway Rehabilitation Workshop at Crewe under the Midland and Scottish Railways.<sup>2</sup> Most of his patients with fractures had been treated elsewhere and were seemingly incapable of improvement. Yet of 165 consecutive patients of this type, 115 were returned to their former employment after an average period of 17 days in the centre. Of his work, the Editor of the *British Medical Journal* wrote: 'This work provides the strongest possible argument for the establishment in every industrial area of rehabilitation centres where graduated occupational and recreational therapy may prepare workmen for the stresses of heavy manual work instead of doing light work which is so often unavailable and unavailing'.

Others continued to extend the scope of rehabilitation, notably H. E. Griffiths at the Albert Dock Hospital, Greenwich, and Alexander Miller, who in 1935 established, at Motherwell, the first rehabilitation centre for injured miners. There he succeeded in rescuing 80% of injured Lancashire miners threatened with permanent disability. E. A. Nicoll founded a residential centre for miners at Berry Hill Hall, Mansfield.

World War II once again brought the need for rehabilitation to the fore and the Royal Air Force played a



Fig. 1. Workmen's accident and rehabilitation centre, Johannesburg. Patients at work in the remedial workshop. Most of the work done is carpentry.

Fig. 2. Industrial rehabilitation centre, Johannesburg. A non-ambulant tetraplegic patient in a wheel-chair bending figure-of-eight hooks in a jig designed to give work therapy.

dominant rôle in this work under the direction of Sir Reginald Watson-Jones who had earlier been associated with Miller in the Miners' Welfare Commission. From Miller's pioneer scheme and those of the RAF grew the whole international concept of rehabilitation as we know it today.

1943 saw the establishment at Egham<sup>9</sup> of the first rehabilitation unit supplying an industrial area and by 1958 there were 15 such units.<sup>10</sup> 1943 also saw the founding of the workshop at the Austin Motor Works in Birmingham, to be followed by centres at the Vauxhall Motor Works at Luton in 1945 and at the works of Platt Brothers, Oldham, in 1946.

#### *The Position in South Africa*

In South Africa industrial rehabilitation has progressed slowly but surely. In 1953 a non-profit company known as the Rehabilitation Association for Injured Workmen was formed.<sup>11</sup> This Association established the Workmen's Accident and Rehabilitation Centre, originally in the Colin Gordon Nursing Home and later in the Brenthurst Clinic, Clarendon Circle, Johannesburg. Here, full rehabilitation services are provided for workmen from the time of injury until they are fit to work again. Remedial workshops, where carpentry is the chief trade practised (Fig. 1), are provided, but there is no organized disposal of the manufactured products. By June 1959, 1,000 in- and out-patients had passed through the centre.

On 1 April 1957, the Department of Labour started a pilot industrial rehabilitation centre at Springfield in Johannesburg in the same grounds as the Sheltered Employment Factory.<sup>12</sup> This centre caters for the less severely disabled males and females who can be placed in jobs after their course of treatment which lasts, as a rule, not longer than 3 months. This is a purely outpatient establishment in which the patients make accessories for the Sheltered Employment Factory (Fig. 2) and are given physiotherapy and vocational counselling. In the first 2 years 106 patients were admitted to the centre.

#### AIMS OF A REHABILITATION CENTRE

As I have mentioned, the aim of any industrial rehabilitation centre is to restore the injured or ill workman to his normal life and working efficiency as fully as possible and as soon as possible.

It is believed that this can best be achieved by giving the patient useful work to do while carrying out the necessary exercises needed for full recovery. Elaborate physiotherapy departments are best avoided; preferably the patient should continue doing his own job on the plant, but there he lacks medical supervision. Light duty is condemned for the same reason; it can so easily become a scrap heap for partially disabled men.<sup>13</sup>

The ideal is a centre such as is found at the Vauxhall Motor Works, Luton. There men perform their tasks under medical supervision in a specially constructed workshop,<sup>14</sup> where the normal factory machines are adapted to provide the exercises required by the injured worker. At the same time the machines are used for their normal purposes, e.g. a single spindle drill press, which can be widely adapted, is the most useful machine of all. Workmen at the Vauxhall centre are paid their full basic salary

and a bonus. They work a full day, but rest is permitted when necessary and sedentary work is available for medical cases. Two engineers trained in occupational therapy run the centre under medical direction.

Stewart<sup>15</sup> claims that every factory of more than 7,500 men should have its own rehabilitation workshop and should be able to give full vocational training as well. Combined centres for smaller organizations are recommended.

#### AFRICAN EXPLOSIVES AND CHEMICAL INDUSTRIES REHABILITATION CENTRE

It may seem very ambitious for a comparatively small factory such as the African Explosives and Chemical Industries factory at Somerset West to attempt to establish a rehabilitation centre. When 3 long-term patients with lumbar-disc lesions spent 842 days off duty in 1 year, I was convinced that an attempt at providing a rehabilitation service should be made.

Certainly there were no other facilities available in the Hottentots Holland area (where the factory is situated), nor in Cape Town itself, 30 miles away. Long-term cases stayed at home, attending the physiotherapist once or twice a week, but contributing nothing positive to their improvement. Africans, not allowed in the housing compound unless fit for duty, languished in the wards until completely well.

It was under these circumstances that the Vauxhall Rehabilitation Film was shown at the factory in December 1956 by Dr. Martin Singer. This excellent film made such an impression that it was decided gradually to build up a small experimental centre at the Somerset West factory.

The object was to provide a small workshop under strict medical control, in which employees of all grades and colour could perform tasks useful to the organization and, at the same time, hasten their recovery.

The essential requirements of such a centre are as follows: (1) a suitable building, (2) suitable productive jobs, (3) the cooperation of employees and management, (4) the necessary machines and tools, (5) staff, (6) limited physiotherapy equipment, and (7) sufficient members to justify the centre.

#### *Establishment of the Centre*

We were fortunate in that the hospital bulk store (Fig. 3) occupied one room (30 feet by 30 feet) of a wartime corrugated iron hut, which was more than adequate for its needs. By a ruthless pruning of redundant stores and records, we were gradually able to move into this place without too many questions being asked.

The cement floor of this building had a central well; the roof was pitched, with no ceiling. Since the centre was not officially recognized and had no funds, machines had to be begged or borrowed. A sewing machine was the first acquisition and with this the first patient was able to sew together 'vynide' strips, which provided a lining for the walls and a ceiling for the roof. Next followed a bicycle lathe, then a punch, and so, little by little, the centre progressed in spite of many difficulties.

The whole idea was so new to South African industry that the men and their unions had to be convinced they





Fig. 3. View of the corrugated hut where the rehabilitation centre at the African Explosives and Chemical Industries factory is housed.

were not giving the company something for nothing. They had to be persuaded that their hard-won agreements were not being carelessly or dangerously circumvented. Furthermore, the rules of the Sick Fund state that no member may do work of any sort while drawing from the Fund!

Lastly, there was the attitude described by Samuel Butler in *The Way of all Flesh*: 'I reckon being ill is one of the greatest pleasures of life provided one is not too ill and is not obliged to work until one is better'.

The management were also dubious because (1) they were afraid the centre might become a convalescent home for 'crocks', (2) it was felt the factory was not big enough to support a centre, and (3) the types of jobs available at the factory did not lend themselves to production in a centre of this type.

Furthermore, it is hard to elicit support for a project in which, according to Kenneth P. Duncan,<sup>32</sup> 'it is impossible to prove financial gain'.

#### Factory Jobs

The factory has approximately 3,000 employees, made up of 2,000 African, 800 European and 200 Coloured persons. It produces primarily explosives and secondarily acids and chemicals, fertilizers, supported and unsupported plastic sheeting and paints. There are no repetitive jobs such as rivetting brake linings or bending copper piping

for motor cars. Such engineering jobs as there are, are predominantly for maintenance purposes.

In order to find suitable jobs, a search was made of the factory and every job analysed in terms of use to the centre. It is quite remarkable how supervisors shrink from the possibility of work being taken from them!

It was necessary, too, to analyse the types of injuries and illnesses commonly encountered in this factory. While the Vauxhall factory reports 60% hand injuries<sup>34</sup> most of ours are leg, back and arm injuries.

#### Running the Centre

Staff was a problem. An engineer with a good deal of common sense and an understanding of his fellow men is needed to run a centre such as this. He must be able to adapt machines to the needs of individual patients and at the same time persuade the reluctant and often suspicious patient that all that is being done is worth while and for his own good. Upon his ability and enthusiasm to get this message across must depend the success, or otherwise, of the centre.

Admission to the centre has, in the past, been voluntary except in factory accident cases and this has, on the whole, worked well. The patients do not receive special pay as they work only from 8 a.m. to 12 noon.

For 2½ years the centre grew up without supervision other than that supplied by the medical officers. This difficult task was made easier by the help of the Apprentice Supervisor and the engineering department as a whole. Most of the alterations to the centre were done by apprentices and many of the adaptations and alterations of machines were carried out by pupil engineers (Figs. 4-6).

Now, 3½ years after the first patient signed the register on 19 March 1957, it can be said that the employees have been convinced of the worth of the scheme and that the management and the directorate have backed it to the extent of allocating funds for expansion and for the salary of a pensioner as a part-time supervisor.

The centre has now been extended to include an adjoining room, thus enabling separate physiotherapy facilities to be provided and new machines to be erected. Table I lists the types of machines, their actions and

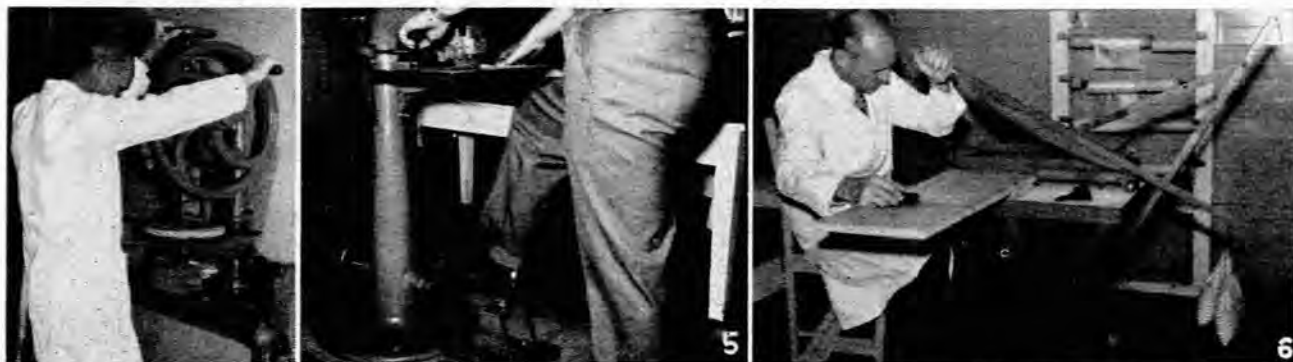


Fig. 4. Old drill adapted for cutting jointing and gaskets. It provides arm and shoulder exercises.

Fig. 5. A punch found on the scrap dump. Rotary movement of the ankle is required to release the clutch so that the punch can be operated.

Fig. 6. This guillotine has been converted so that the clamp works by leg action and the blade by hand action. Resistance can be added to make this either light or heavy work.

TABLE I. MACHINES USED AT CENTRE, WITH ACTIONS AND ARTICLES MADE

Type of machine	Action	Articles
1. Sewing machine (treadle)	Ankle	Aprons, fly-swatters, etc.
2. Sewing machine (pedal)	Ankle and leg	
3. Bicycle lathe	Leg exercises	File handles, etc.
4. Bicycle jute winder	Leg exercises	Rolling jute from one roll to another
5. Envelope punch	Rotary ankle exercises	Punches holes in envelopes
6. Hand drill	Arm and shoulder	Cutting jointing
7. Drill press	Arm and shoulder	Stamping A.E. & C.I. trademark. Drilling holes in flanges
8. Guillotine	Arm and foot	Cutting samples. Cutting paper
9. Wire turner	Rotation forearm	Wire handles for (1) brushes, (2) fly-swatters
10. Plastic welding	Leg	Welding various articles.

the articles which can be made on them. In addition, there are, of course, bench tools, and it is hoped to provide a press for back and shoulder exercises.

Articles produced, in addition to those mentioned in the table, include: Telephone directory covers, sun visor sets, letter and tape carriers, and plaster boots based on the Vauxhall pattern. The plaster boots have proved a great success and enable patients to walk normally and return to work very early.

Finally, a great deal of work has gone into the centre itself, e.g. painting, making tables, shelve doors, jigs for machines, etc.

TABLE II. PATHOLOGY OF PATIENTS VISITING THE CENTRE, WITH AVERAGE NUMBER OF VISITS

Pathology	No. of patients	Average number of visits
Back injuries	22	16
Meniscectomies	20	28
Knee injuries	23	9
Fracture—dislocations	13	40
Crushed hands	1	75
Minor injuries	21	5
Medical conditions	15	16
Paresis	3	59
Postoperative	7	13
Total	125*	29

\* Of the 125 patients, 88 were off duty (inpatients) and 37 on duty (out-patients).

Table II shows the type of patients attending the centre and the approximate number of visits. It has been found that patients after meniscectomy have returned to work more quickly and with less postoperative disability since

the centre has been open. These figures are by no means conclusive evidence that we are getting patients back to work more quickly, but the patients certainly are physically much fitter than at a comparable stage in the past.

#### CONCLUSION

The major difference, in my opinion, between this centre and the Vauxhall one—ignoring the discrepancy in size—is that those employees attending the Vauxhall centre are considered to be back at work whereas ours are still off duty. Until such time as this position can be remedied, the workshop will not have achieved its object.

I do, however, feel that this centre may prove to the sceptical that industrial rehabilitation is possible even in small units. It is certainly a practical proposition in areas where a group of factories could combine to provide the service or where a private organization could do the same thing. This, I believe, will be done in Cape Town in the near future.

#### SUMMARY

The history of industrial rehabilitation is reviewed with particular reference to the work of Sir Robert Jones and other pioneers in Great Britain. Mention is made of the work of the Workmen's Accident and Rehabilitation Centre and the Industrial Rehabilitation Centre, the 2 pioneer schemes in South Africa. This is followed by a description of the centre which was started at the Somerset West Factory of African Explosives and Chemical Industries in 1957, with special reference to the difficulties encountered.

I wish to thank Dr. J. Dalton, Chief Medical Officer of the Company, for permission to publish this paper, Dr. T. S. Eddy, my immediate superior, for his help and encouragement, the management for their patience and forbearance and, above all, the employees for overcoming their suspicions and helping to make the centre a success. I must also thank all those who sent me slides and photographs. Fig. 1 is reproduced by permission of the Department of Medicine, University of the Witwatersrand, Fig. 2 appeared in 'Rehabilitation in South Africa', and I thank the editor for permission to reproduce it here.

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