

The transfusion has been preceded by a moderate degree of bleeding. Then we have devised in our laboratory a method for the reconstruction of the common bile duct, which I think may be of interest to you. It was devised by one of the students, and consists in the application of the omentum to the side of the duodenum, along which a simple rubber tube has been placed which has a sponge attached to the end of it, which is passed into the duodenum through a small opening. It is a very ingenious device. Of course, the common bile duct is removed, and the tube takes its place. This tube is ultimately removed by peristaltic traction on the sponge. We have not had an opportunity to employ this technic long enough to see how permanent the good results will be. The fistula is not lined with fibrous tissue but with endothelial cells so that we hope its usefulness will be permanent. We have some cases which have been functioning perfectly for three months.

## WORK-CURE

A REPORT OF FIVE YEARS' EXPERIENCE AT AN INSTITUTION DEVOTED TO THE THERAPEUTIC APPLICATION OF MANUAL WORK \*

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It may be stated without fear of contradiction that suitable occupation of hand and mind is a very potent factor in the maintenance of physical, mental and moral health in the individual and in the community. Conversely, it has been recognized, though not too well emphasized, that the right kind of work, properly carried on, may be a valuable remedy in certain functional nervous diseases when unsuitable occupation has been the rule, when suitable occupation has been misused or when idleness, either from choice or necessity, has been the habit.

The normalizing effect of suitable manual work or even of well-chosen intellectual work on the neurasthenic or psychasthenic who has been idle or overworked and who has been for years the prey of mental and nervous complications, has only to be seen to be profoundly appreciated. In these cases in which the tired mind tortures itself with doubts and fears and spends the long days in useless self-analysis and in appreciation of mental and physical suffering, it is probable that progress toward health is often indefinitely delayed because no occupation is found or even attempted. But the difficulties in the way, first, of finding a suitable employment for the neurasthenic, and then of inducing the patient to exert himself in his own behalf are very great and have made progress along such lines quite slow. Unfortunately, it is also true that ill-advised work can be productive of positive harm and may result not only in deepening discouragement, but in the intensifying of all symptoms.

I have for a long time felt that adequate study of this problem could be made only in an institution devoted to that object. It is no more reasonable to suppose that such a complex remedial measure as work can be successfully used haphazard than that drugs and other agents should attain their fullest usefulness without the aid of laboratory or hospital experience.

Having these ideas rather clearly in mind, though without the cheering knowledge of similar work having been done elsewhere, I established, some five years ago, a small workshop for the making of hand-woven fabrics in cotton, wool and linen. The venture was looked on as a strange one for a busy general practitioner, and, indeed, the growing industry has been a serious financial

burden and a great consumer of time. But the lessons the shop has taught and the ease with which it has made possible the management of an increasing number of neurasthenic patients have in every way justified the experiment.

The work-cure has proved to be an excellent background and basis for medical treatment of the usual sort and for psychotherapeutic measures of one kind or another. It has also, in a surprising number of neurotic cases, proved almost the only remedy needed to bring about satisfactory improvement.

In pursuance of this industrial idea at Marblehead a number of the artistic crafts have gradually been introduced. These crafts are chosen because of their almost universal appeal, because of their essential dignity and because of the possibilities of very gradual acquirement. The crafts are chosen also because proficiency along such lines is a thing which may well be valued by any one, whatever the education or position in life may be.

From the first, the patient is taught to economize strength—to do deliberately and without undue excitement what simple manual work may be deemed advisable. He is shown, for instance, that he can saw through a piece of wood without grasping the saw with a crushing grip. The simplest mechanical acts are often at first chosen, as they give in themselves the least opportunity for mental and physical fatigue. These mechanical acts are repeated, with frequent intervals of rest, until they are accomplished normally and without fatigue. Gradually the difficulties and requirements of the work are increased, the essential point being the economy of nervous energy and the maintenance of a simple and direct mental attitude.

If the work has no interest to the patient he is asked to do it just the same and he is encouraged to expect results in the shape of better physical strength at least. There is never any pushing or urging, but always a plain statement of facts. "Do this, and you will in the end benefit by it, although at present it may seem to make you worse." The patients, as a rule, enjoy the novelty of the treatment and forget for the time something of their worry and suffering.

It is not hard to believe that after a certain amount of such mechanical education the mental processes take the cue, so to speak, and the patient finds himself thinking as well as acting in a simpler, more methodical way. It has been found by experience that if progress is made gradual enough the occupation may be pursued with astonishing benefit even in cases in which fatigue and pain would seem to prohibit any sort of activity.

The idea that manual work is wholesome and developmental, and that it may pave the way for successful medical treatment, or that it may be in itself a curative agent, is, of course, not new. But the systematic use of manual work for therapeutic purposes in an institution devoted to this object is believed to be decidedly new, if not heretofore untried in this country.<sup>1</sup>

It has seemed from the first that, to be most successful, the workshop should be pretty well divorced from

1. It seems that some such plan as this has been in operation in a public institution in Germany since 1899, in which year the first patient was admitted to the "Haus Schönow" under Dr. Lühr. At about this time also Grohmann in Zurich instituted a similar work, which is still in successful operation. Mention should be made of the excellent work of Dr. Blumer at the Butler Hospital in Providence and in one of the state asylums in New York when his efforts in the direction of the adequate employment of the insane were among the earliest in this country. Dr. J. J. Putnam at the Massachusetts General Hospital has within the past few years been making successful application of industrial therapeutics, as has also Dr. Fuller at the Adams Nervine Asylum. Mention should also be made of the work of Dr. Brown in California. Doubtless a good many individuals and many institutions not known to me are making daily use of similar methods of treatment.

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the sanatorium; consequently the attempt has been made to bring about this condition. It may be said that the shops at Marblehead represent primarily a practical industrial plant. The patients are apprentices and pupils; they are, of course, especially provided for in the way of opportunities for rest and in the matter of ordinary medical treatment, but no attempt is made to carry out the elaborate treatment, hydrotherapeutic, electric, etc., of the sanatorium. If the patient needs these things he should stay at the sanatorium until he has received their full benefit.

If we are to restore the patient to the fullest usefulness, he must finally give up these artificial aids, and it has seemed to me that they had better be given up, in the main, when the work is begun. Perhaps this is a mistaken idea and it may prove that industrial treatment may be carried on with success at the sanatoriums. The danger, theoretically at least, is that in the sanatoriums the work will too often be looked on as a pastime, that it will be too apt to occupy a secondary place and, therefore, to fail of its full value to the individual.

A division of the twenty-four hours into changeable periods of work, rest and recreation, plenty of air, wholesome food, wise suggestions and such medical treatment as may be indicated—these simple elements, together with a pretty complete detachment from all other obligations in life, represent in brief the industrial system of treatment.

This plan of treatment must exclude, for the time being, patients who are in need of constant care and nursing; but, owing to its great flexibility, it is available in some form in the management, at one stage or another, of a wide range of affections in which there exists a weakening or perversion of the functioning of mind or body.

If these premises are true, and the evidence is that they are, it should be of interest to the profession to know that such an industrial plant can be started and maintained by a general practitioner without initial capital and with very little outside assistance. The principal aid which the institution has received was in 1906, when I received from the Proctor fund, which is in the keeping of Harvard University, a grant of \$1,000 "to assist in the study of the treatment of neurasthenia by progressive and graded manual occupation." Last year a friend of the institution erected, at an expense of about \$600, an addition to one of the buildings. Other gifts amounting to \$300 have been received from time to time from various sources and applied to the work. Although the plan has turned out to be more of a charity than its founder hoped, it has treated, in the main, people who are able to pay something. I personally have made no attempt to provide food and lodgings; but use has been made of a small hotel in the immediate neighborhood. The work has been conducted, therefore, under somewhat unfavorable conditions, with little or no nursing care and with living conditions such as are ordinarily considered suitable for well people and not for invalids.

The crafts employed at Marblehead have been hand-weaving, wood-carving, metal-work and pottery. They are named in the order of their clinical or therapeutic usefulness. The weaving has proved of unexpected value in that it provides a lively and growing interest with immediate and tangible results and from the fact that, as a general exercise, the old-fashioned hand-loom is a success. These great looms require simple but strong and effective motion of arms and legs simultaneously.

Another advantage is that the coarse-textured woven fabrics do not require too close a use of the eyes.

Wood-carving affords excellent use for hands, eyes and muscles. The wood-work is particularly useful to beginners, as it gives opportunity for broad free arm movements of especial service as a balance to the finer, closer work which taxes the patience and endurance.

The metal-work is perhaps the least useful from the therapeutic point of view, and yet in certain cases it is of especial value. It has against it the facts that it is slow, requires very accurate fitting and measurements and dexterous handling of special tools. In its favor are the moral support and satisfaction which comes from having mastered a hard, intractable material. It is true, also, that some of the processes are relatively simple—notably that of polishing. Another good feature of this craft, particularly for pupils well on the way to recovery, is to be found in the hammering. The interest in the work is often so great that the noise and shock of the hammering pass unnoticed, thus accustoming the patient to harsh sounds—a not unimportant part of the industrial plan.

The pottery industry, although most of this work is done by the craftsmen rather than by the pupils, has developed very rapidly. The potter, who came directly from the State School of Pottery at Alfred, N. Y., proved to be a man of unusual ability. This young man with an able corps of designers and assistants has in a few years developed a ware which now ranks very high among the best ceramic products of this country.

It is interesting and suggestive to note that six out of the ten people now employed in teaching the crafts or as assistants came to these shops originally because of some physical or nervous handicap, but are now performing in full or nearly full capacity the exacting work of their positions.

I approach the matter of classification of cases and tabulation of results with a good deal of diffidence—not that I am ashamed of the results, but because it is so easy to overestimate or underestimate the results of this kind of treatment and because classification of the functional nervous conditions is still very unsatisfactory. During these first years of the institution most of the available energy and money has been devoted to the improvement of the industrial plant. The sanatorium possibilities have been sadly neglected and no attempt has been made to attract patients otherwise than by the excellence of the shops themselves. The figures are more interesting, however, on that account, for they suggest much better results with a constantly improving equipment. During the five years exactly 100 patients have been treated—9 males and 91 females. The accompanying table gives, as nearly as can be estimated, the results of treatment.

RESULTS OF WORK-CURE

Name of Disease.	Number Treated.	Improved.	Much Improved.	No Relief.
Hysteria .....	18	15	1	2
Insanity * .....	5	2		1
Neurasthenia severe .....	12	7	4	1
Neurasthenia mild .....	20	12	8	0
Neuroses .....	17	8	5	4
Psychoses or fixed idea .....	8	1	3	4
Unclassified .....	20	14	4	2
Totals .....	100	59	27	14

\* It is not intended to treat at Marblehead any case of insanity. These cases were accepted in the early days of the institution.

Among these cases there were three cases of chronic appendix inflammation, subsequently relieved by operations. There were fourteen cases of defective vision wholly or partially relieved by glasses.

It has been somewhat difficult to keep track of the patients, but relapses have been very rare—relapse, that is, to conditions as bad as or worse than those for which relief was originally sought. Not counting those who have remained as teachers and assistants, the average stay has been three months. Ten patients have returned one or two times for continuance of treatment or instruction. As far as can be ascertained, about 25 per cent. of the patients have in some measure kept up their work and their interest in the work after leaving the shops. In a number of cases outfits of looms and accessory sets of carving tools, etc., have been furnished to pupils who wished to continue the work.

It should be said that the shops have to some extent been used as a school of applied art by persons who are not ill at all, but who wish to study one or more of these ancient crafts. Incidentally, too, there have been pupils who came as students and not as patients who found unexpected relief from cares and troubles in the atmosphere of quiet work.

The shops have already taken steps toward the establishment of a training-school where young women or nurses who wish to become qualified as teachers of these crafts may obtain the necessary training. It is hoped that these young women may extend the usefulness of the shops by acting as private instructors in the homes of patients or by teaching at other institutions.

It must not be inferred that progress has been altogether easy. On the contrary, as has been stated, the school has represented a serious financial burden. Mention should be made here of the fact that several of the craftsmen and teachers, appreciating the humanitarian element of the work and in view of possible future financial success, have been willing to work for a very little money—practically their living expenses—and in one case without any reimbursement, thus making possible the continuance of the institution.

The plant is very nearly self-supporting now, largely from the sale of its products, which are of excellent quality, thanks to the intelligence and constant activity of the skilled designers and craftsmen, to whom too much credit cannot be given.

I have found that the ideas embodied in this work appeal, as a rule, not only to the profession, but to people generally, and, finally, to the patients themselves, who rarely object to the life and who have often, indeed, found in it the elements of happiness and success.

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## PRINCIPLES UNDERLYING SURGERY OF THE SPLEEN

WITH A REPORT OF TEN SPLENECTOMIES \*

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Our knowledge of the function of the spleen has been so vague, and our ability accurately to determine its physical proportions so unreliable, that it has been impossible to recognize diseased conditions until they reached a stage so advanced that splenectomy became a necessary consequence. Therefore, surgery of the spleen has been destructive in character. Recent investigations lead to the speculation that many of the anemias and associated blood states may ultimately be best treated

by operative procedures directed to the spleen and other blood-forming organs.

In its ontogeny the spleen probably goes back to a time before the development of the cerebrospinal nervous system. This is indicated by the fact that its only known nerve supply consists of filaments derived from the splanchnic sympathetic to the capsule, stimulation of which causes contraction. It is an organ of internal secretion controlled by chemical stimulation through the blood stream, in many respects resembling the liver. We may surmise that this form of stimulation has been quite adequate for function, otherwise the spleen would be more closely associated with the sympathetic ganglia, as are the adrenals and pituitary body. The internal secretion of the adrenals and pituitary produce their effect not only by chemical stimulation through the blood, but also by direct action on the sympathetic ganglia which enables a very small amount of secretion to produce widespread results. The sympathetic nervous system can be compared to a piano, the internal secretions being the fingers of the player, or to an internal telephone exchange within a building; and it enables small organs with scanty secretion, like the parathyroids, to work in harmony with other organs of internal secretion.

Evidently the internal secretion of the spleen is not important, as splenectomy does not produce serious results, the associated organs taking up the function.

A study of the spleen leads to the conclusion that it possesses three distinct functions: First, it takes part in blood formation, in which it is associated with the bone marrow, lymphoid and adenoid structures of the body. Second, it is a destroyer of worn-out red blood cells. Third, it acts as a filter of micro-organisms which may be contained in the blood and which are passed thence to the liver, probably for complete destruction and also as an aid to the liver in carrying on certain functions in relation to the metabolism of the food.

The fetal blood is derived from the spleen, liver, bone marrow, lymphoid and adenoid structures of the body. The liver loses this function some time before birth. In the adult the red cells are largely formed in the bone marrow, and the white cells in the lymphoid and adenoid tissues, including the spleen. In health the spleen loses its power to develop the red blood corpuscles and retains that of white cell production only to a limited degree, its chief function being to destroy worn-out red blood corpuscles. The ancestral blood corpuscle, from which both red and white have their origin, is probably the mesenchyme cell, a form of lymphocyte which appears first in the fetal blood. In leukemia there is a reversion to the ancestral lymphocyte or fetal type. In the grave anemias there is a tendency to reversion to primitive red blood cells, showing granular corpuscles of various sizes and shapes.

The spleen receives its blood supply from the celiac axis, identical in origin with the blood supply of those important derivatives of the foregut—the stomach, pancreas and liver. It does not, however, send its blood directly back into the general circulation, but the splenic vein joins the superior mesenteric and gastric veins to form the portal system.

It would appear that the liver, among other functions, neutralizes toxins and kills bacteria which may be picked up by the portal radicals from the digestive tract. Perhaps the spleen with its huge blood supply acts like a large lymphatic gland performing some analogous function for the general circulation; but that its blood must be still further changed by passage through the liver

\* Read in the Section on Surgery of the American Medical Association, at the Sixtieth Annual Session, held at Atlantic City, June, 1909.