

Industrial Nursing

WEDNESDAY AFTERNOON SESSION

October 6, 1943

Presiding—Mrs. Christian Seabrook, R. N., Local Group Nursing Supervisor, Metropolitan Life Insurance Co., Chicago, and Chairman, Industrial Nursing Section, N.O.P.H.N.

Records—the "Seeing Eye" of Industrial Medicine *

BY WILLIAM J. FULTON, M.D.

Medical Director, Eastern Aircraft Division, General Motors Corp., Baltimore, Md.

Starting point number one—and the point on which all to follow hinges—is the adequate manning of an industrial medical department to give prompt and efficient service, and to maintain records that meet minimum standards.

We will briefly review the services of an industrial medical department, exclusive of physical examinations or physician's time, and call them the direct service items.

The time required to attend to the wants of each of these patients varies with different types of service, and each service calls for many timings in order to arrive at an over-all average. Analysis of ten thousand stop watch studies of all types of plant hospital service resulted in an average of 11.57 minutes. We feel confident it is applicable to the great majority of medium type industries, such as airplane and automobile assembly plants. 11.57 minutes will go into an eight hour day (480 minutes) a fraction over 41 times, which leads to the conclusion that one nurse can take care of the direct and indirect services to not more than 41 cases per day—if those services and records are to be of good quality.

Two other general rules may be laid down here; namely, first, that where shifts are eight or more hours in duration, a case seeking one of the items of direct service just outlined will come through your doors for every 120 man hours worked; second, during any single shift,

one case for every fifteen employees working will seek some form of service.

This second general rule (one case per fifteen persons per shift) leads to another conclusion; namely, that 41 times 15, or 615 employees, working on any one shift, will produce sufficient direct service cases to keep one plant dispensary nurse or attendant completely occupied. The number of cases per day produced by 615 employees will range from 32 to 50.

Consider that this service is required only for the cases that come through your doors, and that we have left out physical examinations which, exclusive of physician's time, require from ten to seventeen minutes of hospital personnel time. Add this consideration to the foregoing and we have a basis for calculating the necessary hospital personnel to give adequate service and produce records of the type that we are going to discuss.

Cost of Under-Manned Staff

A startling amount of production time can be lost through the inefficiency of an under-manned medical department, to say nothing of the costs and poor quality of service. Every penny's worth of bad medicine that results from under-manning will be multiplied to a dollar's worth of bad personnel relations.

Finally, if industrial medicine is to get out of the flat cost bracket and is to enter the field of practical applied prevention, it must be additionally manned. It is only in the range above personnel adequate to

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care for the direct service that industrial management is justified in expecting returns on medical investments in reduction of accidents, occupational hazards, sick absenteeism and insurance premium, and an improvement in personnel relations and environmental hygiene.

Foundation of Records

Now let us start our industrial patients through the dispensary and lay the foundation of our records. Here is a 3x5 form, carried in pads by the foreman. Emergencies excepted, all must present it. It is made in duplicate. An automatic time clock stamps the time of dispensary arrival and departure. The duplicate is returned by the patient to the foreman. On this pass the foreman has noted the name, clock number, time of the accident, and indicated by an "X" the exact spot in the plant where the injury occurred. The dispensary personnel adds the following data. In the upper left corner, the anatomy, such as face, arm, eye, cornea, leg, etc., in the upper right corner, the type of injury, such as laceration, puncture wound, burn, fracture, embedded foreign body, etc., and, across the top, the date is stamped. These slips are sorted and filed as to type of injury. We call this the accident prevention file. It is kept up to date and at all times is at the disposal of the director of safety. The use of this pass as an instrument of accident prevention will be demonstrated later.

Aside from safety, this pass has several other attributes worth mentioning. It prevents waste of production time by loitering. It partially regulates the flow of surgical redressings and minor complaints through the plant dispensary.

Surgical Card

Here is the 5x8 surgical card, on which is recorded the complete history of any injury, from admission to discharge. This and all similar forms have been whittled by experience to a point that will satisfy maximum simplicity and practical adequacy. Three points should be stressed:

1. The exact time and date of the occurrence of the accident or onset of the complaint.

2. The exact time and date of the initial report by the patient.

3. Meticulous recording of the employee's statement in his own words and, preferably, in his presence.

The reverse side holds the record of subsequent redressings or treatments.

A few remarks are in order here on the tendency to highlight the importance of potential legal defense in the making of medical records. Ascertaining the true facts regarding injury or illness is more important medically than legally. Make good medical records and any need for legal application will be met automatically.

Redressing Sheet

To facilitate the recording of redressings in a busy dispensary, each staff member has a redressing sheet for each shift. On it, they record the time, name, clock number, treatment and progress note of each case handled. These are subsequently entered by the same staff member on the reverse side of the surgical card, and checked off on the redressing sheet. These sheets lend themselves readily to summing up the total number of revisits at the end of the shift.

This 3x5 card holds the record of each initial medical complaint: the diagnosis, treatment and the final disposition of the case. When the severity of the symptoms warrants sending the patient home, a duplicate pass home for sickness is made out. One copy is attached to this card and the other passes through the personnel department. These cards are filed alphabetically in a permanent yearly file.

When an employee is absent from work or late, the clock card is replaced with a red "absent report" card. If the absence or lateness is due to any type of physical condition, the employee must pass through the dispensary for a check-up before being allowed to return to work. This is obviously a valuable safety and health protective measure. The dispensary staff indicates the ability or inability to return to work on this card and returns it, along with the employee, to the personnel department. In order to keep track of the number of these absentee cases, a tally sheet for each shift is kept near the files.

On this, each case is indicated by a small pencil mark. This sheet is also used to record those cases of injury that require treatment by outside surgical or medical consultants.

When the physical condition of an employee, following injury or illness, indicates a change in work, a slip is made out in duplicate—one copy going to the supervisor, the other copy being clipped to the employee's medical record card.

Daily Hospital Report

At the end of the shift, the surgical cards, redressing sheets, medical cards, passes home for sickness, and absentee tally sheets can be quickly totalled, divided into men and women, and entered on the daily hospital report. This report is made up for each 24-hour, 3-shift, period. This same form serves to hold the total monthly, quarterly, or annual report, copies of which are forwarded to management, personnel and safety departments.

In order to facilitate the making up of monthly reports, a time and labor-saving "recap sheet" is used. It measures 17x11 inches, has thirty-one horizontal lines, and columns for the items recorded on the daily hospital report form. The totals from the daily report are entered on this sheet every day. When the end of the month (or any other period) is reached, we are in a position to arrive at our totals quickly. It is from such data, kept over a long period of time, that our time studies and calculations to determine adequate hospital personnel are made.

Attention is called to two facts in regard to the development of our records from this point on: First, it adds one minute and ten seconds to each direct service case, including totalling the data and filing the pass to the hospital, and has been included in our time of 11.57 minutes per case. Secondly, this system need not disrupt or displace any system or type of recording now in effect, but may be installed as a valuable adjunct to it. From here on we make our individual records *live*.

Index Record

Based on day-to-day experience, we have developed a 5x8 reversible card, di-

vided into 512— $\frac{1}{4}$ "x $\frac{1}{2}$ " sections. It is divided into a surgical and medical side, and is capable of holding, in code, a ten to fifteen year record of every injury and medical complaint on the job, along with other items entered in code on medical side, such as periods of employment, leaves of absence, physical examinations, personal contacts, etc. We call this form the index record of plant hospital service.

The entire surgical code consists of a minimum of symbols, has been based on practical experience, permits further additions to its present construction, and can be easily mastered in two weeks practice by any grammar school graduate. It's a simple form of industrial medical shorthand.

Let us return to the surgical record card of our eye injury case, and enter it on our index record. Now let us enter a medical record card for the same individual.

Sick Absenteeism Data

To have signed and returned to the personnel department the red absent report card, without further ado, would have thrown away the opportunity to record sick absenteeism. We have taken advantage of it for some years. Here is the 5x8 card designed to hold sick absenteeism data. It is a simple form, carrying two columns down the right side which indicate "calendar days" and "working days." Here we enter a record of sick absence for the same individual. The standing orders for sick absent recording are as follows, from left to right; first, the day of the week and date of employee's return; next, the "off date" or date of the onset of disability, including the day of the week. Next the diagnosis. If the employee had no medical attention of any kind and makes his own diagnosis, put it down in his own words and always put quotation marks around it. If the diagnosis is professional; i.e., by dispensary staff or via a physician's note, record it without quotation marks. Any note from a physician is filed in an envelope bearing the physician's name. The presence of such a note in the file is indicated on the absent record. Keeping such a physician's file is of great value. Lastly, the time

lost is recorded in calendar days and working days.

We are not going to discuss pre-employment and periodic physical examinations in detail in this presentation. They should be mentioned, however, to complete our individual record. The examination form has been greatly simplified, and folds to a 5x8 size. All practical data derived from each examination, that is of value in proper placement, together with medical department ratings, etc., is forwarded to the employment and personnel departments on the request for physical examination form.

These three records (physical examination, index and absent) are kept together as one unit in a pocket. The pockets are filed alphabetically in trays.

Value of Individual Records

Here should be stressed the importance of keeping medical records active and up-to-date. To do this, it is essential that the medical department receive routinely the daily report of the employment department to management. This type of report contains—new hires, lay-offs, transfers and various leaves of absence, etc., including names and dates. Failure to keep your files cleared, by this means, will soon find them hopelessly cluttered with inactive records, and your all important record of periods of employment will be lost. Routine file clearance is especially important in times of a high rate of employee turnover.

A discussion of all of the values and varieties of application of this combination of individual records would take thrice our present allotted time. We can only enumerate a few points.

1. In dealing with large numbers, the efficiency of individual application is enhanced and the personal relationship of medicine to patient is markedly improved.

2. The time and labor saved in reviewing individual histories is tremendous.

3. The value of any therapeutic or safety measure can be swiftly and accurately evaluated, individually or collectively, the conclusions having the added weight of large numbers, backed by records of other individuals that constitute controls.

4. The ground work for research in almost any form of occupational hazard is made available—research by groups, ages, occupations, etc.

5. Data covering a cross section of the population, for a long period of time, is made available for all forms of industrial, local, and national statistical research.

6. The actual degree of hazard to health and safety of any operation, process, occupation, material or group of materials can be accurately measured and compared.

7. The safety factor relevant to any operation analysis can be accurately computed.

8. The relation (if any) between sickness and accidents can be established.

Rating and Comparing Records

Our individual records are now condensed into a simple, accessible unit. Before a fair and practical individual application can be realized, some base line or standard for measure and comparison must be made. To establish our base line for measuring and comparing, we divide the total number of each of our three recorded items—namely, injuries, medical complaints, and sick absenteeism—by the average number of employees working. This produces a table of averages which may be used as a standard of measure or to compare the individual employee with his fellows. We have used two periods to illustrate how the standard may vary, by sex, in proportion to length of the work week, or under conditions of peace or of turmoil.

Our standard is now set by which the medical department may rate fairly and compare accurately an employee's status in safety, medical complaints while on the job, and number of sick absences. Further, these visible, condensed records paint a day-to-day, ever-changing picture of each individual, continually singling out those who need attention in some phase of safety and health.

The Problem Group

Before we go on to the method of application and the measure of its success or failure, some further general truths should be stated—general truths that have

come from repeated mass analysis of these records over a period of years and from recorded observation of those who have made these records. Repeated analyses of the index record of plant dispensary service over an eight year period invariably lead to the same basic conclusion:

PER- CENT- AGE		PER- CENT- AGE
Accidental Injuries and Medical Complaints		of Total Employees
80 to 85%	are produced by	30%
15 to 20%	are produced by	60%
0%	are produced by	10%
100%		100%

There are some observations pertinent to this basic conclusion that should be recorded.

a. Not only do the mathematical percentages remain constant, but the individual employees within the percentage groups, to a large extent, remain the same individuals. This holds true regardless of length of service, transfers among occupations that are hazardous by varying degrees, location in the factory, etc. There are, of course, employees who pass back and forth from one group to another, but they form a minority in each group.

b. There is no consistent connection between the physical condition of an employee as determined by pre-employment and periodic physical examination and the plant dispensary record that the employee accumulates. We find no evidence to support the theory that employees who, at pre-employment physical examination, were found to have major physical disabilities and were classified as physically below average are any more prone to injury, sickness on the job, or sick absenteeism than are those who were judged to be physically above average.

c. Comparison of the plant dispensary record with that of the personnel department demonstrates that a majority of those making up our basic 30% group produce the majority of problems for supervisors, personnel and safety departments. It is

within this group that we find the preponderance of neurotics, indigents, irresponsible, and otherwise below par brothers and sisters.

The foregoing conclusions and observations add up to this—environment, occupation, physical condition, etc., play the minor role in the incidence of injury and physical complaints during working time. The major role is played by what we term "the human factor." A safe and an unsafe worker retains the same status regardless of environment and occupation. We do not intend to convey the idea that the status never changes. It does. We do, however, point out that, with extremely few exceptions, the status of those individuals who make up our basic 30% group never changes so long as they are left to their own devices. When a change for the better does occur, the reason can almost always be traced to some personal attention paid directly to the individual.

Some comfort may be derived from these conclusions in the realization that at least 70% of our industrial family is composed of good, average, safe and relatively healthy American citizens. This emphasizes the point that "an industrial medical department, manned only to take care of direct dispensary service, is at best realizing but 40% of its potential value to industry." Our safety, personnel and medical departments should be sufficiently manned to do more for our dependable majority. Too often they are truly "the forgotten men."

Applying the Records

We are now in a position to make our records live, and to apply them. Let us outline the machinery of application, follow-up, and evaluation. Every visit to the dispensary affects someone's record in some way. The members of the dispensary staff making the entry on the index or absent record are familiar with the basis of measure. Trained to recognize deviation from the average, or unusual departure from the past record of the individual, they are expected to act immediately on these occasions. Where accidental injury is the offender, the case should be referred to the safety director. Medical complaints and sick absenteeism are ini-

tially medical problems, and are handled by the plant physician, the head nurse, or other staff members that they may designate. Frequently, cases turn out to be distinctly personnel problems. Lastly, some may become the problem of superintendent or higher management.

Let us take a look at a typical case. This employee has worked only three and one-half days, yet already has suffered three accidental injuries and registered one medical complaint. This is distinctly a case for the director of safety. The nurse immediately sees to it that the index record, together with any pertinent observations and remarks, is transcribed on a form and to this is attached a 3 x 5 personal contact record card. Both are forwarded to the director of safety. The nurse enters the code symbol on this employee's index record to indicate this personal contact. After the safety director makes whatever investigation he deems necessary, he records his findings and action on the personal contact card, and returns it to the hospital file. This is the record of the entire transaction—including the notes by the safety department and the request for follow-up in thirty days. The investigation by the safety department located the underlying cause of these accidents—"horseplay"—and corrective measures are being taken. The date for follow-up of the case is set and noted on the hospital calendar. When the follow-up date is reached, a glance at the individual's record will serve to measure the effect by comparing the recorded items after the date of the personal contact with those before. This appraisal will determine what future action may be necessary.

When the appraisal indicates that definite improvement has taken place, you are faced with the most important follow-up of all; namely, to call the individual in and tell him about it. I know of no maneuver that better promotes morale and if omitted, creates a more subtly damaging psychological effect. This same routine of find-the-case, action, record, follow-up, measure, and evaluate is carried out in all such personal contact cases.

Collective Study

Now we leave the individual and go into the collective study of accidents. In so doing, we hope to demonstrate that industrial medical records, applied co-operatively, serve to further safety and act as its guide and measure. What we have to say here deals specifically with accidental physical injury, but bear in mind that such studies are likewise applicable to all phases of industrial hygiene.

Kept hanging near the surgical treatment booths in the dispensary is a simple mimeographed form that we call the medical log. A clean sheet is begun each shift. Immediately following the care and recording of a new injury on the surgical card, this data is transferred to the medical log by means of pencil marks. The entry requires but a few seconds.

This log record is at all times accessible to the safety staff, and places in their hands an ever present mint of material that automatically serves as an instrument to direct numerous attacks at the source of accidents. Observing a rise in any type of injury, the safety director can refer to the accident prevention file, spot the individuals and locations immediately, and put control measures in motion without undue delay. This type of accessible co-operative record also saves much time that would otherwise be required of medical and safety personnel to make many individual queries and investigations. It has one more point worthy of note—namely, it takes from other than professional personnel the necessity or excuse for general access to medical records that are properly accepted as being confidential.

At the end of the day or shift, the pencil marks on our medical log are totalled and can be permanently recorded. Here we build the material for research too comprehensive to discuss in detail. The weather reports, absenteeism, and many other items may be correlated with it. Here, hour by hour, is the bedside accident chart of our collective patient, the barometer of injury, and the hidden answer to many unsolved problems.

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Anatomical Distribution

The final portion of our one minute and ten seconds is spent on the entry made on the anatomical distribution of injury form. At the end of the day the surgical cards are entered with small pencil marks. It can be done quite rapidly. This form serves as a cross study of types of injury (horizontal columns) with anatomy (perpendicular columns). Each month, or at any other desired period, the pencil marks are added and the totals recorded. By dividing the total of any column into the grand total of injuries, we may get a ratio index for each horizontal or perpendicular item. A year or more of such a study establishes a standard for each type of injury or anatomical part. We have learned from long observation of this ratio index that certain types of injuries, like many diseases, are epidemic and that seasonal variations are almost constant. The same is true of injuries to certain parts of the body. This type of study is of more than academic interest. It is capable of numerous practical applications and is an instrument that indicates the optimum time to "bear down" if you would prevent a recurrence of undesirable past experiences. The anatomical distribution record is, like the medical log, accessible to the director of safety, and can be applied much the same way.

We deem an injury severe if it reduces the efficiency of the patient fifty percent or more for any period over four hours. We express severity by the factor resulting from dividing the number of injuries we deem severe into the total number of new compensable injuries. This measure has been watched over a period of years and proves to be an accurate and valuable measure and prognosticator. It is a simple measure and easily understood by management.

Corrective Measures

What is done when our measure spots a rise in any particular type of injury? We know from past experience that if something is not done, severe injuries soon occur. Let us use eye injuries as an example. A sudden rise in the frequency or severity is noted. The last hundred passes to the hospital, filed under eye injuries, are taken from the file and beginning with the remote date, they are rapidly plotted on the factory map with tacks. No time-consuming plant inspection by safety committees is necessary. Two closely grouped tack areas disclose and eliminate the hazards responsible for the epidemic.

Thus we begin and end our study of accidents with the little pass to the hospital. It is the Alpha and Omega, and furnishes the five "W's" of safety—who—where—when—what and why.

Thus we conclude, leaving it to you to decide whether or not the information accumulated in our one minute and ten seconds of extra recording per case will prove to be a worthwhile investment. Our aims are set forth, and the basis for realizing them made concrete through the planning of various types of records. Our "seeing eye" is now ready to function. It warns of danger, the presence of unsuspected and alien influences; it automatically records and reveals data which enable us to improve the whole society of industry in health, safety, and mental hygiene. The "seeing eye" is a miracle of electrical engineering; records—our "seeing eye"—open the door to vast opportunities in human engineering. Dreams and medicine may not sound like a practical combination, but if you would make progress, do not be afraid to see visions and work toward their fulfillment. A last thought—to its patients and to the nation industrial medicine has much to give—nothing to sell!

THURSDAY AFTERNOON SESSION

October 7, 1943

Presiding—Joanna M. Johnson, R.N., Supvr., Industrial Nursing Div., Employers Mutuals, Wausau, Wis.

Nurse's Part in Physical Examination Program

By H. GLENN GARDINER, M.D.

Medical Director, Foote Brothers Gear & Machine Corporation, Chicago, Illinois

There has been a change of recent origin in the part the nurse plays in a physical examination program.

The changes in status have, in certain instances, not been simply those of privileging ourselves to use the nurse increasingly in the simple mechanics of the examinations, but in the interpretation of findings as well.

There is no question that there is a considerable lack of competent available physicians which is a challenge to use in the manner of utmost efficiency the time of those we do have. It does not require any great amount of initiative to set up a procedure so that one physician assisted by two or three nurses can, without difficulty, examine 100 or more examinees in an ordinary working day. The quality of this examination can be far better than today's average and is completely adequate for today's needs. We simply substitute a streamlined means of examining which is necessary for the duration, yet contains the essentials found apropos in our peace time activities.

The nurse can call for the physician to double check any of the obvious abnormalities detected, but what of the borderline or hidden cases in which the training and experience of a physician are often taxed to detect and interpret? Certainly the nurses' training and experience are not such that they can be expected to display such achievement. Yet these are the very cases which have, in many instances, shifted the scale to a proven economic advantage to industry of a physical examination program. No matter how willing and well meaning the nurses may be to accept it, we are not playing the game fairly when we thrust such responsibilities on their shoulders.

Much of the effectiveness in creating the desired impression upon the incoming applicant and in determining his decorum as a worthwhile employee is effected by letting him know that his employer thinks enough of him to provide for him in many ways. The first example he meets is the dignity, care and consideration at the time of the preemployment examination. Thus, he will carry the memory of his reception in the medical department as the representative attitude of the company with which he is affiliating himself.

Dividends of many types are to be expected if these impressions are what they should be. They may be minimized by any apparent lack of attention such as that of an examination without a physician.

In these days of war there is a perfectly natural coincidence, lending material aid to the cause for the use of nurses in the physical examination program. Most of our nurses are female and our present great influx of workers in industry are female too.

Another important factor in facilitating a maximum number of reasonably complete examinations in the minimum time possible—and thus the most efficient *modus operandi*—is that of the physical layout of the examination and dressing rooms used. If a large number of examinations are to be done routinely, or if the examinations are done on both sexes, it is almost a must that two examination rooms be used.

Each examination room should have two dressing rooms attached—each having a door opening into the examination room proper and another door opening into the exit hall. In addition, these dressing rooms should contain facilities for obtaining urine samples as well as for dressing, with hooks

for clothing, a place to sit while waiting, a mirror, etc. Each examining room should have doors permitting the coming and going of the physicians and nurses without going through the dressing rooms.

Perhaps the best way to bring out just what is our conception of the part a nurse takes in a modern, comprehensive physical examination program is to give a general outline of procedure. For convenience, we will suppose the examinee is feminine and enters the examination routine fresh from her interviews in the employment department. After recording her name, she is given a preliminary eye test—preferably by orthorater which has been selected for its speed and efficiency, and is operated by a lay technician.

A nurse then records the age, sex, address, marital state, color, number of children and their ages, etc., and includes a careful history of serious illness and injuries, operations, menstruation, admitted defects, deformities, or weaknesses, previous occupations and the position sought now. If these findings are to be of full value the nurse must not only have a general knowledge of such procedures coupled with more than a little tact and friendliness, but a special knowledge in the art of developing the loose ends of a history, into a lucid revelation of conditions which may materially influence the attitude of the physician in classifying the examinee and in placement recommendations.

The examinee is then escorted to a dressing room where she changes to an examination gown. While she is waiting

for her examination a urine sample is obtained and blood pressure, temperature, pulse and hearing records are taken by the nurse. During the examination the nurse records the findings as dictated by the examining physician. Additional laboratory tests, if indicated, are then made before the examinee is allowed to dress in street clothes. In many instances the laboratory technician is a nurse who if not too busy may function in addition as one of the nurses helping in the examination routine.

As the need arises, the nurse may enlarge her activities to include more detailed histories such as vaccination, family history, etc., being limited only by the degree of exhaustiveness the director of the examinations sees fit to request.

In summarizing, let me call attention to the fact that although the scope of the nurses activities has been broadened immensely, it has not put her in a position of rendering opinions. She has made certain technical and factual records, largely a mechanical activity—but in no way an unimportant procedure.

The interpretation and analysis of these findings is still left to the physician who is in the logical position to accept the responsibility for presenting the official opinion, and for making recommendations regarding placement, need for care, etc.

There is every reason to suppose that this rationalized concept of the part of the Nurse in a physical examination program will continue after the present urgencies have subsided to normalcy.

New Trends in the Treatment of Industrial Injuries

By HENRY H. RUBIN, M. D.
Industrial Surgeon and Physician, Chicago

New trends in the treatment of industrial injuries incline toward conservatism and a greater consideration of physiological principles. This has resulted in improved care. But the primary concern should be prevention and control of injury and disease. The means of accomplishment are through safety educational programs in industry regarding safe practices and the use of protective equipment. A good work environment is essential. Good vision, proper nutrition, and the avoidance of fatigue are requisites for the worker. Physical examination and medical supervision are also of importance in the program.

Psychological Aid

In ministering to the injured workman it is not enough to bind his wounds according to the modern precepts of first aid. Psychological aid is just as essential. In approaching the injured person, one must gain his confidence through words of reassurance and sympathy and by one's own composure. Recovery will be hastened by gentleness of handling the patient as well as by gentleness in handling the wound. Keeping him quiet in the first aid room, rather than rushing him to the doctor's office or to the hospital will do much to allay his mental anguish. In most instances, it would be better for the attendant to seek the doctor's advice over the telephone or to have the doctor go to the patient.

Eyes

"Arc flash" conjunctivitis is a condition quite prevalent among electric arc welders.² It is caused by exposure to ultra-violet or actinic rays and is characterized by delayed onset, self-limited course of twenty-four hours, swelling of the lids, photophobia, and sandy feeling in the eyes. Prevention is effected through educational pamphlets and personal instruction in protection by flash goggles with side pieces, helmets, welding clothing, and screens. Active treatment con-

sists of keeping the patient in a darkened room or having him wear dark glasses, cold applications to the eyes, a local anesthetic in water solution as butyn or pontocaine for immediate relief, and in ointment base—as butyn or holocaine at night while attempting to sleep, and a vasoconstrictive drug such as adrenalin. Analgesics and sedatives may be required in severe cases.

Wounds

To guard against infection and promote primary healing is the objective in the treatment of wounds. The broken skin admits bacteria and it has been found that it takes about six hours for them to multiply and invade the tissues. Thus it is seen that prompt care is of the essence if bacterial invasion is to be prevented.

The simple abrasion is cleansed and an antiseptic, such as mild tincture of iodine is applied, covering with a sterile dressing.

The small incised wound is cleansed with white soap and water and the edges are brought together with flamed tape, small skin clips, or non-absorbable sutures, whichever is indicated.

The contused, lacerated and penetrating wounds may be more extensive and may be complicated by the entrance of the wound into tendons, muscles, joints, or to fractured bones. These wounds are cleansed thoroughly with a mild soap and water. The operator should be capped and masked and wear sterile gloves and gown. Irrigation with sterile saline solution follows the soap and water cleansing. All torn, ragged and damaged tissue is excised and bleeding is controlled.

The extent of debridement should be to the point where the tissue looks normal, bleeds freely, and the muscle fibres contract. Tendons, nerves, and large blood vessels must be spared. This repair is done within the six hour period. The wound may be closed by primary suture and covered with a copious fluffed gauze pressure bandage. If the "golden period"

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has passed, non-absorbable sutures are inserted and the wound is packed with sterile gauze. The pack is removed in three days and the sutures tied. This is called closure by secondary suture. The consensus is that sulfanilamide should be powdered into the wound, using from three to ten grams.² Where tendons and nerves are severed, they should be sutured, enlarging the wound if necessary. Fine suture material is used. Early passive motion after tendon suture tends to give the best results.⁴

Foreign bodies should be removed if they are accessible. Otherwise, they should be left undisturbed if the search would be prolonged and mutilating. The "Locator," an electro-magnetic induction apparatus, has been used in determining the surface location and depth, and has proven of value in removal of foreign bodies.⁵

Anti-tetanic serum should be administered in cases contaminated with street dust, and for massive wounds anti-gas gangrene serum should be given.

Fractures

In industry, fractures occur most frequently in the hands and feet. The only means of ruling them out is by X-ray which should be used frequently wherever there is the slightest doubt. The fingers are most frequently involved and they are best treated in flexion with early motion to prevent stiffness. In the foot the phalanges are most frequently involved. They are treated by strapping to the adjacent toe, inserting a piece of cotton between the toes. For metatarsal fractures the use of a transverse metatarsal bar is very effective.⁶ This hardwood bar is placed under the sole of the shoe 1½" in front of the heel and retained by flat topped screws drilled through the inside of the shoe. The bar must be high enough so that the ball of the foot will not come in contact with the floor. One must wait about ten days—or until the swelling has subsided to a point where the patient can put on a shoe.

In fracture of the long bones the various types of accepted treatment are classified as open reduction and internal fixation, skeletal traction, plaster cast immobiliza-

tion, and external fixation. The latter is accomplished by means of fixation pins placed above and below the fracture or the fixation and reduction splint, and has been used with satisfactory results in fractures of the tibia and fibula.⁷

In compound fractures the trend is toward the modified Orr treatment. After careful debridement of the wound and proper reduction of the fracture, sulfanilamide is placed in the wound and fifteen grains of sulfa drug is given every four hours for three days thereafter. The wound is packed open and the fracture completely immobilized with a plaster cast. Little or no treatment is required until the cast is changed four to six weeks later.⁸

Burns

Minor burns are apt to heal in less than a week no matter what preparation is applied. In a statistical study of minor industrial burns occurring in a group of about 250,000 employees, the recommended treatment consisted of washing the area with white soap and water, leaving the blisters unbroken and "undebried," covering with fine mesh gauze impregnated with petrolatum or 5 per cent boric acid ointment and applying a firm dressing over this, bulky enough to keep dirt away but not too large to keep the man off his job.⁹

In extensive burns first aid consists of covering the burn with a sterile towel or gauze moistened with soda solution. Pain is controlled by the hypodermic administration of ½ grain of morphine. Shock may have to be combatted. Further care consists of cleansing gently with plain white soap and sterile water as described under "Wounds." The soap is removed by rinsing with sterile saline solution. Fine mesh gauze is impregnated with sterile vaseline or 5 per cent boric acid ointment and this is applied to the burned area, followed by pressure dressings. Blood plasma and oxygen may be required. General anesthesia should be avoided.

After the slough is removed, which takes from ten to fourteen days, the denuded area may require skin grafting. This is usually effected by means of small

deep skin grafts which are covered by vaseline gauze or moist fluffed gauze and an Ace bandage.

Traumatic Shock

The treatment of shock is dependent on the various types of injury which it may follow. More than one factor may be present, shock being due to crushing injury or hemorrhage which may accompany the injury.

The treatment of shock following hemorrhage is blood transfusion given as quickly as possible and in adequate amounts.

In shock following burns the treatment is blood plasma given in amounts of from 200 c.c. to 500 c.c. every hour and from 1,000 c.c. to 5,000 c.c. for twenty-four hours, depending on the severity of the shock. This and the withholding of water oppose the concentration of the blood, and have been successful in the treatment of burn shock.²⁰

In shock following crushing injuries there is a loss of serum and plasma into the tissues and the treatment is the administration of plasma.

The treatment of shock following injury to the soft parts is whole blood or plasma to replace that which is lost as a result of the condition.

The practice of overheating patients in shock has been found harmful.²¹ Experimental studies on the effect of various external temperatures in shocked animals reveal that cold and heat proved dangerous to life. There is a loss of energy to the shock victim at a time when he needs every bit of it to keep alive. He will do best if wrapped in blankets and kept comfortably warm at room temperature.

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The Nurse's Part in A Program of Industrial Safety & Hygiene

CLARK D. BRIDGES

Industrial Hygienist, National Safety Council, Chicago

When your Chairman and program committee suggested this topic several months ago, it was readily accepted because of my conviction of many years standing that the nurse is a vitally important cog in the gears of the efficient industrial organization. Or it might be stated this way—and this is particularly true in the smaller plants—the nurse performs so many functions to aid management and employees that her real value is often not recognized until the plant, through accident or design, tries to get along without her.

Monetary Value

The actual dollar value of effective health and safety programs has been dem-

onstrated. In 1941, the National Association of Manufacturers conducted a survey to determine the results obtained by its member firms from such activities. This report disclosed the following highly significant results:

Reduction in	Accident Frequency.....	44.9%
"	Occupational Disease	62.8%
"	Labor Turnover	27.3%
"	Absenteeism	29.7%
"	Compensation Insurance Premium	23.8%

The report also indicated that the average actual savings in a 500-man plant amounted to over \$5,000 annually. This report contains other valuable information and is recommended to all who are interested in getting the most out of their safety and health programs.

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In reprint No. 1765, of the U. S. Public Health Service, published in 1936, it was estimated that the minimum monetary value to industry of medical and engineering services for the development of health and safety programs is \$18,800 annually per thousand employees. Also of interest in this connection is the study made several years ago by the American College of Surgeons, which disclosed that per capita medical costs are higher in small plants than in large ones—one of the reasons being the lack of programs of prevention.

Personnel for Program

It is simple enough to recite these benefits and the methods by which they may be obtained. The real problem in many plants is locating persons with the necessary training and enthusiasm to convince management of the benefits of such a program, the ability to put it into effect and carry it through. The nurse is often in an ideal position to bring this about, inasmuch as many firms do not have full-time safety engineers or industrial hygienists but must depend upon only occasional service of this nature from their insurance carrier, and the doctor is usually on a part time basis. Even in the larger organizations, where full-time medical and safety personnel are employed, the nurse can be of immense benefit to the entire program through her interest and participation.

Special Training Needed

Graduate nurses find that there are many phases to industrial nursing for which their previous training has not prepared them. It behooves them, therefore, to take advantage of all the special training they can obtain, if they are to enhance their position and increase their value beyond that of simple first-aid service.

Even though nurses generally do not have fundamental engineering training, they can obtain instruction in fundamental principles of accident prevention by attending the war training classes being conducted by the various engineering colleges throughout the United States as a part of the training program of the United States Office of Education. These classes teach the student to understand the fundamental

causes of accidents and give them a knowledge of effective measures which can be taken to combat them. She will meet other men and women concerned with the same problems and with whom she can discuss her own problems with benefit. She will learn sources of information and of expert help. These courses are usually 96 hours in length and are tuition-free. In some parts of the country similar courses are given in industrial hygiene and occupational diseases. Anyone interested in this general problem should take advantage of the training offered by these courses.

References and Exchange of Ideas

It is very desirable that the nurse attend the local and national meetings on industrial health and safety. Most progressive communities have safety councils which meet periodically where many valuable ideas may be obtained and experiences exchanged. She should have available for reference the Safe Practices and Health Practices Pamphlets of the National Safety Council applying to the processes and hazards in her plant. She should read regularly the periodicals in the medical and safety fields.

She should, as one of her very first duties, make a thorough inspection of the entire plant in order to become familiar with the processes and materials used and obtain a general knowledge of the operations. She should also accompany the safety inspection committee on their periodic inspections and investigations of accidents. Through familiarity with the plant processes, the hazards involved and the corrective measures necessary for their proper control, the nurse can do a good deal of effective safety work while she is taking care of minor injuries in the first-aid room by questioning employees regarding the cause of their injuries and what to do to prevent a repetition.

Accident Records

The importance of accident and first-aid records will assume new meaning after the nurse has completed her course of instruction in safety engineering. She will realize the importance of watching frequency trends, the importance of detecting individuals or departments or operations

which are responsible for more than their due share of injuries. The *cause* of the accident will be emphasized in her record rather than the nature of the injury as probably was the case before her realization that the keystone of prevention is a knowledge of the causes of accidents; therefore, her periodic summaries of cases handled will include more valuable information for the use of the safety committee.

I believe the nurse belongs on the safety committee as a permanent member of it, possibly as secretary if her duties permit her this much time for the keeping of these records also. Through her acquired familiarity with the plant processes and appreciation of the importance of accident records just mentioned, she is in a position to be of definite assistance to the safety committee.

Treatment and Examination

First-aid treatment of industrial injuries by the nurse under the standing orders of the physician should also encompass intelligent evaluation of the nature and extent of the injuries to the end that employees may be returned to their own work just as soon as possible, consistent with the condition and ability of the patient, to reduce lost time from work. Where a variety of operations are performed in a plant, it is usually possible to find some kind of productive activity which employees with minor injuries can perform without loss of income to themselves or productive capacity to the employer. Such procedures, when properly handled, are beneficial to all concerned.

Nurses can be of more than ordinary assistance in the physical examination program. Many doctors, in these days of shortages of medical personnel, find it desirable to take the time to train capable nurses in methods by which they can aid in the screening process, thereby reducing the amount of time which the doctor must spend with each individual. Nurses can be taught to recognize significant conditions and bring them to the attention of the physician for his expert examination and decision.

Whether such a program is in effect or not—and it should be stated here that

there are definitely two schools of thought on this subject—nurses should know the industrial significance of defective physical conditions. These may affect the accident proneness or be aggravated by injuries which may be suffered or health hazardous materials and processes to which the worker may be exposed. The nurse should maintain check records to see that periodic examinations are made promptly. Furthermore, those employees who appear to be accident prone and those who are habitual callers at the first-aid room for aspirin and similar medication can be detected and referred to the doctor for special examination.

Other Functions

With the increasing employment of women in industry, experience has shown the desirability of having a women's counselor in every plant where any appreciable number of women are employed. The nurse is in an excellent position to perform these functions. By special study of the rapidly accumulating literature relative to induction, training, susceptibility to industrial poisons and the peculiar health and safety problems of women, a most effective program can be developed.

There are a number of other functions the industrial nurse can perform for the benefit of the general program. She can supervise sanitation facilities such as toilets, lockers and locker rooms, wash rooms, drinking fountains and the drinking water supply. The field of health education offers great opportunity for improvement of employees' off-the-job health. Early detection of non-industrial illnesses and diseases will prompt reference to a physician reduces lost time due to these conditions. Supervision of the canteen or cafeteria, with emphasis on proper nutrition, is another field of endeavor which can show paying results.

In summary, it is apparent that the industrial nurse can be one of the very important factors in the production of and maintenance of a smoothly and effectively operating industrial organization. One word of caution, however, these results are not achieved overnight, in fact, it may take years to do it. It's hard work but don't give up.

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