

**INDUSTRIAL HOSPITAL, SHANGHAI: REVIEW OF
880 CASES FROM THE COTTON MILLS.**

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Since the Industrial Hospital was established in September, 1919, at the Yangtzepoo Social Center, Shanghai, many questions have been asked by social workers, factory operators, physicians, tourists, church members, city officials and others concerning the nature and severity of the cases, particularly those due to accidents. These inquiries have led us to feel we may make a contribution to sociology and industrial hygiene by an analysis of a number of our cases arranged as far as possible in accordance with the most frequent requests for special information.

In this particular study we have confined ourselves to the cotton industry for several reasons. By choosing a single industry we avoid the confusion of taking industries of different hazards, and varied proportion as to age, sex, and so forth, of the working personnel. Also it is the largest single industry on our co-operating lists, and men, women, and children are employed in all of the cotton mills.

In reviewing the literature we regret to note that there appears to be little written on industrial hygiene and medicine in China. Indeed, much light is needed on these subjects, and while the information presented in this study is fragmentary, we present it in the hope that it may at least stimulate others, who are in possession of further information, to publish it.

Perhaps it may be helpful, first of all, to call attention to some of the shortcomings of these statistics. The figures are taken from the large, modern mills which are in most cases managed by foreigners. We feel that statistics from the strictly native industries would be of more value in helping us to form an accurate opinion of actual industrial conditions in China. Another point on which we feel the report is defective is the omission of the time at which each accident occurred. Inquiry into the subject in other countries has shown that the majority of accidents occur near the end of a working day. It would be interesting to obtain exact data on this subject here in China, where the working day is

records do not give the time of the accident; but what information we have tends to corroborate what has already been ascertained. It has also been found almost impossible to get all the facts and details of the accidents. In many cases no one could be found who seemed to know. Even the name of the machine is usually unknown, for as yet it appears that the Chinese working man's vocabulary does not include the names of the foreign machines they use. A report of the accident should be sent with each patient to the hospital and thus aid the surgeon in devising means for accident prevention. Furthermore, the report does not state the extent of permanent disability in each case. Just how much the efficiency and earning power have been cut down by the accident is an important question. Another drawback in these statistics comes from the comparatively small number of accident cases dealt with, especially the number of accidents to women. Indeed, the fact that there are not more of the latter is in itself most interesting.

For the better understanding of these statistics a word should be said about our organization. The Industrial Hospital and Dispensary was established at the request of the mill owners in the Yangtzepoo district. The hospital is paid certain fees by the companies. When an employee is hurt or taken sick he is given a card which entitles him to treatment in the hospital or dispensary as the case demands. If it is necessary for the patient to remain in the hospital the company pays for his board while there. Only hospital patients are included in this study because our hospital records are much fuller than those of the dispensary, and of course none but the more serious cases are admitted to the hospital. The total percentages are obtained by taking the percentages of the entire number of specified cases rather than a bare sum of the percentages in each column.

TABLE I.—NUMBER OF HOSPITAL CASES WITH PERCENTAGE OF ACCIDENTS.

	No. of Cases	Percentage	Industrial Accident Cases	Percentage	Other Cases	Percentage
Men ...	566	65	231	41	335	59
Women	164	18	43	26	122	74
Children	150	17	100	66	50	33
			374	42	507	57

The present study falls into several divisions as follows : men, women, children, their accidents and diseases. Persons under fifteen years of age are classified as children. The average age of 100 children injured by accidents was 12 years; the youngest child injured was 5 years old. Sixty per cent. of all the patients were male, and forty per cent. female. Table 1 shows the total number of cases treated, with the proportion treated in each division. The percentage of accident cases and of those not due to accident is also given. In comparing the figures of this table, especially of the accident cases, we must bear in mind the important factor of different occupational hazards. For instance, the occupations of the men are far more dangerous than those of the women and children; therefore fair comparisons of the number and severity of accidents to the men, on the one hand, and to the women and children on the other, cannot be made. But judging from observation we feel that the work of the women compared with that of children is much the same as to industrial hazard, so that in this particular the comparison is fair and likewise valuable.

What makes the figures in Table No. 1 more interesting to us is the fact that although the work of the dispensary with its thousands of cases is not included in this study, yet we note that the proportion of men, women and children injured was approximately the same in that department.

The textile community served by our hospital consists of about 15,000 workers. Undoubtedly other foreign hospitals near the upper end of the district treat some of the men and children from this district; but most of the women willing to accept foreign treatment must come to our hospital, since there are no available beds for women anywhere else near this section of the city. The exact proportion of men, women, and children employed is hard to obtain. In many mills it appears the manager does not have the figures. Much of the work is contracted out, and in that case no one knows except the contractor of a division, and he knows for his own division alone. Even here the personnel changes from day to day. However, from the numerous conversations with managers and contractors, and from figures obtained from social workers in the district, we have estimated the proportion as follows : women, 55 per cent. ; men, 25 per cent. ; children, 20 per cent. Yet with this

women employed than children, Table 1 shows that in the same length of time and in the same mills there were 100 accidents to children and 43 accidents to women. As we have already said, it is unfair to compare this with the number of accidents to men. For in addition to their occupation being more dangerous, men are less prejudiced against foreign medical treatment, and therefore come more readily to stay in our hospital than women and children. Between the women and children we can make fair comparisons, and we naturally ask ourselves the question: Why is it that relatively so few women are injured in the mills? Are all the injuries reported? Various replies may be given to these questions. However, we feel that we have an answer of such great importance that it should be given. It is a known fact that in our common experience, backed by statistics from industries all over the world, most of the accidents occur among inexperienced and untrained workers. Much is said about guarding machinery, and we by no means wish to minimize its importance; yet our experience in China convinces us that it is almost impossible to guard a machine so that it cannot injure an inexperienced and unskilled worker. We say without reserve that the education of the worker in the uses of machinery and against its dangers, familiarising him with means for prevention of accidents, is the greatest factor in decreasing their number. The woman worker has experience, she is cautious; she becomes familiar with the workings of her machine and the dangers thereof. The child, on the other hand, has little experience. He is not easily taught the dangers of machinery, and he quickly becomes fatigued. Therefore, as long as he works with machinery the problem of keeping him from having an accident is a difficult one.

TABLE 2.—ACCIDENT CASES: SITE OF BODILY INJURY.

		Upper Extremity	Lower Extremity	Head	Trunk
Men	...	35%	34%	16%	10%
Women	...	53%	18%	20%	6%
Children	...	51%	30%	15%	3%
Total	...	42%	31%	16%	7%

This Table shows the distribution of the wounds over the

injuries of the men and those of the women and children. A man's work is more varied. He may be anything from a fitter to a carrying coolie. According to his occupation so will be his injury. He may be hurt on the lower extremity, or on the upper, or on both. Among the women and children, nearly all of whom work at machines, a larger proportion of the wounds is confined to the upper extremity. Ninety-five per cent of the wounds are of the hand or just above. Many of the permanent disabilities in women and children come from disabled hands. It is most deplorable that the hand, which is so useful, especially to the textile worker, is the part of the body most often mangled.

TABLE 3.—ACCIDENT CASES: NATURE OF INJURIES.

	Lacerations.	Compound Fracture.	Simple Fracture.	Burns.
Men ...	67%	15%	3%	8%
Women...	37%	35%	2%	6%
Children ...	57%	21%	9%	12%
Total ...	59%	18%	5%	8%

As we should expect from the cotton industry, the wounds are largely lacerations.

The great majority of the compound fractures recorded above were of the bones of the hand or of the lower forearm.

Seventy-five per cent approximately, of the lacerations were infected. These infections, if treated reasonably early, do not result in fatalities, but infection of the hand often leaves it badly crippled. By plant extension work and by educating the foremen to send the patients to us at once after first aid has been given, we hope gradually to improve our results. Still, even when we get the patient at once and use every means to cleanse the wound and to rid it of irreparably mangled tissue before suturing it, the results are often disappointing. The lack of personal hygiene on the part of the worker, the writer is convinced, forms a big factor in these infections. The hands of the workers are always dirty, and the skin is often fissured and cracked, thus forming lodging places for innumerable bacteria. When the accident occurs these germs are ground down into the warm blood and infection follows. Reviewing

only two cases of tetanus. This review includes hundreds of cases in which we might naturally expect tetanus to follow wounds. One of these cases of tetanus was a cotton mill worker who had a severe laceration of the hand with numerous puncture wounds over its dorsal aspect. The hand had been caught in the teeth of a machine used to card waste cotton. Because of the expense we have been unable to use prophylactic doses of tetanus as a routine measure. We are now using it in cases where we have great reason to fear that tetanus may follow.

Because of the high inflammability of cotton and the large number of steam-pipes in the mills, the hospital has received a considerable number of patients with burns, some of which were quite severe.

TABLE 4.—ACCIDENT CASES RESULTING IN PERMANENT DISABILITY OR DEATH.

	Permanent Disability	Death
Men	20%	1.7%
Women	44%	0%
Children	29%	3%
Total	25%	1.8%

In this table, giving the percentage of disability in accident cases, we find children have the highest accident mortality. The proportion of cases of permanent disability is 9 per cent higher among the children than among the men. In seeking a cause for this we are reminded of what has already been said that it is among the young and inexperienced that accidents are most frequent and severe.

We were surprised to find that among the women there were no deaths from accidents and but 44 per cent of cases permanently disabled. The reason for this is plain. On turning to Table 2, it will be found that of the women patients 20 per cent had head wounds, and upon investigation of the subject we found that the injuries were mostly wounds of the eye. In the weaving room, where so many women work, there is a sharp-pointed instrument that pierces many a worker's eye. This accident has always resulted

TABLE 5.—INDUSTRIAL HOSPITAL CASES NOT DUE TO ACCIDENTS.

	Tuber- culosis	Non- tuberculous respiratory diseases.	Beri- beri	Parasitic diseases.	Chronic ulcers of leg.
Men ...	5%	7.5%	6%	22%	5%
Women...	14%	15%	3%	4%	10%
Children .	22%	8%	0%	32%	0%
Total ...	9%	9%	5%	19%	5

In Table V. we have given some of the more common diseases and ailments, not due to accidents, which send patients to us, as we think it may be of general interest. One of the most striking things in this Table is that it does not contain, strictly speaking, a single industrial disease. This is not surprising when we consider the nature of the cotton industry. Few if any of the poisonous chemicals are used which in some other industries contribute so largely to disease. The irritating fumes of bleaching powder in cotton mills are for the most part quite efficiently removed. Nevertheless, they do form a factor for consideration in the high percentages of tuberculosis and other respiratory diseases. The hot, humid atmosphere of the cotton mills also plays a part in these diseases. We wish to call attention to the high percentage of tuberculosis among women and children: 14 per cent of the women and 22 per cent of the children. Beside the above-mentioned causes, the long working hours and poor living conditions should likewise be remembered. It would be interesting to offer some comparative figures on the incidence of disease in other industries. Apparently the percentage of tuberculosis among men in the cotton mills is not higher than in other industries in the community. As to the women and children, we have no comparisons to offer on this point, as on our co-operating lists we have very few industries other than the cotton industries that employ women, and none that employ children to any large extent.

The beri-beri cases are interesting because the patients, without exception, come from other parts of China to Shanghai seeking employment. The disease developed after they came here. Of course the complete change of work and living conditions should be recognized as factors.

Since many of the people of the Yangtzepoo district come from

how many of the parasitic diseases reported in China could be found in this district. But this work has just been started, and we can not speak with any authority. It is a weighty industrial problem without a doubt. The writer, in common with many physicians in China, has also been much interested in the large number of patients with chronic ulcers of the leg. Many of the patients, for one reason or another, never come to the hospital, so that our observations have been most limited. In many of the cases studied we have been unable to find the direct cause, but lack of personal hygiene and poor nourishment seem to be the predisposing factors in a large percentage of the cases. Because the cases are so common we too often fail to give them careful and proper consideration. Ulcers of the leg must cripple the efficiency of labourers in China to a great extent. A thorough study that would indicate the means of prevention and methods of rapid healing of a large number of these cases would be a great contribution to the efficiency and earning power of the working men of this country.

In concluding we shall attempt no systematic summary, since we feel the Tables presented serve this purpose. But I wish to call attention to the accident death-rate (1.8 per cent.) and the rate of permanent disability (25 per cent.). These percentages are based on a study of 374 hospital cases, so that we feel the number is sufficient for conclusions to be drawn. It is noticeable that the children, who should certainly have the easiest and least dangerous tasks to perform, are those who suffer the most, the percentage of accidents followed by death or permanent disability being heaviest among them.

The tuberculosis cases presented in Table 5 were all clinically active and for the most part far advanced. If every woman and child in the industry was to be carefully examined it is probable that tuberculosis would be found prevailing to an alarming extent.

Systematically organized work in industrial hygiene and medicine is indeed in its infancy in China. The organization of industries here is also in its initial stage. Therefore it behooves medical men all over the country to see to it that the various industries of China shall not be developed fully without the aid and guidance of the former. If the two be developed together, not only will the task of organization be easier for medical men, but untold