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The Humanizing Holiday

CHRISTMAS comes once more to restore our sense of proportion. We have become warped through differences of opinion on politics, creed and business; we are inclined to exaggerate the failings of our fellow men. We need the humanizing influence of this great holiday of the Christian year.

But Christmas is no time for the General Confession, for introspection. There is a time for solitary reflection and meditation but not at this season. It is a time for forgetfulness of self, for an outpouring of generous sentiment.

It is a holiday that must be shared. Wealth cannot purchase the joy that comes from the companionship of family and friends. Next to the man who has no Christmas dinner, the most forlorn individual is the one who must eat his alone —even in an exclusive restaurant.

The many acts of kindness and generosity remind us of the essential decency of people. Present day philanthropy, in contrast to much of that in the past, is inspired more by a desire to relieve distress on earth than to lay up treasure in heaven.

Christmas provides a way of expression for the inarticulate. Shyness, thoughtlessness, or just lack of words prevent outward demonstration of the love that people feel. Then comes Christmas to provide both a reminder and a way of expression.

Then there is the lesson of humility, of becoming as little children who sometimes find the truth more directly because their hearts and minds have not become clouded with sophistries. This brings to mind a verse whose authorship cannot be recalled at the moment:

A king may miss the guiding star,
A wise man's foot may stumble;
For Bethlehem is very far
To all except the humble.

There are some who bewail the brief duration of the Christmas spirit on earth. We wish it could remain, yet we can be thankful for this transient exultation of the human heart.

And there are some who begrudge others the gaiety of the season, seeing in it a pagan influence. But there was merry-making at Cana.

A Welcome Development

WITH industry showing definite signs of recovery, industry is facing a shortage of skilled labor. This is a normal development rather than an alarming new problem, says John W. O'Leary, president of the Machinery Institute.

"After every depression we face this shortage of men with specialized skills," said Mr. O'Leary. As long as business is normal the need of finding suitable men to train for skilled jobs is constantly with us.

"These who deny that any shortage of skilled labor exhausts, and also those who complain that the shortage is impeding business operations fail to recognize the happy circumstance and the opportunities it brings for full employment. This is a normal and welcome development."

As evidence of this development, Mr. O'Leary pointed out that machinery manufacturers had taken on hundreds of apprentices during the past few months to train them for skilled jobs now available and for jobs which will become increasingly numerous as the demand for capital goods continues.

Mere jobs at subsistence wages do not constitute real recovery. The American worker wants work which will employ his ability and skill and pay a wage which will afford reasonable standards of comfort for his family. More employment opportunities in the higher brackets of skill are the surest way to the more abundant life.

With increasing employment come new opportunities and responsibilities for the safety man. The apprentices who are entering industry must be started on the right track but the older workers must not be overlooked. Workers are not listed among the company's assets at so much a head but they are one of industry's most valued possessions.

In This Issue

A REDUCTION of 48 per cent in accident costs has been one of the rewards of organized accident prevention work in the Standard Oil Company (Indiana). No less important has been its influence in bringing management and employees close together in mutual understanding and respect. (Page 11).

A large share of our modern hazards are bred by our environment. If the environment remains defective, we can hope for but limited improvement through regulation by statute or individual behavior, says Col. Willard T. Chevalier, who stresses the importance of the technician in designing a safer setting for the individual's daily life. (Page 12).

"The north wind doth blow"...but the safety engineer isn't worrying about the robin; it's the men in the shop. Cold weather calls for alertness in the individual, which is sometimes difficult when the senses are numbed by cold, and increased attention to correcting avoidable hazards. (Page 14).

The highway isn't the only place where quick stopping means safety. Improved electrical controls and dynamic braking have made hazardous machines much safer. (Page 17).

Breaking through the ice may end in tragedy or merely in discomfort, depending upon the precautions taken. Captain Fred Mills of the Boy Scouts, who is teaching thousands of boys how to enjoy water sports safely, gives some helpful advice on how to keep on the dry side of the ice. (Page 19).

Industrial Health

A Department for Physicians and Laym

Air Contaminants That Affect Health

By H. B. MELLER*

DURING the development of present knowledge of the influence of air contaminants on health, naturally many theories were advanced that later scientific work has modified or displaced. However, not always has the correction been as widely and thoroughly disseminated as was the original theory; this condition, perhaps, has led to some confusion.

There are available different published classifications of dusts. Included in such classifications are dusts the exposure to inhalation of which is, or is likely to be, occupational. Of dusts which are inherently toxic when inhaled or otherwise absorbed and which cause systemic poisoning, examples are lead, arsenic, mercury, manganese. Examples of dusts which have the ability to penetrate the deep lung tissues and to be retained there are quartz, flint, chert, asbestos, talc, coal, iron, clay, slate, and other types of rock dust.

In order that the discussion may not go too far afield attention will be centered upon this last group and upon pneumoconiosis, the general term used to designate lung conditions caused by dust. Silicosis, which is caused by the inhalation of free silica, has been prominent recently in the public press, sometimes in a way that made misunderstanding possible, if not probable.

What Dusts Cause Injury?

It has been established that the potentiality of silicious dusts to cause lung damage is, with very few exceptions, dependent upon their content of free Silica (SiO_2). The development of silicosis depends, therefore, upon the concentration of dust containing free silica in the air breathed. In other words, the total amount of free silica breathed and retained seems to be the primary factor; the length of time necessary for a sufficient accumulation is important, but less so than the total load.

Silica occurs also in chemical combination in silicates. Some of these compounds have been proved definitely to be relatively harmless to health, some are still in the realm of doubt, and one, asbestos, may cause the disease called asbestosis, which is the result of lung damage similar to, but not identical with nor as serious as, that produced by free silica.

The size of dust particles in the air which an individual may breathe is important. Not often are particles larger than 10 or 12 microns found in the deep lungs, except in the case of asbestos dust, where fibres as long as 200 microns have worked their way down lengthwise.

Uncomplicated Silicosis. Silicosis, uncomplicated by an infection, is more of an impairment than a disability. It is not seriously disabling until it reaches an advanced stage, and does not of itself greatly shorten the life of a silicotic. It is in cases where tuberculosis develops that the worker must be removed from his occupation.

Silico-Tuberculosis. When a silicotic dies, the immediate cause of death is usually some type of intervening lung infection, as tuberculosis. It is not known just why the presence of silica in the lungs increases susceptibility to tuberculosis, but when an adult with silicosis is exposed to tuberculosis, an active infection may occur, regardless of the previous state of health. It is thought probable that silica dust can reactivate healed tuberculosis lesions of the adult type; how long such lesions have healed the reactiv is possible is not certain. Exposu silicotics to tuberculosis or of tu culous individuals to silica dust is se and should be avoided.

After silicosis has become well-e lished in the lungs, medical scienc not found a way to arrest the prog of the silicotic process toward the of disablement except through limi or preventing further exposure to t dust. Nor has medical science fou way to prevent tuberculosis from superimposed upon silicosis, e through control of contact. The of silico-tuberculosis is chronic a very difficult to influence by trea according to phthisiologists.

Medical Control

As a basis for intelligent dete tion of the physical fitness of a a job in a dusty trade, physic ination, with stereoscopic ro grams of the chest, is necessary with this study goes, naturally, th aration of an occupational histor detail as to the exact nature of p work and of exposure to industri —*not a valueless recording of oc* tions as "laborer," "machinist," et Sayers of the U. S. Public Healt vice, has developed a method of se information for a proper occupatio history; among others, Cummings, Saranac Laboratory, also has worked a useful history blank.

Standards have been develope the diagnosis of silicosis. There a suitable technic for taking roent grams of the chest in order to bri the characteristic lung changes.

Periodic physical examination cluding roentgenograms, are essen employers are to be enabled accu to learn the effect of individual exp and intelligently to transfer an workmen to lower dust concentra before serious injury has been don to work out a system of rotation indicated as desirable in order tha

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posure may be intermittent. Such examinations are helpful also in showing the efficiency of engineering control methods.

The ability to place responsibility in case of claim for injury is no small part of the value of such initial and periodic examinations.

Asbestosis. Clinical experience has shown that the inhalation of a sufficient amount of asbestos dust causes a serious type of fibrosis, which is not accompanied by an unduly high incidence of tuberculosis.

Other dusts and silicate compounds so far studied produce, at most, only a mild non-progressive reaction in the lungs, provided there is no significant amount of free silica in their composition. While not serious clinically, such conditions may give rise to considerable litigation.

Adequate statistics on morbidity and mortality from occupational disease, to serve as a basis for effectively focussing the efforts to study and control dust diseases of the lungs are non-existent.

Preventive Engineering

It would be needless repetition to attempt to discuss in a technical way the engineering phases of dust control. All interested are referred to *Industrial Dust,* by Drinker and Hatch, issued in August of this year, which deals comprehensively with the subject; U. S. Bureau of Mines Information Circulars 6840 and 6848, by Harrington and Davenport, a review of literature on *Prevention of Dust Diseases;* U. S. Public Health Service Bulletin 217, by Bloomfield and DallaValle, on *The Determination and Control of Industrial Dust;* Report Z9 of the American Standards Association; and to the U. S. Bureau of Mines for a list of approved protective devices.

It may be said that, in general, the engineering specialist can and will devise the necessary equipment to meet the conditions specified to him. But the setting of limits of permissible dust concentration is not his but the physician's responsibility. The engineer is concerned with keeping dustiness to or below the limits at present considered satisfactory.

Methods of Determining Dust

Some dusts (as lead) are determined by chemical methods and the concentrations in air are recorded gravimetrically as milligrams per cubic meter. Others (as silica, where size is a factor in determining dangerous particles), are given by count. Neither method gives the whole story, but in both cases it may be possible to secure the information necessary for the purpose.

In one report this statement occurs: "There is no doubt in the mind of anyone familiar with the present dust-sampling and dust-estimating methods that they will be amended and changed from time to time. At the present writing we would advise the use of the simplest possible procedures where dust control alone is in question. If one wishes to obtain values which can be compared with published data, it is generally necessary to copy with considerable care the technic used in the original case. This is another way of admitting the annoying fact that results by one method are usually not comparable to those obtained by another method."

In another place, the report says: "It is very doubtful if any useful purpose is served by determining accurately extremely dense dust concentrations—the only excuse for such data is to show the skeptic that the workplace is much dustier than it should be . . . . .

"It is probable that any sampling procedure which fixes concentrations in groups 100 per cent apart is sufficient and that the results of any attempts to come closer to the concentration at the moment of sampling are simply misleading. Thus ranges such as 0-5, 5-10, 10-20, 20-40, etc., suffice for dust control."

Particle Size. As dust particles in the lungs are of the order of 1 micron, with rarely a particle over 10 microns, dust control for hygienic reasons should be aimed at particles in the size range found to have been breathed and retained. Again quoting: " . . . . . if one could avoid use of the dusts of 1 micron or less or exclude them from the dust which passes a 325-mesh screen, nearly all dust diseases would be eliminated." But to avoid the use of or to exclude these dusts involves very practical limitations. The thought here is to stress the desirability of study and experimentation in the direction indicated by the committee making the report.

Dust Elimination

Obviously, it is better, when possible, to purchase equipment already supplied with exhaust hood, rather than to have to worry to fit one to equipment not designed to be hooded. Thus the responsibility for potential efficiency is upon the manufacturer.

There is available comparatively little information upon which to base the scientific design of hoods. The Preventive Engineering Committee of Air Hygiene Foundation includes in its recent report a table of minimum air velocities to capture certain industrial dusts (for use in granite cutting, grain elevators, paint spraying, sand pulverizing, electric welding, electric plating, quarrying and mining, and hatters' fur.)

For protective equipment such as dust respirators, air supplied masks, sand blast helmets, and goggles, very complete information is available, because of the work of the U. S. Bureau of Mines, the Bureau of Standards, and the American Standards Association in preparing and issuing specifications to be met if the equipment is to be used under conditions where approval is necessary.

Of course, all agree that, where possible, dust should be controlled at the source, and protective equipment used where this action cannot be accomplished.

Permissible Dustiness

There are various figures that have been and are being used as guides to permissible dustiness where free silica is present. It should be noted that many of the data were not determined as the medical requirement, but as being attainable in good practice and apparently satisfactory from a safety standpoint.

In South Africa the figure is 1 milligram per cubic meter (or 300 particles per cubic centimeter, or approximately 8.5 million per cubic foot).

Dr. Lanza found in 1917 in the Joplin, Mo., district that, with good eng

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Air Contaminants

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neering practice, a figure of 1 milligram per 100 liters of air could be attained.

The U. S. Public Health Service, in its study in the anthracite region of Pennsylvania, found that 50 million particles per cubic foot with 5 per cent quartz in the coarse dust and 10 million particles per cubic foot with 35 per cent quartz were apparently satisfactory and often were attained.

The figure of 10-20 million particles per cubic foot for granite dust with 35 per cent quartz content is often quoted from the Vermont granite studies and the U. S. Public Health Service.

Some metal-mining companies have gone further, setting the maximum of permissible dustiness at 5 million particles per cubic foot.

Certainly, there is a degree of air cleanliness that is safe, from the standpoint of concentration of harmful dust. But the engineer may find himself in the position of practically being forced to control any dust, harmful or otherwise, if he would protect his employers against suits at common law and the possibility of award of damages to men who have breathed dust containing little or no free silica. A dusty workplace is difficult to defend in court. Neither courts nor compensation boards, and certainly not juries, have seemed to be greatly impressed with a low silica dust count in an otherwise dusty atmosphere.

By engineering means it is possible in many cases to reduce dustiness below figures established by limited medical studies. In view of the limited nature of these studies to the present time, and in view of the lack of understanding of many physiological problems associated with the breathing of dust, it seems justifiable to set standards of dustiness as far below the medically determined levels as practical engineering permits.

A Novel Extinguisher

WHEN firemen responded to an alarm which reported an automobile ablaze on a highway near Mission, Texas, they found the fire out and the motor splattered with the dripping remains of ripe tomatoes, according to a story in *The Weekly Underwriter*.

The driver explained that a farmer driving by had seen his predicament and offered the tomatoes as fire extinguishers. The men had bombarded the blazing engine with the tomatoes and the fire was quickly extinguished.