and strains: 11,528 puncture wounds, 8,663 fractures; 8,295 burns and scalds; 713 dislocations; and 220 concussions.

The number of direct amputations of some member or members of the body, by machinery or other hazards, was 422. Of this number seven were arms; five were hands; four were legs; one was a foot; five were toes; and four hundred fingers or parts of fingers.

You will note that the parts most susceptible to injury were fingers. Of all the claims filed with the Commission most of them were due to injury to the fingers—a total of 33,676. I do not want to tire you with figures, but as long as the state of Ohio continues to send out such reports no one can convince me that mechanical safeguarding is doing all that it should do to reduce hazards.

I would not have you believe that I do not recognize the importance and value of proper supervision and training of the worker to control hazards. This form of accident prevention has a very *definite* place in the control of safety—but it does not, and should not take the place of a mechanical device when needed.

A study of accidents in many of our larger plants will generally show that very few of them are due to unguarded machines. This, in my opinion, is not true of the many smaller plants which for various reasons do not purchase modern machinery and equipment as do the larger plants.

I will cite a few instances of accidents due to the lack of proper mechanical guarding or engineering.

Case No. 1. An operator working on a dial feed punch press lost the tip of his thumb when the press did not eject the material properly. Instead of taking a stick or stopping the machine he used his thumb to force out the part, with the result that he lost the tip of it. After this accident occurred a guard was placed over this particular part which made it impossible for anyone to put his thumb in this particular position.

Case No. 2. The operator of an automatic punch press received a severe injury to his finger when he placed his hand on the guard used to prevent the tie rod from falling in case it should break.

Case No. 3. An employee lost a thumb on a hydraulic press which operated at a very slow rate of speed.

Case No. 4. An operator of a punch press lost a tip of his finger when he was equipped with a positive guard.

These cases show the need for better engineering. In the age of speed we cannot trust to anything but the best in safety. There are too many factors which cause the human being to fail.

Again—why should we assume that we have reached the goal from the standpoint of engineering? Why do we maintain our large engineering forces for the improvement and development of our products? If it is desirable and profitable from that standpoint—why is it not equally as important to continue our engineering development in safety?

Who would want an automobile that was designed twenty years ago in preference to the splendid model of today? Likewise, the models of safety of today must progress if we are to reduce accidents to a minimum.

Mechanical safeguarding and engineering play an important part in the control of occupational diseases. A noted labor leader, a few years ago, made the statement that no man should do the work that a machine can do. Likewise, may I say, that no man or woman should be permitted to perform an operation which involves an occupational disease that a machine can perform. I have in mind a particular operation which required the use of wood alcohol. Under the old method this operation would have been performed in a very crude manner. Under the present conditions a modern machine costing five thousand dollars was installed to take care of this particular operation. The only reason that this machine was installed was the consideration of the operator's health.

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Safety Education

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The speaker said in part: Most of us in the safety game go through the stage of guarding our plants, and then of having foremen and occasionally executives expect accidents to cease, as though machine guards might exert an influence on stumblers, trippers and those who neglect their goggles. It was only after we had analyzed our accident statistics and dug out the causes that we discovered a major category of human causes which no amount of machine guarding could prevent.

Today we know that education is the most concern of any industrial safety expert, indeed plant education is so vital that we must find ways of putting a thrill into it.

First of all, a thrill for ourselves.

It is worth while to visualize the environment in which our modern safety program is being produced. An engineering section, accustomed to weighing facts for their accuracy, acts as sponsor for our codes and safe practices pamphlets. Psychologists inspire us to accurate thinking regarding the mental attitudes of workmen. Medical science gives us warning and procedure regarding industrial diseases, infections, and every-day health requirements. Psychiatrists are helping us to locate and to retrain the "accident-prone" employee. Sociologists are writing texthooks on the organization of our plants for safety as well as production. And checking up on our entire set-up, we have expert statistics emanating from the American Engineering Society.

I narrate these facts to bolster any who may be losing courage in these trying days. It will not be long before safety education will be accepted as on a par with other industrial interests founded upon scientific research.

It is not to pillory the men in question, but to express my surprise that their kind still exists, that I mention two headline speakers on one 1933 regional safety program. The first speaker created a laugh where a laugh was out of place by stating that the only printed matter he could find in preparation for the topic of "Public and Home Safety" was a book on funerals. The matter was serious, because he is a regent of State Normal schools and lives at his state capitol, where access to at least three libraries of unusual size is available. The other speaker, a plant superintendent and a college graduate, stated that he was formerly a plant safety man and that he had been trying to unlearn the nonsense of his earlier years in which plant safety depended upon "the carnival method", "sob-stuff appeals", and the contest inducement. There were in the audience many friends of the speakers who could have loaned them scientific material on their subjects which would have made either humor or tirades appear what they were in fact, a waste of time that ought to have been used constructively.

Every delegate to this Safety Congress owes it to himself to visit the headquarters