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NAT'L SAFETY COUNCIL

Inhalation of Dusts

On the dusty lung hazard, I suspect this section is not particularly interested. Other industries have the chief exposure to it. The specialists give it a variety of names; silicosis, anthracosis, siderosis, asbestosis and pneumonoconiosis. The "osis" mean the insurance company has to pay for it. I have been learning this, however, that we cannot depend on the chemist alone to tell us whether or not any particular dust is or is not dangerous. We have to hire another specialist that calls himself a petrographer. You see our lung specialist says the most dangerous dust is free silica, not combined silicates, and straight chemical analysis does not make this distinction. It makes a microscopic optical examination necessary. It was at our Rochester mid-year meeting that I got the straight dope on this free silica idea from Dr. Russell of the Public Health Service. The finer particles of free silica (only a few microns in length) are breathed right into the air sacs of the lungs. Particles of other substances are similarly deposited but are then gobbled up by certain white cells and carried away. The free silica is not, but stays there and is walled up by tissue. Some years later the silica becomes colloided, breaks through the wall and presents a nice culture medium of devitalized tissue for tuberculosis germs to breed in and there you are. So watch out for free silica dust or silicosis. Another test for the dangerousness of dusts was given me by Dr. Sayres of the Bureau of Mines. He has to approve the kind of rock that can be used for rock dusting of coal mines. He injects a sample of the dust into the peritoneal cavity of a guinea pig and in a week or so examines the peritoneum for fibrosis; if any, the dust is unsafe; if none, it is O. K. which reminds me that one specialist asserted we could get a fibrosis in the lungs merely from swallowing sand. Except for the next specialist I met scoffing at his idea, I was all set to cut spinach off of my menu.

Lapse in Industrial Poison Data Sheets

Some inquiry has been made in this Section as to why your Industrial Poisons Committee has quit on the job of getting out Industrial Poisons Data Sheets. While officially connected with these flyers of which the chief merit was brevity I hardly dared to mention them,—they so quickly became obsolete under the onset of new ideas from the real specialists. Logically, I am now dropping myself out of this activity (being Chairman of your Nominating Committee) and leave the issuance of further sheets in the capable hands of your retiring sectional Chairman, Dr Greenburg. Of course, also, there is now a Health Section of the Council and Dr. Sappington is going to press every month or so with up-to-date articles of the same general type. I might mention the subject that finally stalled us two years ago on the run of data sheets: chlorine. The Poisons Committee could not agree as to whether chlorine was a poison or was not. The toxicologists said it was, the manufacturers said it was not. The real answer probably was a quantitative one, as Dr. Macht has just pointed out to you in discussing drugs in general. The manufacturers finally said that their case was proved by the fact that President Coolidge cured his cold by inhaling chlorine. Ever since we have been waiting to hear from President Hoover. If the toxicologists win out, the country will have to go into mourning.

New Treatment for Nitrous Fumes

I do want to trespass a bit more upon your time to mention nitrous fumes. The air seems to be clearing on this subject. I do not recall how many expert chemists in your industry have tried to persuade me that this hazard was exaggerated, that process were the really toxic fumes generated,—some higher oxide like N_2O_5 or "ordinary" nitrous fumes were harmless, that only in the rare disorder of a nitrating

whatnot. Yet we have been getting such cases every now and then with fatal outcome. We even had such a fatal case in an ordinary shop exposure,—a man cleaning a casting in a pail of nitric acid and outdoors at that. Now comes the Cleveland Clinic disaster and focuses attention again on this nitrous fume question. The immediate deaths are assigned to high concentrations of carbon monoxide, the delayed deaths to nitrous fumes from the decomposing film. The Chemical Warfare Service seems competent to speak from both chemical and toxicological standpoints. They tell us the fumes involved were nitrogen dioxide, NO_2, and nitrogen tetroxide, N_2O_4, both present in a reversible reaction in proportions depending on the temperature. The originally generated fume is nitric oxide, NO. (The harmless nitrous oxide, N_2O, is generated in negligible amounts.) On exposure to moist air, the nitric oxide is immediately oxidized to the dioxide or tetroxide and I do not see how a workman is likely to breathe the nitric oxide before it has been exposed to the air.

I hesitate about going into the details of this new therapy for nitrous fume poisoning. Your doctors should themselves study the medical literature on the subject. As Mr. Armstrong has mentioned, our section has just issued a Chemical Safe practices Pamphlet on "Nitrous Fumes." This includes the new hospital treatment and you will note that the old passive method is replaced by a new aggressive treatment. As before, and this is within the safety man's functions, all doubtful cases must be followed up over night because of the delayed onset of the really serious symptoms. It is safest to allow no exercise at all and to send the case in an ambulance to a hospital for observation.

Absolute rest and warmth are called for with prompt study of the blood (hourly hemoglobin estimations) to detect any increase in concentration. At the first hint that the blood is thickening, radical steps to hold it down are advised by the specialists. There are two ways to accomplish this and present authorities appear to differ slightly as to priority between them. The one is water or saline solution intake of from four to eight liters per day, intravenously if necessary. The other is venesection or bleeding to the extent of 350 to 800 cubic centimeters, depending on the severity of the case (and also, I suppose, on the heft of the individual involved). Now our pamphlet on the subject and also, I understand, Dr. Underhill, placed fluid intake ahead of blood discharge, whereas the Chemical Warfare Service report on the Cleveland Hospital Disaster gives priority to bleeding "for incipient or advanced" cases of this type of edema from gassing. The Warfare Service feels that the blood remaining after venesection will then withdraw fluid from the tissues to restore the whole volume to normal. If this means a reduction in lung fluid, it would seem to the layman an important distinction, especially since in critical cases oxygen administration is advised.

Perhaps this question of sequence is not of importance since both treatments follow each other closely or are even given at the same time. If a certain sequence is important, however, I hope our specialists will advise us definitely as soon as they can, because we all want to conquer this fume hazard if possible.

Of course, the question as to quantity inhaled still remains a factor in determining the damage done. It is stated by Henderson that nitrous fumes do not cause a spasm of the glottis (as strong chlorine does) and no particular pain accompanies their deep inhalation. This makes them all the more dangerous. Shallow breathing as a protection is talked about by practical men but I would be more inclined to train the workmen, in case of a spill or fume off, to hold their breath and beat it. Any direct handling of the exposed nitrating liquid should always include adequate respiratory protection, whether you think there is any danger or whether you don't, for the great outdoors. All necessary repair work in vats, on pipelines, etc.,