

Buenos Aires, Argentine
June 7th., 1938

Dr. R. A. Kehoe
Laboratory of Applied Physiology
College of Medicine
University of Cincinnati
Cincinnati, Ohio
U.S.A.

Dear Dr. Kehoe:

Thanks very much for the information contained in your letters of May 10th. and April 23th.

The situation in Chili is, I believe, satisfactorily taken care of. I am informed that the men in question have been dismissed for reasons other than those discussed.

You are correct in assuming the Brazilian situation dormant for the time being.

Regarding Venezuela, I imagine Dr. Weiss has resigned because of inactivity as Standard Oil Company has as yet not opened up this market. I shall go into the question in detail when I next go to Venezuela which I hope to be able to arrange in a not too distant future.

I enclose herewith translation of an article published in the January, 1938 Bulletin of the "Obras Sanitarias de la Nación" in Argentine. The problem of naming a doctor for Argentina will, I believe, soon present itself and I have taken some preliminary steps towards this end. This Bulletin suggests a possible avenue of approach and I would appreciate having your reactions to the article, particularly as they reflect fundamental knowledge and understanding of the problem. In the meantime I shall obtain other information regarding the authors and other sources from which to obtain information.

Very truly yours,


Lester S. Roberts.

LRB:PH
c.c. Messrs. Chemelin & Devan.-

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THE PROPHYLAXIS OF PLUMBIC INTOXICATION

By Drs. Alberto C. Peralta Ramos & Juan M. Obarrio Jr.

(of the Medical Staff of the Obras Sanitarias de la Nación)

One of the principal problems of industrial medicine is that referring to intoxication produced by the use of heavy metals and especially that concerning plumbism.

The battle against plumbism should be faced from two points of view; the prophylactic and the curative. The first is of far greater importance to us and we shall deal with it in this work. To this purpose the steps taken to suppress industries that use lead should be considered, replacing them by others in which less toxic matter is employed, and in this respect there exist projected laws and ordinances ruling those industries that use lead and others prohibiting the use of matters containing lead.

We can make a classification of those industries that predispose plumbic intoxication dividing them into two groups. In the first enter the so called dangerous occupations, among which rank the press workers (linotypists), electric storage battery workers and those workers in charge of laying out telephone wires. Various statistics show that about a 27 per cent of the workmen are intoxicated.

In the second group we must consider those industries in which the workmen come into accidental contact with the materials that are capable of producing the intoxication. Amongst these we must mention one that holds particular interest for us and is that referring to workmen in charge of lining the iron sheets of the water deposits with substances that make them less corrosive, seeing as how they are generally covered with paint made on a lead basis.

By individual and general prophylaxis we must take into consideration the nature of the noxious matter and the ways of penetrating into the organism.

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By individual and general prophylaxis we must take into consideration the nature of the noxious matter and the ways of penetrating into the organism. Pekely de Busseldorf deals with this problem in an extensive publication. Pekely points out that the different lead compounds show a different solubility in the organic liquids, and to this is the danger due depending greatly furthermore, as an intoxication factor, on the so called pulverization faculty.

The manners of absorption of the toxic being dealt with can be considered as three:

1st. SALES CONTACT

Is of little importance though cases of intoxication produced by having the hands submerged during a long time in liquids containing lead salts have been proven.

2nd. DIGESTIVE

Has considered until a short time ago as the principal mode of absorption. The toxic is introduced by way of drinks with leaded water or by the ingestion of toxic substances for suicidal or abortive purposes. Among the cases produced by the ingestion of leaded drinking water we should mention the observations presented to the Paris Academy of Medicine on the verification of great epidemics in those villages where the water for consumption was very poor in salts, the intoxication taking place because of the water dissolving the lead of the piping. It is a proven fact that distilled water attacks lead; distilled and boiled water has a more intense action while on the other hand water containing carbonic acid does not attack it, forming a layer of carbonates on the wall of the pipings that prevents the water from coming in direct contact with them and therefore impeding the action of same on the lead. From the studies presented to the Paris Academy, the conclusion has been arrived at that intoxications of a hydric origin developed in those localities that consume water poor in salts, lime and acids and that are little mineralized, have a PH close on 6, having found in some of the analysis practiced that the lead content reached 12 milligrams per liter.

In the digestive way, intoxications of professional origin should also be mentioned. In these cases the toxic is taken to the mouth by means of dirty hands, be it by smoking or by tooth-picks or it can also be taken by the saliva that transports the lead deposited on the pharynx by breathing. Once ingested, in the stomach the toxic transforms itself into soluble lead-chloride, the main

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3rd. BY INHALING

After the studies made in recent times, it is the most important. It has

been proven that the toxicity of the lead inhaled is ten times greater than that ingested. This is due to the fact that all salts, be they soluble or not, are absorbed at the height of the pylmonary alveolus, passing wholly into the circulatory flow, there not existing consequently any filter as in the digestive way.

In that absorption, the presence of carbon dioxide in contact with the sodium bicarbonate of the organic liquids is of prime importance.

In this mode what is also very important is the form of breathing, it being proven that with a good nasal respiration 60 per cent of the lead inhaled is stopped, while by buccal respiration, 80 per cent reached the pulmonary alveolus. The lead on reaching the blood is transformed into colloidal lead-diphosphate and partly into colloidal lead-triphosphate that is deposited on the bones but under certain conditions is transformed again into colloidal lead-diphosphate, thus explaining those cases of late intoxication.

PROPHYLACTIC MEASURES

The prophylaxis of this intoxication can be divided into individual and general prophylaxis.

For the purpose of orientating the individual prophylaxis, we should keep in mind:-

Age.- It has been proven that intoxication is more frequent in adolescents than in adults.

Sex.- More frequent in the feminine sex.

Condition of health.- Certain morbid cases aggravate the intoxication: tuberculosis, syphilis, arteriosclerosis, hepatic insufficiencies and alcoholism, the latter being a predisposing factor.

RESPIRATORY MEANS

Breathing by the mouth, as we have mentioned above, is a predisposing factor just as also is the prolonged breathing that can be observed in certain af-

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Immunity.- Certain people are immune to lead, but it is not known whether it is a congenital or an acquired immunity: there also exists a certain degree of acustoming ones self to the toxic, demonstrable because the ailments that present themselves in the workmen that are intoxicated repeatedly are each time less intense.

Coming back to the prophylaxis itself, we should first indicate the hygienic attention tending to avoid that the toxic come into contact with the mucus of the respiratory and digestive passages which are the principal ways seeing as how the cutaneous is of little importance.

HYGIENIC MEASURES

The workmen should be advised not to take their dirty hands to their mouths and not to use tooth-picks while working and once their work is over, wash their hands thoroughly, preferably with sulphurous soaps, wash their beards and mustache and carefully brush their teeth so as to eliminate the particles that may otherwise have remained. Smoking should be prohibited during working hours and the workmen should be obliged to keep their nails as short as possible so as to avoid the toxic from getting in below them, or also, the use of rubber gloves may be implanted. Also they should be advised not to go around barefooted and to use special clothing for working in, which should be removed when not working, this as a means to not take the toxic to their homes.

As the introduction by breathing is the most important, it is against this that we should exert our prophylactic care. For this purpose, dry work will be substituted by humid and the workmen shall be provided with special masks to avoid the inhaled lead from coming into contact with the pulmonary alveolus. These shall be metallic masks made of various superposed layers numbering more than ten, for it has been proven that from 30 to 80 per cent of the inhaled lead passes through ordinary breathing masks and that it can pass through as many as six metal layers. Nevertheless, the continuous use of the perfect mask is not possible for any length of time because it is too heavy, for which reason the prophylaxis should be directed principally towards hygienic steps that exclude dust and lead vapour.

GENERAL PROPHYLACTIC MEASURES

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GENERAL PROPHYLACTIC MEASURES

The measures of general prophylaxis can be summed up as follows:

- a) Well ventilated premises.
- b) Replacement of dry work by humid.
- c) Installing of air removing apparatus so as to avoid the dust and lead vapours from coming into contact with the mucus of the respiratory passage.
- d) Installation of dressing rooms, wash-stands and water proof floors

and walls on the working premises

- e) General and popular measures of instruction should be taken. By means of conferences, signs, etc. alcoholism and the use of tobacco, predisposing factors of great importance, shall be combatted: the workmen shall be instructed as to the proper nutrition they should take, based principally on foods rich in fats; it would also be good to advise the workmen as to the conveniency of drinking a good quantity of milk before going to work as it contains a great quantity of fat. Individual prophylaxis should also be made of common use taking measures to avoid this intoxication.

While it is possible, all industries that employ materials that contain lead shall be replaced. For this reason the use of paints manufactured on a basis of lead for protecting the iron sheets of water deposits is not advised and these should be replaced by zinc metallizing.

By metallizing is understood the pulverization of a metal in fusion by means of a special apparatus invented by Schoop in 1910 and which is composed of two principal parts, one of which melts the metal to be used, and the other used to pulverize it finally on to the substance to be protected, by means of a compressed gas.

Lastly we should mention that in the struggle against plumbism, there is as much importance attached to the periodical medical visits to the working premises as to all the aforementioned and the filing of the personnel in charge of these works, so much so that it has been said that to work efficiently against plumbism, the industrial, the workman and the doctor should work together.

In this periodical medical examination, all slight signs of plumbism should be investigated, having in mind for this that with a good history of the men it is possible to catalogue those workmen that have suffered previous intoxications and by the acustoming mentioned before, only present slight symptoms of intoxi-

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In this periodical medical examination, all slight signs of plumbism should be investigated, having in mind for this that with a good history of the men it is possible to catalogue those workmen that have suffered previous intoxications and by the acustoming mentioned before, only present slight symptoms of intoxication. Furthermore, by the periodical medical examination, all those workmen that present a morbid condition capable of predisposing or aggravating an intoxication shall be removed.

To end this, we may freely say that since the prophylactical measures mentioned are being applied and hygienic conditions of the working premises have been improved, the professional intoxication by lead has greatly diminished in a very evident manner.

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