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The experimental production of a relative immunity to the cerebral manifestations of lead poisoning.

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When guinea pigs are poisoned with lead in the form of commercial white lead administered by mouth in capsules, with a daily dosage of about 300 mg. per kilo of animal, convulsions result on about the fourth day. These convulsions are highly characteristic, being epileptiform in character and exhibiting both clonic and tonic phases. Such animals may die in the first, or in subsequent convulsions, or, if the administration of lead be stopped, they may recover.

If a resting period of sufficient length be allowed after the cessation of convulsions, the survivors will be found to have acquired a partial immunity in respect to the cerebral manifestations of lead poisoning, so that they may be given a larger number of doses of the same size as those first used without producing convulsions. If this process be repeated, the amount of lead which can be administered without producing convulsions may be greatly increased. A limited number of animals thus prepared have reached a point at which four times the usual convulsion-producing dosage has been given without convulsions resulting. During each of the longer periods of administration the usual loss of weight, cachexia and muscular weakness develop, indicating that whatever immunity is produced is against a local action of lead and not against its general toxic effect. There has been noted a marked individual variation in the ability of animals to develop this relative immunity, and in certain instances death has occurred unexpectedly in animals well along in the course of lead administration.

The experimental evidence thus obtained is in accord with the belief of some of the older writers upon lead encephalopathy, that the manifestations of this condition are more apt to be shown by those relatively new to a particular lead hazard than by those who have been long exposed to lead. Clinically, there are found

numerous exceptions to this rule, although our experimental results indicate that it is founded upon a scientific basis.

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The experimental production of lead gangrene in guinea pigs.

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Kazda[1] has reported three clinical cases of gangrene of the feet in relatively young typesetters. These he believes to be the first clinical observations of lead gangrene. Similar experimental results have been obtained by us in guinea pigs which have received large amounts of white lead by mouth. In this animal there can be produced a dry gangrene of the ears. The extreme margin of the pinna becomes slightly shrunken with a hyperemic zone proximal to the border. The margin to a varying depth becomes necrotic, drys down and is finally cast off, leaving an irregular margin which is somewhat thickened. The condition is usually bilaterally symmetrical. This result has been obtained only in those animals which have received an unusually large amount of lead, such as is made possible by the method described in the preceding communication. That it has not been observed hitherto is apparently due to the fact that it has been impossible to administer a sufficient amount of lead without killing the animal through lead convulsions. The induction of a partial immunity makes this possible.

[1] Kazda, F., *Wien. klin. Wchnschr.*, 1923, xxxvi, 694.