that should be given is about 0.1 gram. In larger doses diuretin itself is liable to become toxic.

In cases in which the dose of the magnesium salts exceeded 2 grams per kilo the injection of diuretin alone could not save the animals. But if in addition to the diuretin an intravenous infusion of 0.9 per cent. solution of sodium chloride was instituted, animals were seen to recover even from doses of magnesium salts amounting to as much as 2.25 grams per kilo. When still larger doses of magnesium salts were given the animals usually died of respiratory paralysis in less than fifteen minutes and before any diuresis could have been effected. However, I have seen animals recover even from doses of 2.5 grams per kilo if, in addition to the diuretin injection and the venous transfusion, artificial respiration was early resorted to. For doses larger than 2.5 grams per kilo all three measures together usually proved of no avail; with this dose the early death of the animal is usually due greatly to paralysis of the heart.

108 (251)

The toxicity of magnesium nitrate when given by mouth.

By **S. J. MELTZER.**

[*From the Rockefeller Institute for Medical Research.*]

It is a daily experience that large doses of magnesium sulphate can be taken by mouth without any other than a purgative effect. I have given to rabbits, by mouth, 7 grams or more of magnesium sulphate (in molecular solution) per kilo, without any unfavorable effects. The same applies also to magnesium chloride and some other magnesium salts. I have, however, discovered that magnesium nitrate when given by mouth is capable of producing a toxic effect like that of magnesium salts when introduced subcutaneously.

When a dose of 6 grams per kilo in molecular solution is given by mouth to a rabbit, the animal soon becomes paralyzed and narcotized and dies in thirty or forty minutes of respiratory paralysis. Fifteen or twenty minutes after the administration, the appearance and behavior of the animal is exactly like that of one which received magnesium sulphate subcutaneously (2 grams per kilo). A dose between 4 and 5 grams per kilo causes in general

the same symptoms but in a gradual way; the animal dies after five or six hours. A dose of between 3 and 4 grams causes no serious effects, but for six or eight hours after its administration the animal remains in a soporous state; it sits in one place with eyes closed and head drooping; a loud noise wakes it up and it attempts to move about or to eat, but in a few minutes it falls asleep again.

This toxicity of the magnesium nitrate is apparently due to its greater absorption from the gastro-intestinal canal. It is certainly not due to its diminished elimination through the kidneys; on the contrary it acts in some degree as a diuretic, and, when given by subcutaneous injection, the animal withstands a somewhat greater proportionate dose of the nitrate than of the sulphate or chloride, probably because the nitrate increases somewhat the diuresis. As to the share which the anion, the nitrate end of the compound, may have in the toxic effect, I do not wish to make a positive statement; but I doubt whether it is of any importance. I studied the toxic effects of sodium nitrate administered by mouth and compared the manifestations with those seen after administration of magnesium nitrate; the contrast was sharp. Even with a dose of 12 grams of the sodium nitrate per kilo there is never such an anesthesia or paralysis as that caused by the magnesium salts; on the contrary the animal is all excitement and restlessness. Besides, the late death of the animal after administration of sodium nitrate is due to circulatory disturbances, whereas after poisoning with magnesium salts, the animal dies of respiratory paralysis.

109 (252)

On the promoting influence of heated tumor emulsions on tumor growth.

By **SIMON FLEXNER** and **J. W. JOBLING.**

[*From the Rockefeller Institute for Medical Research.*]

We have on several occasions presented to this Society some of the results of the study of a transplantable sarcoma of the rat, and we wish to-day to record an effect on the growth of the tumor which is produced by inoculation of the rats with an emulsion of the tumor cells, previously heated for half an hour to 56° C. This