obtained not infrequently in patients with organic or functional gastro-intestinal disorders.[9] Our experiments demonstrate that in such instances the disturbed gastro-intestinal absorption and motility plays an important role in determining the shape of the blood sugar curve.

Summary. After resection of the stomach or jejunum the oral glucose tolerance test in dogs shows a high and sometimes delayed curve; the curve is not altered after ileectomy.

[9] Christlieb, W., *Dt. Arch. f. Klin. Med.*, 1937, **181**, 394.

14080

Detoxication of a Substituted Phenyl Stibonate in the Rat by Administration of *p*-Aminobenzoic Acid.

J. H. SANDGROUND.* (Introduced by G. H. A. Clowes.)
From the Lilly Research Laboratories, Indianapolis, Indiana.

The writer has reported[1] experiments that demonstrated the highly protective powers of *p*-aminobenzoic acid when administered in substantial but well tolerated quantities to rats that simultaneously had received high lethal doses of Carbarsone, "Tryparsamide," arsanilic acid, and Acetarsone. Further experiments, to be published *in extenso* elsewhere, have shown that *p*-aminobenzoic acid provides equally high protection against other pentavalent arsenicals including phenyl arsonic acid and also against at least one of the trivalent arsenical antisyphilis drugs.

In view of the therapeutic value placed upon some of the less toxic antimony compounds in the treatment of such important tropical diseases as kala-azar and schistosomiasis, it seems desirable to record the capacity of *p*-aminobenzoic acid to protect rats against acute fatal doses of the German proprietary drug, "Stibosan" (sodium *m*-chloro *p*-acetyl amino phenyl stibonate), the only pentavalent antimony compound which was presently available for test purposes in our laboratory.

The test animals were albino rats, weighing approximately 100 g but otherwise unselected as to breed, sex, or age. Treated and control animals were maintained on a balanced diet in large communal cages. *p*-Aminobenzoic acid in the form of its water-soluble sodium salt was administered either by mouth or parenterally at the same time as the antimonial drug was introduced into the saphenous vein of the rat.

In the early stages of these studies, we administered a so-called sustaining dose of *p*-aminobenzoic acid for the following 2 or 3 days. Experiments already completed have indicated that the quantity of *p*-aminobenzoic acid administered has usually been more than was necessary to achieve the desired effect. A typical experiment is summarized in Table I.

Discussion. As tested in our laboratory against *Trypanosoma equiperdum* in rats, "Stibosan" has proved to have a very definite but relatively low therapeutic index. The quantity of drug necessary to effect a permanent cure of rats infected with *T. equiperdum* approaches the maximum dose that the majority of rats can tolerate. Since *p*-aminobenzoic acid interferes with the bacteriostatic action of sulfanilamide and its derivatives, it is of particular interest here to mention that *p*-aminobenzoic acid does not show any evidence of interfering with the trypanocidal potency of "Stibosan." This is shown by the disappearance of trypanosomes from the peripheral blood of rats that receive "Stibosan" plus large quantities of *p*-aminobenzoic acid. Owing to the already mentioned low trypanocidal efficacy of this antimonial com-

* It is with great pleasure that the writer acknowledges the conscientious and invaluable technical aid he has received from Mr. Charles R. Hamilton in the prosecution of this study.

[1] Sandground, J. H., *Science*, 1943, **97**, 73.

TABLE I.
Protection of Rats Against Sodium *m*-chloro *p*-acetyl amino phenyl stibonate ("Stibosan").

Intravenous drug dose	Dose of *p*-amino-benzoic acid and frequency of administration	No. of rats used in exp.	No. of rats surviving	% survival + *p*-amino-benzoic acid	% survival Control
300 mg/kg	1 g/kg x 3 days	12	12	100	
	controls	10	4		40
380 mg/kg	1 g/kg x 3 days	11	10	90	
	controls	12	0		0

pound, trypanosomes reappear in the blood of many of the treated animals and cause their death as late as 24 days after the start of the experiment.

The protective properties of *p*-aminobenzoic acid against "Stibosan" are spectacular. While the majority of protected rats remain normal in appearance and activity, the control rats receiving "Stibosan" alone rapidly lose weight, their fur becomes roughened and matted, they develop extreme flaccid paralysis of the hind quarters, and excessive secretion of the lachrymal glands seals the eyelids. Most animals die on the second to fifth days of the experiment. Lesions, especially of the kidney cortex, are outstanding in the morbid anatomy of fatal intoxication.

14081

Electrical Field of the Nerve Impulse.

J. A. GENGERELLI.
From the University of California at Los Angeles.

In a previous report, experiments were described purporting to test for the presence of an electro-magnetic field surrounding the segment of nerve bearing a nerve impulse.[1] Considerations arising from the bioelectric circuit hypothesis of nerve transmission lead to the conclusion that no electro-magnetic field should exist owing to the cancellation of the magnetic field accompanying the component of the circuit external to the axis cylinder by the magnetic field accompanying the component within the cylinder. The experiments indicated, in fact, that, within the sensitivity of the measuring instrument, no electro-magnetic field was present.

The passage of a nerve impulse involves, however, not only the existence of local bioelectric currents through the electrolytic media within and without the axis cylinder, but the existence of electrical lines of force which originate at any point of high potential and terminate at a point of lower potential. In the case of the nerve impulse the zone of depolarization will be characterized by a low electrical potential with respect to the 2 intact zones on either side of it. Hence there will be electrical lines of force originating in the two intact regions and terminating in the depolarized region. If a detecting instrument is interposed in the space containing these lines of force, then an electric charge is induced upon the instrument and may be detected with a suitable recorder.

A detector placed alongside a conducting nerve will convey to the recording instrument 2 peaks of such induced potential; one peak will occur when the depolarized region is approaching the detector, the other when it has passed under it and is receding from the detector. If, however, the nerve is crushed for a length of several centimeters and the

[1] Gengerelli, J. A., PROC. SOC. EXP. BIOL. AND MED., 1942, **51**, 189.