Further tests were carried out using 0.05% and 0.01% "eucupin" with both procaine and "tutocaine". These weaker solutions gave no definite prolongation of analgesia beyond that of the controls and gave no local reactions.

All of the solutions were prepared by the Pharmacy of the University of California Hospital. "Eucupin base" was used throughout. It was dissolved by the addition of 0.1 N HCl and the solution was then neutralized with 0.1 N NaOH until the mixture remained persistently cloudy. The addition of 2 or 3 drops of 0.1 N HCl then sufficed to clear the solution by redissolving the precipitated "eucupin base".

Our conclusion is that, although solutions containing "eucupin" give satisfactorily prolonged analgesia, the local toxicity is too great for clinical use. Solutions made directly from "eucupin dihydrochloride" might possibly prove less toxic and tests are now in progress to determine this.

4381

X-Ray Diffraction Spectra of Glycine.

MAURICE H. SIMMERS. (Introduced by S. C. Brooks.)

From the Department of Zoology, University of California.

There still remains some uncertainty[1] as to whether the needle-like crystals of glycine (produced by precipitation with alcohol from aqueous solution) are identical with the plate form of the crystals (produced by crystallization from water).

This investigation attempts to throw some light on the problem by making use of X-ray diffraction patterns; the powder method was employed.

Glycine from 4 different sources, as follows, was used. A—Prepared by Pfanstiehl. B—Prepared by Eastman Kodak Company. C—Prepared at the Biochemistry Department of this University by the formaldehyde method.[2] D—"Dunn No. 1, 1927," prepared by the reaction of monochloracetic acid and ammonia. The samples,

[1] Falk and Sugiura, PROC. SOC. EXP. BIOL. AND MED., 1917, xv, 25. Falk and Sugiura, *J. Biol. Chem.*, 1918, xxxiv, 29. Biltz and Paetzold, *Ber. deutsch. chem. Ges.*, 1922, xvi, 1066. Brautlecht and Eberman, *J. Am. Chem. Soc.*, 1923, xlv, 1934. Ley and Arends, *Ber. deutsch. chem. Ges.*, 1928, 618, 212.

[2] Ling and Nanji, *Biochem. J.*, 1922, xvi, 707.

after thorough drying, were divided into 3 groups and diffraction patterns taken as follows:

Group I. Each sample was photographed without any preliminary treatment except drying and grinding. The spectra of samples A, B, and C were exactly the same. The spectrum of sample D was different.

Group II. A part of each sample was dissolved in water and the crystals separated by slow evaporation to dryness. This produced the plate form of the crystals. The diffraction patterns were identical, and the same as the spectra of samples A, B, and C of group I. The difference observed in sample D of group I had disappeared.

Group III. A part of each sample of group I was dissolved in water and the needle shaped crystals formed by adding absolute alcohol. All 4 spectra of this group were alike but slightly different from the spectra of Group I. With more complete drying, however, a change took place in the crystals with the result that the spectra became identical with those of Group II. The 3 types of spectrum are shown in Figure I.

We may conclude from these data that there are at least 2 crystalline forms of glycine, the crystals of Group III being different

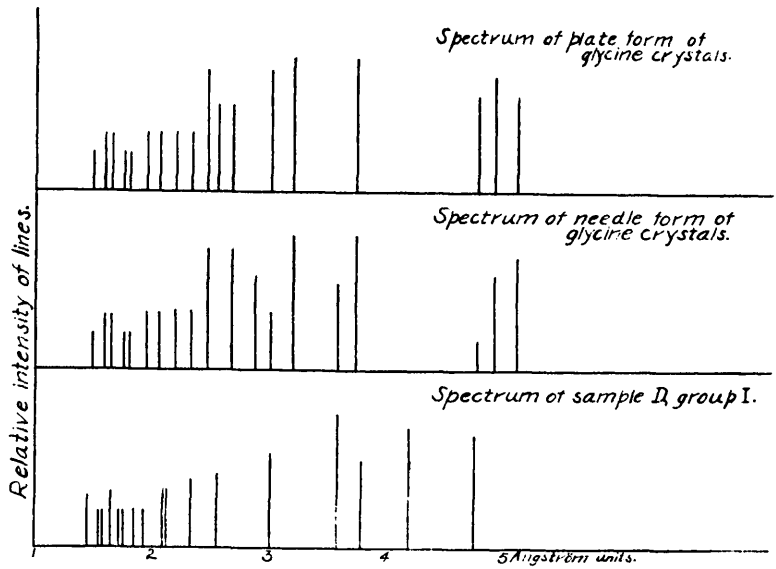

FIG. 1.

Three diffraction spectra of glycine. Calculated spacings between atomic planes are plotted on the abscissae and relative intensities of the lines are indicated by the length of the corresponding ordinates.

from the others, possibly because of containing alcohol of crystallization. These crystals readily change, as a result of prolonged drying, so that their crystalline structure is the same as that of the plate form. These results do not indicate, however, that there is any difference in the structure of the glycine molecule in the plate and needle forms of the crystals. At present the spectrum of sample D, Group I, cannot be explained.

Work is being done in an attempt to elucidate the complete crystal structure of glycine.

4382

Changes in the Size of the Spleen Following Exercise.

S. F. COOK AND M. I. ROSE.

From the Department of Physiology, University of California, Berkeley.

Barcroft and Stephens[1] in a recent investigation have shown that gross changes in the size of the mammalian spleen may be studied in so called exteriorized preparations by means of outline tracings on a plate of celluloid. They find that during muscular activity the spleen shrinks to approximately two-thirds of its resting area.

It seemed worth while to us to investigate the course of recovery in the size of spleens which had contracted as a result of periods of exercise of widely varying intensity and duration. The technique of our experiments differed from that of the Cambridge workers in that we were making recovery observations over short periods of time on decerebrate cats, exercised by means of electrical stimulation. Hence it was sufficient to make a temporary exteriorization which consisted essentially of bringing the spleen through a 2 inch incision which had been carried from the skin through the peritoneum. During active exercise and when no actual measurements were being made, the spleen was returned to its place in the abdomen, and the incision was temporarily closed. Control experiments showed that this repeated exteriorization and replacement *per se* had no apparent effect on size. The area of the spleen was computed from the tracings and used as a basis of comparison.

The results of our experiments show that in cats which were decerebrated so that no rigidity developed, the spleen immediately after exercise had contracted to about 70% of its original area; the

[1] Barcroft, J., and Stephens, J., *J. Physiol.*, 1927, lxiv, 1.