the amount of radiation needed to cure rickets is directly proportional to the area of skin exposed. Thus an exposure of one-fourth square inch of skin for 20 minutes daily heals rickets completely in 3 weeks and similar results were obtained with an exposure of one square inch for 5 minutes, 2 square inches for 2.5 minutes or one-eighth square inch for 40 minutes daily.

In a third series of experiments with 14 rats it was noted that the total irradiation which was found by daily exposure to produce complete healing can be given in as little as 2 exposures 10 days apart.

These experiments emphasize how very little ultraviolet radiation is needed to cure or prevent rickets. Assuming that a similar relationship holds for humans as has been shown in the case of the rat, it is apparent that much smaller amounts of ultraviolet radiation will be effective in preventing or curing rickets than has hitherto been appreciated.

5860

Heparin in Blood Calcium Analyses.

G. WALTERMANN HOLT. (Introduced by Esther M. Greisheimer.)

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Many investigators have assumed that the calcium of heparin is not available for oxalate precipitation, as performed in the Clark-Collip[1] modification of the Kramer-Tisdall[2] method. Interest in this question was aroused by the difference of opinion of various workers regarding the concentration of calcium in serum and in heparin plasma. Cantarow,[3] in a series of 100 determinations, using heparin as an anticoagulant, found that the calcium level was 0.5 mg. to 1.0 mg. less in each 100 cc. of plasma than in the corresponding serum. Greisheimer and Arnold,[4] and Loucks and Scott[5] have published data on this question.

In the present study several different samples of heparin were used. Heparin was added to redistilled water, to calcium chloride solutions, to plasma, and to serum. These heparinized solutions,

[1] Clark, E. P., and Collip, J. B., *J. Biol. Chem.*, 1925, **63**, 461.

[2] Kramer, B., and Tisdall, F. F., *J. Biol. Chem.*, 1921, **47**, 475.

[3] Cantarow, A., Calcium metabolism and calcium therapy, 1931, 36.

[4] Greisheimer, Esther M., and Arnold, A. W., *Am. Rev. Tuberc.*, 1926, **14**, 479.

[5] Loucks, M. M., and Scott, F. H., *Am. J. Physiol.*, 1929, **91**, 27.

with corresponding non-heparinized solutions as controls, were analyzed for calcium by the Clark-Collip modification of the Kramer-Tisdall method.

Dogs' blood served as the source of plasma and serum. All reagents were tested and found to be calcium-free. A microburet whose outlet was ground and fitted with a hypodermic needle was used for titration.

The recovery on calcium chloride solutions was 99.64%. Ten determinations on redistilled water containing 100 mg. % of heparin gave a mean calcium value of 1.170 mg. %. Twenty-seven determinations on calcium chloride solutions containing 10 mg. of calcium in each 100 cc. and on calcium chloride solutions containing, in addition, 100 mg. % of heparin, gave mean values of 9.964 and 11.134 mg. % of calcium, respectively, the difference being 1.170. Control serum and heparinized serum gave means of 10.503 and 11.969 mg. % of calcium, respectively, in a series of 52. The difference is 1.466 mg. % of calcium. Fifty determinations on serum and corresponding heparinized plasma gave calcium values of 10.516 and 11.683 mg. %, the difference being 1.167 mg. in favor of the plasma.

It is concluded that calcium in heparin is precipitable as oxalate.

5861

Platelet Count After Splenectomy and Other Operations.

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Steiner and Gunn[1] demonstrated that splenectomy in normal rabbits was followed by a constant increase in the number of circulating blood platelets. Other operations on rabbits, involving a similar degree of trauma, were also followed by an increase of platelets, which did not differ in time of occurrence, degree or duration from the increase observed after splenectomy. They believed that the degree of rise depended upon the amount of trauma sustained during operation.

These results, though applicable to the rabbit, do not apply to man. It is generally agreed that in humans, the marked increase in

[1] Steiner, P. E., and Gunn, F. D., PROC. SOC. EXP. BIOL. AND MED., 1931, **28**, 1088.