

piration return to normal, whereupon the same effects may be elicited by repeating the injection. Fig. 1 represents the blood pressure effect on a dog, 5 cc. of human saliva having been injected at "A". The coagulation time of the animal's blood drawn after the injection shows a lengthening, rather than a shortening. This effect is probably similar to that observed after the injection of Witte's peptone or during the negative phase following injection of tissue extracts. The injection of large quantities of saliva subcutaneously in the dog (200 cc.) similarly delays coagulation.

TABLE I.

(a) Ratio of human peritoneal fluid to bovine blood and coagulation times.						
Normal	2:3	1:3	6:3	4:3	2:3	1:3
8'00"	4'40"	4'30"	4'10"	3'50"	2'00"	3'00"
(b) Ratio of human cerebro-spinal fluid to bovine blood and coagulation times.						
8'00"	—	4'45"	3'15"	3'00"	2'45"	3'30"

Fluid obtained by abdominal or intrathecal paracentesis shows the same coagulative properties as saliva. This is shown in Table I. It is evident that saliva is but one of several secretions which have the property of hastening coagulation.

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Concomitant Clearances of Creatinine, d-Xylose, Urea and Chlorides During Diuresis in Congestive Heart Failure.

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To get evidences of the mechanisms by which diuresis is accomplished in the edematous patient with heart disease, studies have been carried out on the concentration of various substances in the blood and in the augmented output of urine. Creatinine, or the total chromogenic clearance has been advocated by Rehberg¹ as a measure of the amount of glomerular filtration. The validity of this contention has been attacked by several investigators. Marshall² and Jolliffe, Shannon and Smith³ have advocated the use of sugars and especially of d-xylose excretion and concentration as the index

¹ Rehberg, P. B., *Biochem. J.*, 1926, **20**, 447.

² Marshall, E. K., *Am. J. Physiol.*, 1930, **94**, 1.

³ Jolliffe, N., Shannon, J. A., Smith, H. W., *Am. J. Physiol.*, 1932, **100**, 301.

of the amount of glomerular filtration. Inasmuch as we⁵ and others¹ noted great mobilization and increases in chloride and urea output during diuresis we⁷ have included determinations of these substances in our studies. The urea clearance has been established by Van Slyke and his coworkers⁴ as a measure of renal function. We have calculated in addition to this clearance, a similar but more arbitrary figure for chlorides, d-xylose and creatinine. The milligrams per cent of these substances in the urine and in the blood serum were determined simultaneously; dividing the former by the latter gives the degree of concentration or the index which is mul-

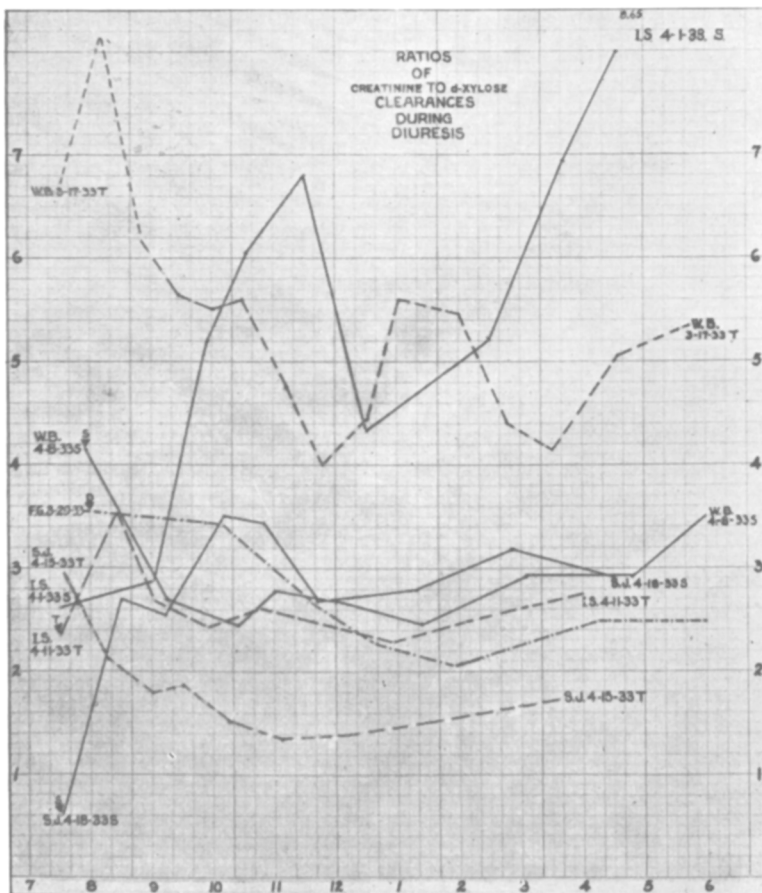


FIG. 1.

⁴ Van Slyke, D. D., and coworkers, *Medicine*, 1930, **9**, 1.

⁵ Herrmann, G., Stone, C. T., Schwab, Edw. H., Bondurant, W. W., *J. Am. Med. Assn.*, **99**, 1647. *Trans. Assn. Am. Phys.*, 1932, **47**, 279.

multiplied by the volume of urine output in cubic centimeters per minute. For convenience we have called these final values "clearances", though they are not established as such for anything but urea. The figure represents directly the amount of blood flow through the kidneys necessary to yield the minute output. The normal values for urea have been established at 54 for urinary flow rates from 0.5 to 1.5 cc., and at 75 for rates above 2 cc. per minute; the respective

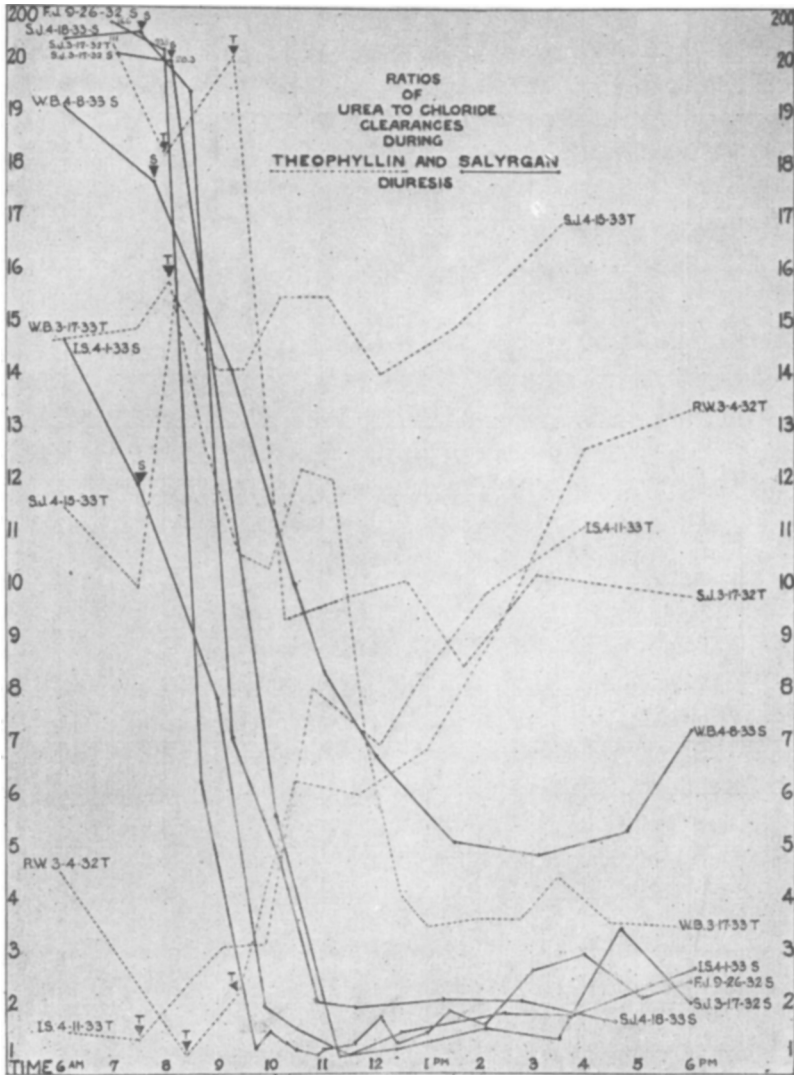


FIG. 2.

chloride rates are 0.5 to 7.5; the d-xylose rate about 90; and creatinine about 150. The ratios of the C (clearance) or F (filtration) of creatinine to d-xylose in normal men are about 1.75; those of urea to chlorides are about 100.

During our first series of 12 and our second series of 10 experiments in the diuresis produced in edematous cardiac patients we⁵ noted striking differences in the clearance when the mercurial salyrgan was administered, in contrast to those obtained by giving the purine, theophylline or by rapid digitalization with digalen. The clearance curves are of the same general types but d-xylose seems to act as a diuretic and increases the creatinine glomerular clearance which is evident especially during salyrgan diuresis. The ratios of the creatinine to d-xylose during the effective periods of the diuretic action are shown in Graph 1. The ratios are all far above the normal 1.75 level.

The urea to chloride ratios shown in Graph II demonstrate a striking difference in the effects of purine as contrasted to mercurial effects. Under the influence of salyrgan the ratios drop precipitately during diuresis, due to the decreased urea clearance and the tremendous rise in chloride output. In the diuresis of theophylline and digalen there is a rising Ur/C (urea sodium chloride) ratio, the result of a conspicuous rise in urea clearance and a disproportionately small rise in chloride excretion. This very sharp contrast in ratios is evidence of a definite difference in the modes of action of the different types of diuretics. The findings support the view that we have subscribed to on the basis of our clinical experimental work⁵ and that of Schmitz⁶ on dogs, namely, that the mercurials act by decreasing tubular reabsorption primarily while the purines and digitalis increase glomerular blood flow and filtration primarily. The reabsorption of chlorides as threshold substances conserved by the body is apparently sharply interfered with as a result of the depressing action of salyrgan on the membranes or the cells of the tubular epithelium.^{5, 6} Urea, on the other hand, as a non-threshold substance is normally not absorbed and only small amounts normally diffuse through the tubular membrane and so the reabsorption defect does not affect it. Augmented glomerular filtration incident to theophyllin and digitalization result in greater urea clearances and relatively slight sodium chloride outputs. Such findings are, therefore, in accord with previous experiences.

The other ratios of the filtration or clearance of creatinine and of

⁶ Schmitz, H. L., *J. Clin. Invest.*, 1932, **12**, 1075.

d-xylose to the other substances have been calculated and have been found to show some suggestively consistent or characteristic relationships in the salyrgan as contrasted to the theophylline or digalen type of diuresis.

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Threshold Values of Ultra-Violet Radiations.*

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The question of glazing the windows of modern homes and hospitals so that winter sunshine with its low content of ultra-violet may enter, and the newer problem of so-called "dual purpose" lighting of houses has raised the question of threshold values.

When one selects ultra-violet sources of greatly reduced intensity and thus reduces sufficiently the size of the unit of ultra-violet irradiation it will be found that the amount necessary for the first detectable effects is much below the amount necessary for complete prevention of rickets. This threshold amount is between one-fourth and one-sixth that needed for complete prevention. Rays from very low power sources, applied in the most advantageous way, can be made quite efficient and practical. The difficulty is that the distance factor and the covering of the animal, when varied, make such enormous differences that results in the hands of different investigators may seem entirely contradictory.

Two series of tests have been directed specifically toward the problem of threshold values. In one, completed in June, 1930, there were 8 groups of chickens containing 17 birds each and 6 pens of rats with 4 rats in each. The lamps were 60 watt Mazda CX bulbs of varying intensities of ultra-violet, except in one control group where a mercury arc was used. The intensity of ultra-violet from the tungsten filament of these lamps can be varied by differences in size and length of the filament. This alters the temperature, and the higher the temperature the greater the amount of ultra-violet. The irradiation in some of the groups was also increased by increasing the time of exposure. A second set of experiments recently completed made use of the quartz mercury arc for a control

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