

or more, and very often not at all unless the catheter be removed. If, on the other hand, the urethra of the same dog, on another day, be irrigated with the same solution or even weaker solutions of apomorphin, care being taken not to inject the drug into the bladder but to confine the irrigation only to the urethra and allow the fluid to run back, vomiting is produced in every case in from three to five minutes. Inasmuch as vomiting is produced in dogs almost as efficiently by means of morphin as with apomorphin, the same results can be obtained by using that alkaloid. Even strong solutions of morphin confined to the bladder produce either no vomiting at all or only after the lapse of a considerable period of time (half an hour to one hour). On the other hand, the introduction of a little morphin solution into the urethra is followed in the dog by vomiting in a few minutes. The remarkable difference in the absorptive power between the urethra and the bladder noted after morphin and apomorphin, holds good for a large number of other drugs and poisons. The author has studied in this connection the effect of various alkaloids, a number of antiseptics, some local anesthetics and a number of salts. The complete account of the investigation will be published in due time in the *Journal of Urology*. It may be stated in this place that an inquiry into the absorptive power of the ureters is also under investigation by the author.

135 (1313)

On the influence of some opiates and antipyretics on the field of vision.

By **DAVID I. MACHT, S. ISAACS, and J. P. GREENBERG.**

[From the *Pharmacological and Psychological Laboratories, Johns Hopkins University.*]

While the effect of drugs on the acuity and field of vision has as yet not been the subject of extensive study, the work extant, such as, for instance, that of Dreser¹ on the influence of strychnin on the visual function, indicates that important changes in visual perception may be produced by the ingestion of pharmacological agents. In connection with an extensive study of the effect of various antipyretics on different psychological functions, the

¹ Dreser, 1894, XXXIII, 251.

authors have made perimetric observations for the purpose of determining whether the various drugs used exerted any influence on the field of vision. The antipyretics studied and taken by mouth were: Acetanilid in doses of 5 to 8 grs., acetphenetidin in doses of 5 grs., antipyrine, in doses of 4 to 8 grs., quinine in doses of 5 grs., pyramidon in doses of 5 and 6 grs., aspirin in doses of 5 and 10 grs., salol in doses of 5 and 8 grs., and certain combinations such as acetanilid plus salol, 5 grs. each; aspirin plus salol, 5 grs. each; aspirin and antipyrine, 5 grs. each; acetphenetidin plus salol, 5 grs. each, and acetanilid and acetphenetidin, 5 grs. each. The effect of these antipyretics was then compared with the action of morphine and a combination of total opium alkaloids (pantopon) administered hypodermically in ordinary therapeutic doses to the same subjects on different days. The experiments were made on the authors themselves and a few of their colleagues with an ordinary perimeter, testing the field of vision for four colors, namely, white, blue, red and green.

It was found that the opiates, morphine and pantopon, taken by injection in every case produced a definite though very slight contraction of the field of vision. As between morphine and pantopon, little difference was noted; yet it may be well to state that in two out of three subjects on whom the observations were made, the morphine injections seemed to produce a slightly greater limitation of the field of vision than pantopon.

Of the antipyretics studied it was found that they produced either no change in the field of vision at all or had a slight tendency to increase it. This was especially noted in case of acetanilid, acetphenetidin, aspirin, and the combinations acetanilid plus salol and acetphenetidin plus salol, which in some of the experiments produced a definite though not marked increase in the field of vision. It was curious to note, furthermore, that the increase was especially apt to occur in case of the white and blue colors, which ordinarily under normal conditions give the largest field of vision.

The conclusions drawn from some of the observations are that the opiates, while producing but little effect upon the field of vision in the normal subject, when they do exert any influence, tend to narrow the field; the antipyretics, on the other hand, when any effect is to be noted, tend to increase the field of vision.

What mechanism may be producing the positive findings in the different cases, it is difficult to say. At any rate, various factors, such as the constriction of the pupil in the case of opium, vaso-motor changes produced by antipyretics, specific effect upon the retinal ganglia and nerves and central cerebral effects must be all considered.

136 (1314)

The relation of growth and swelling of plants and biocolloids to temperature.

[From the Desert Laboratory, Tucson, Arizona.]

By D. T. MacDOUGAL.

The varying constitution and resultant water-relations of the plants may be simulated by mixtures consisting of agar and albumen, or albuminous derivatives, or most successfully by proteins extracted from beans or oats.

The swelling of living and dried sections of plants and of dried plates of such biocolloids in various solutions has been found by the author to depend upon the history or previous treatment of the material, the proportions of protein or albuminous derivatives, and pentosans present, concentration of the solutions and the temperature.

According to Taylor heat should diminish imbibition in gels, while cold and pressure will increase it.¹ The velocity and swelling capacity of two biocolloids at temperatures within the range of growth of plants used for comparison are illustrated by the following auxographic measurements expressed in percentages of increase of the original diameter of sections of dried plates:

SWELLING OF THIN PLATES OF AGAR, 90 PARTS, BEAN-PROTEIN 10 PARTS AND NUTRIENT SALTS .8 PART.

Increase in thickness in percentages of the original.

Temp.	Duration of Swelling.			
	4 Hours.	8 Hours.	10-12 Hours.	20-22 Hours.
15-16° C.....	888%	1,113%		1,325%
21-23° C.....	1,388	1,550		1,900
30-31° C.....	1,472	1,735		2,022
39° C.....	2,486.1	2,736.0	(12 hours) 2,791	Complete
46-47° C.....	2,153	2,347	(10 hours) 2,361	Complete
48-49° C.....	2,361	2,514	Complete	

¹ Taylor, "The Chemistry of Colloids," p. 155, 1916.