early obstructive jaundice (*i.e.*, before damage to the hepatic cells has occurred).

The cephalin-cholesterol flocculation test as originally described, however, fails to provide adequate margin for the study of alterations in the degree of damage to the hepatic cells. The purpose of this preliminary report is to show that the degree of cephalin-cholesterol flocculation produced by the addition of various concentrations of serum, when carried out at intervals, may be used as an index of increasing or decreasing hepato-cellular pathology.

The cephalin-cholesterol emulsion[4] was prepared according to the procedure originally described by Hanger.[2] Five chemically clean test-tubes (10 ml capacity) were set up each containing 4 ml of 0.9 per cent. NaCl and 1 ml of the diluted lipid emulsion. To Tube I was added 0.1 ml of the patient's serum and the contents mixed. Decreasing concentrations of serum were then prepared according to the following schedule:

Dilution 1.—0.1 ml of serum diluted with 0.9 ml of 0.9% NaCl.

Dilution 2.—0.1 ml of Dilution 1 diluted with 0.9 ml of 0.9% NaCl.

Dilution 3.—0.1 ml of Dilution 2 diluted with 0.9 ml of 0.9% NaCl.

Dilution 4.—0.1 ml of Dilution 3 diluted with 0.9 ml of 0.9% NaCl.

To Tubes II, III, IV and V were added 0.1 ml of Dilutions 1, 2, 3 and 4, respectively. The tubes were placed in a rack and kept at room temperature for 24 hours. The degree of flocculation of the cephalin-cholesterol emulsion was then read and graded from 0 to ++++, the former indicating no flocculation and the latter complete clearing of the supernatant fluid.

The table shows the results obtained in two of seven patients with simple (catarrhal) jaundice. In Case I. F., fractional cephalin-cholesterol flocculation tests carried out at intervals indicated increasing hepatic damage from the day of admission to the hospital until the 34th day when the icterus index reached 188 units. Clinical improvement was evident on the 48th hospital day when flocculation failed to occur in Tubes IV and V. In this patient, the extent of fractional flocculation appeared to vary directly with the icterus index. In Case D. C., clinical improvement was accompanied by decreased to absent flocculation in the high dilutions; of interest was the lag observed in the diminishing cephalin-cholesterol flocculation compared to the decided decrease in the icterus index on the 28th hospital day. This is not unlike the lag in the return of the erythrocyte sedimentation rate to normal commonly encountered in patients recovering from acute rheumatic fever.

[4] In these studies, the cephalin-cholesterol antigen prepared by the Difco Laboratories, Detroit, Michigan, was used.

TABLE I

FRACTIONAL CEPHALIN-CHOLESTEROL FLOCCULATION IN TWO PATIENTS WITH SIMPLE (CATARRHAL) JAUNDICE

Days	Cephalin-Cholesterol Flocculation					Icterus Index
	Tube I (0.1 ml serum)	Tube II (0.01 ml serum)	Tube III (0.001 ml serum)	Tube IV (0.0001 ml serum)	Tube V (0.00001 ml serum)	
	Case I. F. Female, age 45 years					
0	++++	++++	+++	0	0	94
11	++++	++++	+++	0	0	125
17	++++	++++	+++	++	0	150
34	++++	++++	+++	+	+	188
42	+++	+++	++	+	+	150
48	+++	+++	+	0	0	107
	Case D. C. Female, age 46 years					
0	++++	+++	+++	++	0	125
28	++++	+++	+++	+	0	21
49	+++	+++	++	0	0	13

Summary: The fractional cephalin-cholesterol flocculation test appears to be a valid procedure for following alterations in the degree of hepato-cellular damage in patients with diseases of the liver. When carried out at intervals, the fractional test permits the evaluation of injury to the hepatic cells in terms of increasing or decreasing pathology.

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STUDIES ON PERIPHERAL VISUAL ACUITY

ALTHOUGH peripheral visual acuity curves are well known, there has been very little work done to determine normal variability or to correlate this acuity with other visual functions. Certain wartime accidents under combat conditions have indicated that faulty peripheral acuity, unknown to the individual, may have been responsible. This prompted the writer to develop a reasonably short, accurate test of this visual function and to investigate the possibility of improving it by systematic training. A brief report is presented herewith.

Peripheral visual acuity (or efficiency) was measured by the use of Landolt broken circles with breaks of the following sizes; .5, 1, 1.5, 2, 2.5, 3, 4, 5, 6, 7, 8, 9 and 10 mm, fitted to a carrier mounted on a 25 cm perimeter. Illumination was kept constant with a built-on illuminator, the light from a 60-watt Mazda daylight lamp 35 cm from the test object being incident at 45°. Surrounds and operator were blacked out. Nine points on each eye, 30°, 60° and 90° from the line of vision, were tested with the other eye blacked out. The test object was covered with a black paddle and then revealed successively in any of four possible positions corresponding to points of the compass (N, S, E or W), the subject signaling the position with the eye fixed forward. Four consecutive successful identifications were necessary for a score. The

size of the break in the smallest circle successfully identified was scored, the sum of 14 points being the total score. The 90° points were generally too weak to have scoring value. The reciprocal of the total score was used for percentage determinations. One hundred subjects selected at random were tested to determine the norm. The average of all scores was arbitrarily chosen as 100 per cent. On this basis 87 males scored 102 per cent. and 13 females 91 per cent. The best subject scored 364 per cent. and the worst 43 per cent. The peripheral acuity thus measured was found to be an independent factor: it did not correlate accurately with age, sex, central acuity or color vision. There was a positive correlation with central acuity of .39, yielding no practical reciprocal predictive value. Although the youngest group was the best, the peripheral acuity did not decline steadily with age. The oldest of four groups (40–70 years) was the second best age group. Eight color-blind individuals scored an average of 92 per cent. The test showed a .91 reliability.

Of the original group of one hundred, 30 were males from 18 to 27 years of age inclusive, who had normal or better central vision, normal color vision and no astigmatism; the requirements for aviation cadets. Their average score was 115 per cent., the best scoring 210 per cent. and the worst 52 per cent. These latter two represented the 2nd and 99th in degree of peripheral acuity of the original group of 100.

A shortened version of the test taking from 12 to 14 minutes (as compared to from 40 to 60 minutes for the original) was run on another group of 113 subjects and was repeated in from 8 to 10 weeks. The second scores showed an average of 6 per cent. improvement. Twenty of the original group of 100 were retested and showed an average of 16 per cent. improvement. The improvement was roughly proportional to the amount of time taken by the test. In two test groups out of three the second eye tested better than the first.

This investigation has revealed great spontaneous variability in peripheral visual acuity, incidentally always without the individual's awareness. It shows such acuity to be an independent visual factor. The evidence indicates that peripheral visual acuity can be trained. Experiments in testing, training and correlation are being continued.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

A MACROCHEMICAL REACTION FOR THE DETECTION OF PEACH MOSAIC[1]

SINCE the beginning of the program for the eradication of peach mosaic in western Colorado, difficulties have been encountered in the detection of symptoms of the disease in certain horticultural varieties of peach which did not show constant symptom manifestations.[2, 3] Because of these difficulties, the possibility of using a differential color reaction as a supplementary aid in the detection of the malady was investigated. Hutchins[4] in 1933 was the first to use a chemical color reaction as an aid in the identification of a virus disease of peach, the phony disease. Rawlins and Thomas[5] described a microchemical reaction for another virus disease present in peach, the buckskin disease of cherry and other stone fruits.

The Elberta peach variety was used for the test herein described because it showed symptom manifestations of the strains of the peach mosaic virus[6] throughout the entire growing season. The Elberta trees used were grown upon "natural" peach seedling rootstocks. The thinnest possible complete free-hand sections about ¼ inch in diameter were cut from healthy and diseased roots and stems. Sections were placed in a watch glass and a drop of a saturated solution of phloroglucinol in 100 per cent. methyl alcohol was added to each section. After this solution evaporated to dryness, a drop of a solution of nitrophenolic acid in methyl alcohol was placed on each section and allowed to evaporate to dryness. This solution was prepared as follows: Fifty ml of concentrated nitric acid were added to ½ gram of C.P. phenol and allowed to stand over night. An equal volume of water was added the following day and the solution allowed to stand for about 18 hours. Three drops of this solution were placed in 25 ml of 100 per cent. methyl alcohol.

Differentiating color reactions were found to be characteristic of the xylem of sections from healthy trees and from trees infected with the severe and medium strains of the peach mosaic virus. Healthy stem and root portions turned a color varying between Persian lilac and Daphne pink,[7] while virus-infected seedling rootstocks and stems of Elberta

[1] Scientific Series Paper No. 155.
[2] E. W. Bodine and L. W. Durrell, *Phytopath.*, 31: 322–333, 1941.
[3] L. M. Hutchins, E. W. Bodine and H. H. Thornberry, *U. S. Dept. Agr. Circ.* No. 427, 1937.
[4] L. M. Hutchins, *Ga. State Ent. Bull.*, 78, 1933.
[5] T. E. Rawlins and H. Earl Thomas, *Phytopath.*, 31: 916–925, 1941.
[6] E. W. Bodine and L. W. Durrell, *Phytopath.*, 31: 4, 1941.
[7] R. Ridgway, "Color Standards and Nomenclature." 43 pp. 53 colored plates. Washington, 1912.