fluorescent spots. The material from electrophoresis gave two spots with R_F values of 0.15 and 0.30; only the faster moving one contained the toxin. Many attempts at further purification were futile until the following procedure was tried. Since the toxin from electrophoresis did not dissolve in water or alcohol, a 90-mg sample was dissolved in 1.2 ml of 1.6 percent aqueous acetic acid, and 3.5 ml of ethanol was added. A small amount of slightly active insoluble material was removed by centrifugation, and the toxin was induced to crystallize by the addition of 2.6 ml of ether. This process, repeated twice, yielded 13 mg of microcrystalline toxin which gave only one spot on thin-layer chromatography; when assayed it showed activity of approximately 7000 mouse units per milligram.

This material began to darken at 225°C but did not melt. The nuclear magnetic resonance spectrum was taken on a 10-mg sample dissolved in a mixture of 0.15 ml of deuterium oxide, 0.01 ml of perdeuteroacetic acid, and a trace of tetramethylsilane. The spectrum showed a broad singlet at 2.72 ppm (relative area 1/2), a doublet centered at 2.98 ppm ($J = 9$ cy/sec, relative area = 1), strong unresolved absorption centered at 4.65 and 4.90 ppm (relative area between 6 and 7) which was not completely resolved from the strong OH- or NH-peak or both at 5.39 ppm, and a doublet centered at 6.15 ppm ($J = 9$ cy/sec, relative area = 1).

This same solution was quantitatively transferred and made up to 0.3 ml with deuterium oxide, $[\alpha]_D^{25}$ −8.1 ± 0.6 ($\alpha = 0.13 \pm 0.01$, $c = 3.3$, D_2O, $l = 0.5$). This solution was quantitatively transferred and made up to 2.0 ml with deuterium oxide; a weak shoulder showed at λ_{280} $E^{1\%}$, $C^m = 0.2$ with end absorption cutting off at 215 mμ. The infrared spectrum (KBr) showed characteristic absorption at 3410, 3350, 3230, 1665, 1605 cm^{-1}, and rich discrete absorption in the 900 to 1400 cm^{-1} region at 1330, 1315, 1288, 1193, 1162, 1132, 1091, 1070, 1050, 1028, 980, and 935 cm^{-1}. Analysis on the sample recrystallized a fourth time after these determinations gave the following results. Found, C, 39.73; 39.94; H, 5.76, 5.70; N, 13.0. The ninhydrin test, tests for carbohydrates, and the Elson-Morgan test for amino sugars were negative both on the toxin and on an acid hydrolysate of the toxin, but the toxin gave positive periodate and permanganate tests.

Tarichatoxin and saxitoxin (*5*) are chemically quite distinct, but the similarity both chemically and pharmacologically between tarichatoxin and tetrodotoxin (*6*) has not gone unnoticed (*7*).

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4 March 1963

Pattern Vision in Newborn Infants

Abstract. *Human infants under 5 days of age consistently looked more at black-and-white patterns than at plain colored surfaces, which indicates the innate ability to perceive form.*

It is usually stated or implied that the infant has little or no pattern vision during the early weeks or even months, because of the need for visual learning or because of the immature state of the eye and brain, or for both reasons (*1*). This viewpoint has been challenged by the direct evidence of differential attention given to visual stimuli varying in form or pattern (*2*). This evidence has shown that during the early months of life, infants: (i) have fairly acute pattern vision (resolving ⅛-inch stripes at a 10-inch distance); (ii) show greater visual interest in patterns than in plain colors; (iii) differentiate among patterns of similar complexity; and (iv) show visual interest in a pattern similar to that of a human face.

The purpose of the present study was to determine whether it was possible to obtain similar data on newborn infants and thus further exclude visual learning or postnatal maturation as requirements for pattern vision. It is a repetition of a study of older infants which compared the visual responsiveness to patterned and to plainly colored surfaces (*3*). The results of the earlier study were essentially duplicated, giving further support for the above conclusions.

The subjects were 18 infants ranging from 10 hours to 5 days old. They were selected from a much larger number on the basis of their eyes remaining open long enough to be exposed to a series of six targets at least twice. The length of gaze at each target was observed through a tiny hole in the ceiling of the chamber (Fig. 1) and recorded on a timer. The fixation time started as soon as one or both eyes of the infant were directed towards the target, using as criterion the superposition over the pupil of a tiny corneal reflection of the target; it ended when the eyes turned away or closed (*4*). The six targets were presented in random order for each infant, with the sequence repeated up to eight times when possible. Only completed sequences were included in calculating the percentage of total fixation time for each target.

The targets were circular, 6 inches in diameter, and had nonglossy surfaces. Three contained black-and-white patterns—a schematic face, concentric circles, and a section of newspaper containing print 1/16 to ¼ inch high. The other three were unpatterned—white, fluorescent yellow, and dark red. The relative luminous reflectance was, in decreasing order: yellow, white, newsprint, face and circles, red. Squares

Table 1. Relative duration of initial gaze of infants at six stimulus objects in successive and repeated presentations.

Age group	N	Mean percentage of fixation time						P*
		Face	Circles	News	White	Yellow	Red	
Under 48 hours	8	29.5	23.5	13.1	12.3	11.5	10.1	.005
2 to 5 days	10	29.5	24.3	17.5	9.9	12.1	6.7	.001
2 to 6 months†	25	34.3	18.4	19.9	8.9	8.2	10.1	.001

* Significance level based on Friedman analysis of variance by ranks. † From an earlier study (*2*).

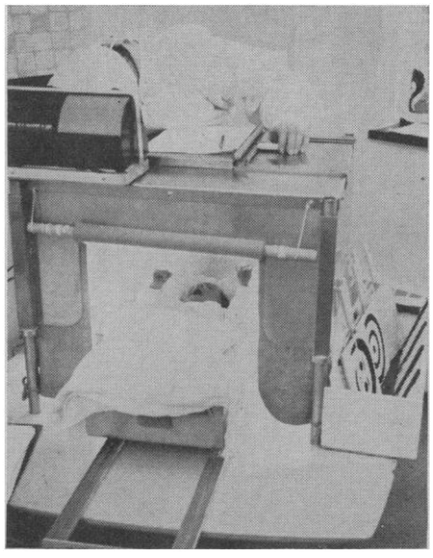

Fig. 1. Infant "looking chamber" for testing visual responsiveness to targets exposed under controlled-stimulus conditions. The patterned objects are visible in a box on the table, each with a handle for sliding it in the chamber. Observer is looking on one side of the target through the peephole, which is hidden by the timer.

containing the patterns or colors were placed in a flat holder which slid horizontally into a slightly recessed portion of the chamber ceiling to expose the pattern or color to the infant through a circular hole in the holder. The chamber and underside of the holder were lined with blue felt to provide a contrasting background for the stimuli, and to diffuse the illumination (between 10 and 15 ft-ca) from lights on either side of the infant's head. The subject was in a small hammock crib with head facing up directly under the targets, 1 foot away.

The results in Table 1 show about twice as much visual attention to patterns as to plainly colored surfaces. Differences in response to the six stimulus objects are significant for the infants both under and over 2 days of age; results from these groups do not differ reliably from each other, and are similar to earlier results from much older infants. The selectivity of the visual responses is brought out still more strikingly by tabulating the longest-fixated target for each newborn infant: 11 for face, 5 for concentric circles, 2 for newsprint, and 0 for white, yellow, and red. For comparison, the first choices of infants 2 to 6 months were distributed as follows: 16, 4, 5, 0, 0, 0.

Three infants under 24 hours could be tested sufficiently to indicate the individual consistency of response. Two of these showed a significant (.005 and .05) difference among the targets in successive sets of exposures, one looking longest at the face pattern in 7 of 8 exposures, the other looking longest at the "bull's-eye" in 3 of 6 exposures. The third infant 10 hours after birth looked longest at the face in 3 of 8 exposures.

It is clear that the selective visual responses were related to pattern rather than hue or reflectance, although the latter two variables are often thought to be primary visual stimuli. Specification of the prepotent configurational variables is unwarranted at this time. The results do not imply "instinctive recognition" of a face or other unique significance of this pattern; it is likely there are other patterns which would elicit equal or greater attention (*5*). Longer fixation of the face suggests only that a pattern with certain similarities to social objects also has stimulus characteristics with considerable intrinsic interest or stimulating value; whatever the mechanism underlying this interest, it should facilitate the development of social responsiveness, since what is responded to must first be attended to.

Substantiation for the visual selection of patterned over unpatterned objects is given in an independent study of newborn infants in which more visual attention was given to a colored card with a simple figure, when held close to the infant, than to a plain card of either color (*6*).

The results of Table 1 demonstrate that pattern vision can be tested in newborn infants by recording differential visual attention; these and other results call for a revision of traditional views that the visual world of the infant is initially formless or chaotic and that we must learn to see configurations (*7*).

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4. High reliability of a similar technique, using the same criterion of fixation, was shown with older infants (*1*). Since eye movements are less coordinated and fixations less clear-cut in newborn infants, a further check of the response measurement is desirable; I plan to do this by photographic recordings.
5. I chose the targets for their expected attention value for the older infants of the earlier study; this may be different for newborn subjects: response to the newsprint may be decreased by less acute vision (although some patterning would be visible without resolution of individual letters); "bull's-eye" elicited strong differential attention only over 2 months of age in another study (*3*); and blue is preferred to red and yellow by newborns (*5*). The face pattern might for these reasons have a relative advantage for newborns.
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25 February 1963

Scavenger Probe Sampling: A Method for Studying Gaseous Free Radicals

Abstract. *Scavenger probe sampling for determining the concentration of certain gaseous free radicals and atoms has been used to study flames and electric discharges. Combining microprobe sampling and chemical scavenging with mass spectral analysis, this technique offers high spatial resolution, absolute concentration determination, and high temperature applicability. The reactions of hydrogen atoms with chlorinated hydrocarbons and oxygen atoms with nitrogen dioxide were used for scavenging. The results were reproducible and proportional to concentration. In an electric discharge oxygen atom concentrations agreed with gas phase titration determinations. The gas phase titration measures atom flux rather than concentration, and differences as high as 20 percent were observed. A method for deriving concentration from flux measurements is discussed.*

Many important chemical reactions involve atoms and free radicals (*1*). These species have only transient existence under normal laboratory conditions and chemical kinetic studies involving them must be undertaken in difficult environments such as flames and electric discharges. A knowledge of the concentrations of these transient species is necessary for such work, but the analytical problem has until recent years been prohibitively difficult. The problem has usually been avoided by the application of the steady-state approximation which allows radical concentration to be expressed in terms of the measurable stable species. In many