After the publication of our original abstract, two reports have appeared on the use of topical anesthetics on the glans penis of rats, resulting in a loss of intromission and apparently incomplete erection. One report (*17*) indicated no loss of sexual arousal; the other (*18*) indicated a decline in arousal as the test proceeded. We have tried a topical anesthetic (5 percent lidocaine ointment, *19*) on one additional intact male and produced, in three tests, disorientation in mounting lasting 26 to 30 minutes, after which the male achieved intromission. Full erection was observed during the period of disorientation. In three control tests with blank ointment, intromission occurred after 5 to 8 minutes. In two additional tests, when a solution of 2 percent tetracaine hydrochloride (*20*) was sprayed on the penis, disorientation and failure to achieve intromission persisted for 37 minutes when the observations were terminated. Experiments such as these are limited by the fact that anesthesia wears off during the course of the test, so that sensory feedback is delayed, not necessarily reduced. Also, the tests in rats were not continued, and a feedback process of the kind found in our cats was not detected.

In summary, long-lasting desensitization of the glans penis causes disorientation in mounting behavior which precludes intromission. This, in turn, causes further decrements in sensory feedback which leads to a pronounced seasonal decline in sexual arousal. In this last aspect our results are in agreement with Beach's theory as stated in the introduction, although the specificity of the sensory mechanism remains unanswered.

LESTER R. ARONSON
MADELINE L. COOPER
Department of Animal Behavior,
American Museum of Natural History,
New York

References and Notes

1. F. A. Beach, *J. Comp. Psychol.* **33**, 163 (1942).
2. ———, *Physiol. Rev.* **27**, 240 (1947).
3. M. Cooper and L. R. Aronson, *Amer. Zool.* **2**, 514 (1962).
4. J. Rosenblatt and L. R. Aronson, *Behaviour* **12**, 285 (1958).
5. J. Langley and H. K. Anderson, *J. Physiol.* **19**, 85 (1895).
6. A. Kuntz, *The Autonomic Nervous System* (Lea & Febiger, Philadelphia, 1953), p. 290; P. Bessou and Y. Laporte, *Arch. Sci. Biol. Ital.* **101**, 90 (1963); W. S. Root and P. Bard, *Amer. J. Physiol.* **151**, 80 (1947).
7. K. Cooper, M. Cooper, L. R. Aronson, *Amer. Zool.* **4**, 301 (1964).
8. R. K. Winkelmann and R. W. Schmit, *Proc. Staff Meetings Mayo Clinic* **32**, 217 (1957).
9. W. W. Greulich, *Anat. Rec.* **58**, 217 (1934).
10. S. Rubarth, *Skand. Vet. Tidskr.* **36**, 732 (1946).
11. J. Rosenblatt and T. C. Schneirla, in *The Behaviour of Domestic Animals*, E. Hafez, Ed. (Bailliere, Tindall and Cox, London, 1962), p. 453.
12. P. Leyhausen, *Z. Tierpsychol.* Suppl. 2 (1956); R. Michael, personal communication.
13. L. H. Mathews, *Proc. Zool. Soc. London*, **111**, 59 (1941).
14. E. C. Amoroso and F. H. A. Marshall, in *Marshall's Physiology of Reproduction*, A. S. Parkes, Ed. (Longmans, London, 1960), p. 707.
15. H. A. Foster and F. L. Hisaw, *Anat. Rec.* **62**, 72 (1935).
16. M. Cooper and L. R. Aronson, in preparation.
17. N. Adler and G. Bermant, *J. Comp. Physiol. Psychol.*, in press.
18. S. G. Carlson and R. Larsson, *Z. Tierpsychol.* **21**, 854 (1964) .
19. Xylocaine, courtesy of Astra.
20. Cetocaine, Cetylite Industries.
21. Supported by grant HD-00348 and grant MH-08600 from NIH. Several students of the Undergraduate Research Participation program supported in part by NSF grant GE-6387 assisted in the research. We thank Miss Alba D. Plescia for technical assistance and Dr. Ethel Tobach and K. K. Cooper for reading the manuscript and for helpful suggestions.

15 February 1966

Imagery; Effect of a Concealed Stimulus

Eagle, Wolitsky, and Klein [*Science* **151**, 837 (1966)] showed subjects the black silhouette of a tree containing as part of its outline the shape of a (white) duck. Previous studies of the perception of figure and ground would lead one to expect that a subject could see either the tree-trunk or the duck at any moment in time, but not both. None of the subjects in this experiment reported seeing the duck. Nevertheless, when they were asked to close their eyes and imagine a nature scene immediately after viewing the picture, 69 percent reported duck-related items in their images, as compared with 50 percent (a small but significant difference) of the control subjects, who had been shown a similar tree without a duck outline. The authors conclude that some of the subjects were able to recognize the duck and the tree simultaneously; only one of these perceptions entered awareness, but the other was able to influence the freer activity of imaging.

An alternative explanation for this surprising result is that, when asked to close their eyes and "image," some of the subjects saw a negative afterimage of the black tree, an image consisting in part of a dark duck. Since a weak afterimage would be hard to distinguish from a spontaneous "image," it could be reported as part of the imaged nature scene even without the subject's becoming aware of its connection with the tree he had just seen. This explanation would avoid the authors' conclusion that both sides of a contour can be perceived or registered as figural simultaneously.

MARY C. POTTER
Center for Cognitive Studies,
Harvard University,
Cambridge, Massachusetts

3 March 1966

. . . In examining the figures of the two tree stumps, it seems to me that the figure with the duck is characterized by a "roundness," in the configuration of the extended branch and the side of the stump. On the other hand, the control figure is characterized by a roundness which is abruptly terminated, as the eye sweeps through the figure from top center, along the curved branch, to the base of the stump and then straight up. It is reasonable, I suggest, to postulate that this abrupt configuration is such as to induce less imagery of nature than the other more rounded configuration. All the responses which the authors found to be duck-related might also be found to be roundness-related. . . .

JAY A. YOUNG
Department of Chemistry,
King's College,
Wilkes-Barre, Pennsylvania 18702

1 March 1966

Relative Heart Weight in Porpoises

Ridgway and Johnston [*Science* **151**, 456 (1966)] compare the blood volumes, hemoglobin concentrations, packed cell volumes, and relative heart weights (percent of body weight) in three genera of porpoises. The data can be interpreted as indicating a relation between the relative heart weight (W) and the red cell volume. It might be argued that the relative heart weight is correlated with the ability to supply oxygen. This in turn is related to the red cell volume (if the heart rate, hemoglobin concentration per cell, and oxygen binding per unit of hemoglobin are approximately the same in three genera). The relationship would be of the form:

$$W = V_b \cdot V_p \cdot K, \qquad (1)$$

where V_b is the total blood volume, V_p, the packed cell volume, and K a constant. The results with Ridgway and Johnston's data are shown in Table 1, second column, the blood volume being expressed in milliliters

Table 1. Relative heart weights (percentage of body weight) as reported by Ridgway and Johnston and as calculated from blood volume and from blood oxygen capacity.

Reported	Calculated by	
	Eq. 1	Eq. 2
Phocoenoides dalli		
1.31	1.30	1.38
Lagenorhynchus obliquidens		
0.85	0.91	0.88
Tursiops truncatus		
0.54	0.51	0.49

per kilogram of body weight, the packed cell volume in percent, and the constant being 1.59×10^{-4}.

A restatement of Eq. 1 is in terms of the blood oxygen capacity (C_o) of a 100-kg porpoise of each species. This relationship is:

$$W = C_o\ (3.5 \times 10^{-4}) \qquad (2)$$

where the blood oxygen capacity is given in milliliters. Results are shown in the last column of the table. It will be of interest to observe if these relationships pertain to additional species.

RICHARD P. SPENCER
Department of Radiology,
Yale University School of Medicine,
New Haven, Connecticut

7 February 1966

Which RNA Stimulates Mitosis in Antibody-Forming Cells?

Hashem [*Science* **150**, 1460 (1965)] reports that RNA extracted from antigen-stimulated peripheral lymphocytes promoted transformation and mitosis of unstimulated lymphocytes. The reaction appeared specific because RNA from unstimulated cells was ineffectual.

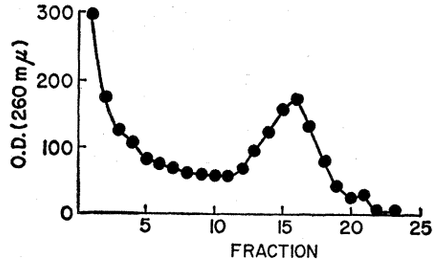

Fig. 1. Mouse-spleen RNA was extracted by the warm-phenol technique. A portion was dissolved in 0.15*M* NaCl and centrifuged in a 5- to 20-percent sucrose gradient at 35,000 rev/min for 10 hours at 5°C in a Spinco 39 rotor. Fractions were collected from the bottom of the tube and the optical density at 260 nm was determined.

These observations are in certain respects similar to experiments reported by me and my co-workers [E. P. Cohen and J. J. Parks, *Science* **144**, 1012 (1964); E. P. Cohen, R. N. Newcomb, L. K. Crosby, *J. Immunol.* **95**, 583 (1965)]. We reported that RNA extracted from the spleens of mice immunized with sheep red blood cells converted a small number of spleen cells obtained from nonimmunized mice to antibody-forming cells. RNA from nonimmunized mice was ineffectual. In both Hashem's report and ours, the active material was extraordinarily sensitive to ribonuclease. We also found that the active RNA sedimented in the 8 to 12*S* fraction of a sucrose density gradient. We were, therefore, curious to learn that Hashem found that heavy ribosomal RNA was active. Hashem's claim was based on the finding of activity in the lower two-fifths of a 5- to 20-percent sucrose gradient centrifuged at 35,000 rev/min for 10 hours in a Spinco SW 39 rotor. He reported no optical-density pattern.

We prepared RNA from mouse spleen by the warm-phenol (60°C) technique, and subjected one portion to gradient centrifugation (5 to 20 percent sucrose) under more conventional conditions (Spinco SW 39 rotor at 38,000 rev/min for 4 hours at 5°C) and a second portion under the conditions reported by Hashem at 5°C. Under conventional conditions, the usual three peaks were observed. Figure 1 shows the optical density after centrifugation for 10 hours. It appears that when mouse RNA is centrifuged at 35,000 for 10 hours, most of the ribosomal RNA is driven into the bottom of the tube. Naturally, factors other than speed and rotor size influence the sedimentation of RNA. For example, rotor temperature during centrifugation is an important consideration and was not reported. The extent of this and other variables in determining the RNA pattern obtained in two laboratories can only be guessed. It does seem possible, therefore, that the RNA fraction that stimulates mitosis of human lymphocytes is closer in size to the RNA that converts cells to form antibody than to the heavy ribosomal fractions suggested by Hashem.

EDWARD P. COHEN
Institute of Microbiology,
Rutgers University,
New Brunswick, New Jersey 08903

3 January 1966

It seems to me that Cohen and I have reached practically the same conclusion in spite of the apparent disagreement about nomination of the active RNA fractions. I would add, however, that in dealing with different antigen-antibody systems I would interpret cautiously any comparative conclusions relating to the conditioned RNA fractions.

NEMAT HASHEM
5, El Goumhouria Street,
Cairo, Egypt, U.A.R.

14 February 1966

Cilia in Nematodes?

In reply to L. C. Cole's question (*1*) about the validity of the statement "Cilia are found in all animal groups except Nematoda," K. H. Kilburn (*2*) correctly points out the presence of cilia in the sperm and sensory organs of many arthropods.

Kilburn also refers to Browne and Chowdbury's observation (*3*) of cilia in the intestine of the dog nematode *Ancylostoma caninum*. This observation I have since been able to show, by the use of more refined electron-microscope techniques than were available in 1959, to be mistaken. The intestinal epithelium of *A. caninum* is not covered by cilia, but has a brush border composed of microvilli, each measuring approximately 8 microns in length and 0.1 micron in thickness. A central core extends from the tip of the microvillus into the apical cytoplasm of the cells, forming rootlets (*4*). Electron-microscope investigations of the intestines of other nematodes, for example *Ascaris* (*5*), have all displayed the presence of such a brush border composed of microvilli covering the epithelium.

If cilia are to be found in nematodes one must undoubtedly, as in arthropods, search in the sensory organs. Therefore we must continue to say that "cilia have not yet been found in nematodes."

JØRN ANDREASSEN
Department of Parasitology,
Zoological Laboratory,
University of Copenhagen, Denmark

References

1. L. C. Cole, *Science* **149**, 1176 (1965).
2. K. H. Kilburn, *ibid.*
3. H. G. Browne and A. B. Chowdbury, *J. Parasitol.* **45**, 241 (1959).
4. J. Andreassen, in preparation.
5. H. G. Sheffield, *J. Parasitol.* **50**, 365 (1964).

14 February 1966