

Recent observations by Anna Bidder on living *Nautilus* have renewed interest in this fabled but biologically little known animal, which very few zoologists have seen. J. Z. Young (University College, London) reported on his detailed neuroanatomical study of *Nautilus*. This study has contributed to an evaluation of its sensory and neural mechanisms and abilities. The pinhole of the eye is large and may not form an image. If it does form an image, the visual information remains inverted, because there are no dorsal-ventral neural chiasmata. The olfactory lobe of the brain is better developed than in any other living cephalopod, and the importance of this sensory modality to *Nautilus* has been verified in behavioral observations by Bidder. The cerebral cord does not show the divisions found in coleoids; it has complex plexiform regions which allow for interaction between signals from various receptors. The nervous system contains large numbers of neurons and is very far from the primitive molluscan condition.

In her report on locomotion in cephalopods, Bidder (Cambridge) explained water movement in and out of the mantle cavity of *Nautilus*. Differences from the more typical cephalopod mechanism are necessitated by the presence of the shell and absence of a flexible, muscular mantle. While jet propulsion is the dominant mode of cephalopod locomotion, other methods help and in some cases supersede it. These methods are diverse and include flange-like fins with wave motion, wing- and propeller-like posterior fins, the use of the arms in walking, and a web between the arms in medusoid swimming.

Locomotion by the arms in *Octopus* raises problems because of limited sensory equipment, but enables the solution of problems that would otherwise be formidable. The visual and locomotor methods used by experimental octopus to obtain a crab, initially visible behind a glass wall but accessible only after a course which temporarily obscures it from view, supported the hypothesis that cephalopods lack knowledge of the spatial position of their arms (M. J. Wells, Cambridge). Such knowledge would require an extreme array of receptors along the arms, neurons from them, and integrative centers in the brain for which space does not seem available. The information required would be much greater than in the vertebrate or arthropod with its limited number of joints separating inflexible segments.

A. Packard (Stazione Zoologica, Naples) also investigated the visual abilities of *Octopus* by means of an ingenious experimental device which rotates the visual field around a stationary animal, or rotates the animal within the stationary field. Oculomotor responses tend as much as possible to bring the stimulus toward the center of the retina of both eyes.

Emphasis was placed on the fact that the well developed sensory, neural, and motor apparatus of cephalopods permits rapid responses to environmental variables. (N. A. Holme, Marine Biological Association, Plymouth). The distribution and reproduction of *Loligo* in the English Channel are closely related to distribution patterns of water temperature.

In other reports on cephalopods, J. S. Alexandrowicz (Marine Biological Association, Plymouth) demonstrated rhythmic contractions of the ganglion situated near the heart in *Octopus*. Pulsations occurring with the same frequency as those of the organs of blood circulation are brought about by a spherical body situated within the ganglion and containing muscle tissue. It is possible that this body has a neurosecretory function. M. R. Clarke (National Institute of Oceanography) discussed the difficult problem of obtaining information on growth rate in cephalopods with particular attention to recognizable increments in the growth of hard parts.

This symposium was organized by C. M. Yonge.

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Forthcoming Events

August

9-12. **Heat Transfer**, 7th natl. conf., Cleveland, Ohio. (W. Chenoweth, American Inst. of Chemical Engineers, 345 E. 47 St., New York 17)

9-13. **American Soc. of Animal Science**, Knoxville, Tenn. (J. E. Oldfield, Dept. of Animal Science, Oregon State Univ., Corvallis)

9-14. **South American Union of Engineers' Federations**, 10th conv., Rio de Janeiro, Brazil. (Federação Brasileira de Associações de Engenheiros, Caixa Postal 1229, Rio de Janeiro)

10-14. **Structural Developments in Inorganic Chemistry**, New Hampton, N.H. (W. G. Parks, Dept. of Chemistry, Univ. of Rhode Island, Kingston)

10-15. **Pan American Federation of Engineering Socs.**, 8th biennial conv.,

Caracas, Venezuela. (L. K. Wheelock, Engineers Joint Council, 345 E. 47 St., New York 10017)

12-14. **Ballistic Missile and Space Technology**, 9th symp., U.S. Naval Training Center, San Diego, Calif. (C. Morrow, Aerospace Corp., P.O. Box 95085, Los Angeles, Calif. 90045)

12-14. **Galaxies**, preliminary conf., Uppsala, Sweden. (T. Page, Van Vleck Observatory, Wesleyan Univ., Middletown, Conn. 06457)

12-14. **X-Ray Analysis Applications**, 13th annual conf., Denver, Colo. (W. G. Mueller, Metallurgy Div., Univ. of Denver, Denver Research Inst., Denver 80210)

12-31. **Mathematics** seminar, Canadian Mathematical Congr., Laval Univ., Quebec, Canada. (L. F. S. Ritcey, CMC, 985 Sherbrooke St., W., Montreal, P.Q.)

13-15. **International Soc. for Horticultural Science**, Edinburgh, Scotland. (G. de Bakker, Le v.d. Boschstraat 4, The Hague, Netherlands)

16-21. **Histochemistry and Cytochemistry**, intern. congr., Frankfurt am Main, Germany. (T. H. Schiebler, Anatomisches Institut der Universität, Koellikerstr. 6, 87 Würzburg, Germany)

16-23. **Latin American Schools of Medicine**, 4th conf., Pocos de Caldas, Brazil. (O. Versiani Caldeira, Univ. of Minas Gerais Medical School, Belo Horizonte, Minas Gerais, Brazil)

16-24. **Human Economy**, conf., Inst. of Paper Chemistry, Appleton, Wis. (A. N. McLeod, IPC, Appleton)

17-20. **American Assoc. of Clinical Chemists**, 16th natl., Boston, Mass. (F. F. Ronan, AACC, 19 Bay State Rd., Boston 15)

17-20. **Natural Ultra Low Frequency Electromagnetic Fields**, symp., Boulder, Colo. (W. H. Campbell, National Bureau of Standards, Boulder)

17-21. **Combustion**, 10th intern. symp., Cambridge, England. (Combustion Inst., 986 Union Trust Bldg., Pittsburgh 19, Pa.)

17-21. **Cryogenic Engineering**, conf., Philadelphia, Pa. (K. D. Timmerhaus, Engineering Research Center, Ketchum 129, Univ. of Colorado, Boulder)

17-21. **Simulation in Space Technology**, Blacksburg, Va. (F. J. Maher, Virginia Polytechnic Inst., Blacksburg)

17-22. **International Astronomical Union**, symp., Thessaloniki, Greece. (Maj. B. R. Agins, Air Force Office of Scientific Research, SRMA, Washington, D.C.)

17-22. **Cardiology**, 4th European congr., Prague, Czechoslovakia. (H. Kafka, Karlovo nám. 32, Prague 2)

17-22. **Endocrinology**, 2nd intern. congr., London, England. (A. S. Mason, London Hospital, Whitechapel, London, E.1)

17-22. **Social Psychiatry**, 1st intern. congr., London, England. (J. Bierer, 7 Hollycroft Ave., London, N.W.3)

17-28. **Molecular Biophysics**, intern. inst., Squaw Valley, Calif. (Prof. Weissbluth, Biophysics Laboratory, Stanford Univ., Stanford, Calif.)

18-20. **International Assoc. of Milk and Food Sanitarians**, Portland, Ore. (H. L. Thomasson, P.O. Box 437, Shelbyville, Ind.)

19-21. **Physiology of Digestion in the Ruminant**, 2nd intern. symp., Ames, Iowa. (R. W. Dougherty, Box 70, Ames)

20-21. **National Council of Teachers of Mathematics**, Minneapolis, Minn. (J. D. Gates, NCTM, 1201 16th St. NW, Washington, D.C. 20036)

22. **American Inst. of Ultrasonics in Medicine**, 9th annual, Boston, Mass. (W. J. Fry, Biophysical Research Laboratory, Univ. of Illinois, Urbana)

22-24. **History of Astronomy**, symp., Hamburg, Germany. (B. Sticker, Institut für Geschichte der Naturwissenschaften, Universität Hamburg, Hartungstr. 5, 2 Hamburg 13, Germany)

22-28. **American Soc. of Human Genetics**, Boulder, Colo. (S. H. Boyer, Johns Hopkins Hospital, Baltimore, Md.)

23. **American Assoc. of Electromyography**, annual, Boston, Mass. (M. K. Newman, 16861 Wyoming Ave., Detroit, Mich. 48221)

23-26. **American Phytopathological Soc.**, Lafayette, Ind. (J. R. Shay, Purdue Univ., Lafayette)

23-26. **Soil Conservation Soc. of America**, 19th annual, Jackson, Miss. (SCS, 7515 Northeast Ankeny Rd., Ankeny, Iowa)

23-28. **American Inst. of Biological Sciences**, annual, Boulder, Colo. (AIBS, 2000 P St., NW, Washington, D.C.)

The following societies will hold meetings in conjunction with the AIBS meeting:

- American Bryological Society
- American Fern Society
- American Fisheries Society
- American Microscopical Society
- American Society for Horticultural Science

- American Society of Human Genetics
- American Society of Parasitologists
- American Society of Plant Physiologists
- American Society of Plant Taxonomists
- American Society of Zoologists
- Biometric Society ENAR-WNAR
- Botanical Society of America
- Ecological Society of America
- Genetics Society of America
- Mycological Society of America
- National Association of Biology Teachers

- Nature Conservancy
- Phi Sigma Society
- Phycological Society of America
- Society for Industrial Microbiology
- Society for the Study of Development and Growth
- Society of Nematologists
- Society of Protozoologists
- Tomato Genetics Cooperative

23-28. **American Congr. of Physical Medicine and Rehabilitation**, Boston, Mass. (G. Gullickson, Jr., 30 N. Michigan, Chicago, Ill.)

23-28. **Conservation Education**, conf., Tacoma, Wash. (C. Boyce, Office of the Superintendent of Public Instruction, Olympia, Wash.)

24-26. **American Inst. of Aeronautics and Astronautics**, Los Angeles, Calif. (AIAA, 1290 Sixth Ave., New York, N.Y.)

24-26. **Society for Cryobiology**, annual, Washington, D.C. (V. P. Perry, Tissue Bank Dept., National Naval Medical Center, Bethesda, Md.)

24-26. **Education in the Nuclear Power Era**, conf., Gatlinburg, Tenn. (M. L. Nelson, Education Div., Oak Ridge Natl. Laboratory, P.O. Box 117, Oak Ridge, Tenn.)

24-26. **Mathematical Assoc. of America**, summer meeting, Univ. of Massachusetts, Amherst. (H. M. Gehman, Univ. of Buffalo, Buffalo 14, N.Y.)

24-27. **American Soc. for Pharmacology and Experimental Therapeutics**, Univ. of Kansas, Lawrence. (E. B. Cook, The Society, 9650 Wisconsin Ave., NW, Washington, D.C.)

24-27. **Biological Photographic Assoc.**, annual, New York, N.Y. (C. H. Weiss, 81 Bedford St., New York 14)

24-27. **American Hospital Assoc.**, Chicago, Ill. (E. L. Crosby, 840 N. Lake Shore Dr., Chicago 11)

24-27. **Toxicology and Occupational Medicine**, 4th inter-American conf., Miami Beach, Fla. (W. Machle, Univ. of Miami School of Medicine, Coral Gables, Fla.)

24-28. **International Council of the Aeronautical Sciences**, 4th congr., Paris, France. (American Inst. of Aeronautics and Astronautics, 2 E. 64 St., New York, N.Y. 10021)

24-28. **Astrodynamics Guidance and Control**, conf., Los Angeles, Calif. (K. Watanabe, 4731 B Engineering Building III, University of California, Los Angeles 24)

24-28. **American Astronautical Soc.**, military space applications symp., Stanford, Calif. (AAS, 516 Fifth Ave., New York, N.Y.)

24-28. **Society for Industrial and Applied Mathematics**, Amherst, Mass. (W. S. Dorn, T. J. Watson Research Center, I.B.M., P.O. Box 218, Yorktown Heights, N.Y.)

24-28. **Scandinavian Mathematical Congr.**, Copenhagen, Denmark. (Secretariat, The Congress, c/o Mathematical Inst., H. C. Ørsted Inst., Universitetsparken 5, Copenhagen Ø)

24-28. **American Mathematical Soc.**, New York, N.Y. (G. L. Walker, AMS, 190 Hope St., Providence, R.I.)

24-28. **Preventive Cardiology**, first intern. conf., Burlington, Vt. (W. Raab, Preventive Heart Reconditioning Foundation, 206 Summit St., Burlington, Vt.)

24-28. **Water Pollution Research**, 2nd intern. conf., Tokyo, Japan. (Water Pollution Control Federation, 4435 Wisconsin Ave., Washington, D.C. 20016)

24-29. **Psychotherapy**, 6th intern. congr., London, England. (F. Pannell, The Congress, 11 Whitehall Ct., London, S.W.1)

24-29. **Preparation and Biomedical Application of Labeled Molecules**, Venice, Italy. (C. Colombini, Center of Nuclear Chemistry, Univ. of Padova, Via Loredan 6, Padova, Italy)

24-3. **International Assoc. of Agricultural Economists**, 12th triennial conf., Lyons, France. (French Organization Committee of the Conference, 4, rue de Lafayette, Paris 16°, France)

25-27. **Association for Computing Machinery**, 19th annual, Philadelphia, Pa. (H. S. Bright, Philco Computers, Willow Grove, Pa.)

25-28. **Western Electronics Show and**

Conv. (WESCON), Inst. of Electrical and Electronics Engineers, summer meeting, Los Angeles, Calif. (R. R. Bennett, Suite 1920, 3600 Wilshire Blvd., Los Angeles)

25-29. **Audiology**, 7th intern. congr., Copenhagen, Denmark. (H. W. Ewertsen, c/o State Hearing Centre, 7 D. Tvaergade, Copenhagen K)

25-3. **International Astronomical Union**, 12th general assembly, Hamburg, Germany. (D. A. Bell, c/o Royal Greenwich Observatory, Hertsmonceaux Castle, Hailsham, Sussex, England)

26-2. **British Association for the Advancement of Science**, 126th annual, Southampton, England. (BAAS, 3 Sanctuary Bldgs., London, S.W.1, England)

26-2. **Logic, Methodology, and Philosophy of Science**, intern. conf., Jerusalem, Israel. (Y. Bar-Hillel, Hebrew Univ., Jerusalem)

26-3. **Electron Microscopy**, 3rd European regional conf., Prague, Czechoslovakia. (Organizing Committee, Albertov 4, Prague 2)

27. **American Soc. for Horticultural Science**, Amherst, Mass. (R. E. Marshall, AMHS, Dept. of Horticulture, Michigan State Univ., East Lansing)

27-28. **Activation Analysis**, Glasgow, Scotland. (J. M. A. Lenihan, Western Regional Hospital Board, 9 W. Greham St., Glasgow, C.4)

27-29. **Pacific Slope Biochemical Conf.**, San Francisco, Calif. (M. P. Gordon, Dept. of Biochemistry, Univ. of Washington, Seattle 98105)

27-29. **Reactive Intermediates in Organic Chemistry**, symp., Quebec City, P.Q., Canada. (C. R. Engel, Faculté des Sciences, Université Laval, Quebec City)

28-3. **Neurology**, 8th intern. congr., Vienna, Austria. (H. Hoff, Medizinische Fakultät, Neurologische und Psychiatrische Abteilung, Vienna 9)

29. **Gravity Research Foundation**, annual, New Boston, N.H. (The Foundation, Gravity Village, New Boston)

29-5. **International Epidemiological Assoc.**, 4th intern. meeting, Princeton, N.J. (L. Breslow, Div. of Preventive Medical Services, California Dept. of Public Health, 2151 Berkeley Way, Berkeley 95704)

30-2. **Electronic Properties and Applications of Solid-Solid Interfaces**, Boston, Mass. (F. S. Gardner, Office of Naval Research, 495 Summer St., Boston, Mass.)

30-3. **Illuminating Engineering Soc.**, Miami Beach, Fla. (A. D. Hinckley, IES, 345 E. 47 St., New York 10017)

30-4. **American Chemical Soc.**, fall natl. meeting, Chicago, Ill. (A. H. Emery, 1155 16th St., NW, Washington, D.C.)

30-4. **Institute of Mathematical Statistics**, annual, Amherst, Mass. (D. M. Gilford, Mathematical Sciences Division, Office of Naval Research, Washington, D.C.)

30-4. **American Ornithologists' Union**, Lawrence, Kan. (L. H. Walkinshaw, 1703 Wolverine Tower, Battle Creek, Mich.)

30-5. **Applied Mechanics**, 11th intern. congr., Munich, Germany. (Organisations-Sekretariat des Mechanik-Kongresses, Inst. für Mechanik, Arcisstr. 21, Munich 2)

30-5. **Cell Biology**, 11th intern. congr., Providence, R.I. (J. W. Wilson, Dept. of Biology, Brown Univ., Providence)