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Studies on the Brain and Behavior of the Rat in a Hyperbaric Environment. J.A. Cromer, S.J. Brumleve, J. Carman, and E.S. Halas. University of North Dakota, Grand Forks, North Dakota.

Electroencephalograms (EEG) were recorded from chronically implanted electrodes in albino rats before, during and after compression and decompression, in order to determine the effect of high pressure (13 ATA) helium-oxygen or nitrogen-oxygen mixtures on the central nervous system. A comparison of EEG recordings suggest a state of light anesthesia in $He-O_2$ at 13 atmospheres.

The hypothesis was confirmed by a behavioral study using the conditioned anxiety learning paradigm. The conditioned anxiety was obtained by repeated presentation of a warning (a light) of an unavoidable electric shock which modified a stable ongoing operant performance (lever pressing) maintained by food reinforcement. The EEG changes and relationships to the behavioral pattern will be discussed.

Supported by ONR Grant No. N00014-68-A-0499, and PHS 1-SO1FR-5407-04.

PRESENT AND PAST MOLLUSKS OF THE FOREST RIVER, NORTH DAKOTA. *A. M. Cvancara, J. M. Erickson,* and *J. D. Delimata.* Dept. of Geology, Univ. N. Dak., Grand Forks, N. Dak. 58201.

The Forest River in northeastern North Dakota was studied for living and fossil mollusks primarily during the summers of 1965 and 1966; additional data were gathered occasionally during 1967-1970. Twenty-two stations were sampled for living mollusks and fossil mollusks were collected at cutbank exposures at four sites. Twenty-one species of mollusks were found living in the river: 6 unionid bivalves (mussels), 5 pisidiid bivalves (fingernail clams) and 10 gastropods. Most of the mollusks occurred in the middle section of the river between Fordville and Minto. Unionids were found farthest downstream (few miles downstream from Minto), followed by pisidiids and gastropods. High chloride content (up to 1230 ppm) in the lower reaches of the river is perhaps the primary ecologic factor inhibiting the occurrence of mollusks. High turbidity, also in the lower reaches, may also be a limiting factor. Fossil assemblages indicate that the fossil fauna was very similar to that of the present, lacking in only five species or less and possessing no different forms. This suggests a similar regimen for the Forest River since the oldest sampled mollusks of that river lived in late (?) Holocene time. Supported by Univ. N. Dak. Faculty Res. Grant 4422-78 and N. Dak. WRRI (funds from U. S. Dept. Interior).

PALEOCENE FRESH-WATER FAUNA FROM SOUTHWESTERN NORTH DAKOTA. J. J. Delimata. Dept. of Geol., Univ. N. Dak., Grand Forks, N. Dakota. 58201.

Nine molluscan species are known to occur in the Tongue River and Sentinel Butte sediments within parts of Billings, Golden Valley, and Slope Counties. The faunal list includes: two unionids, Plesiellipti priscus (Meek & Hayden) and Rhabdotophorus senectus (White); one corbulid, Bicorbula mactriformis (Meek & Hayden); and six viviparids, Viviparus retusus (Meek & Hayden), Viviparus trochiformis (Meek & Hayden), Campeloma nebrascensis (Meek & Hayden), Lioplacodes limnaeformis (Meek & Hayden), Lioplacodes nebrascensis (Meek & Hayden), and Lioplacodes tenuicarinata (Meek & Hayden).

Four of these mollusks are confined to the Tongue River Formation: R. senectus, B. mactriformis, L. limnaeformis, and L. tenuicarinata. Preliminary work indicates that these species may be of value as stratigraphic indicators in differentiating between sediments of the two formations.

The molluscan assemblage is typically one of fresh water with the exception of B. mactriformis. Modern corbulids are known to frequent brackish environments and the occurrence of this species may suggest minor brackish incursions at the time Tongue River sediments were deposited. Supported by N.D.G.S.

KARYOTYPES FOR TWO SPECIES OF NORTH DAKOTA CYPRINIDS. G. W. Dewald. Biol. Dept., Univ. of N. D., Grand Forks, N. D.

Karyotypes were established for Rhinichthyes atratulus Hermann (blacknose dace) and R. cataractae Valenciennes (longnose dace) based on six specimens of the former and seven of the latter. Excellent metaphase spreads were obtained using gill tissue extracted from colchicine injected specimens. Gill filaments were treated with .1 M KCN, triple distilled water and acid - alcohol fixative. Slides were prepared by smearing an epithelial cell monolayer followed by staining with carbol fuchsin. A modal diploid number of 50 was established for each species. R. atratulus consisted of four median, 10 submedian, eight subtelocentric and three telocentric chromosomes. R. cataractae was comprised of seven median, 15 submedian, two subtelocentric and two telocentric chromosomes. Thus, it would appear that these two species can be distinguished based on the differences in their karyotypes. Although there have been no other reports on karyotypes in this genus, it is generally accepted that most cyprinids are characterized by 44 to 50 chromosomes and those with 88 or more are polyploid. Therefore, the two species in question appear to be diploid.

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