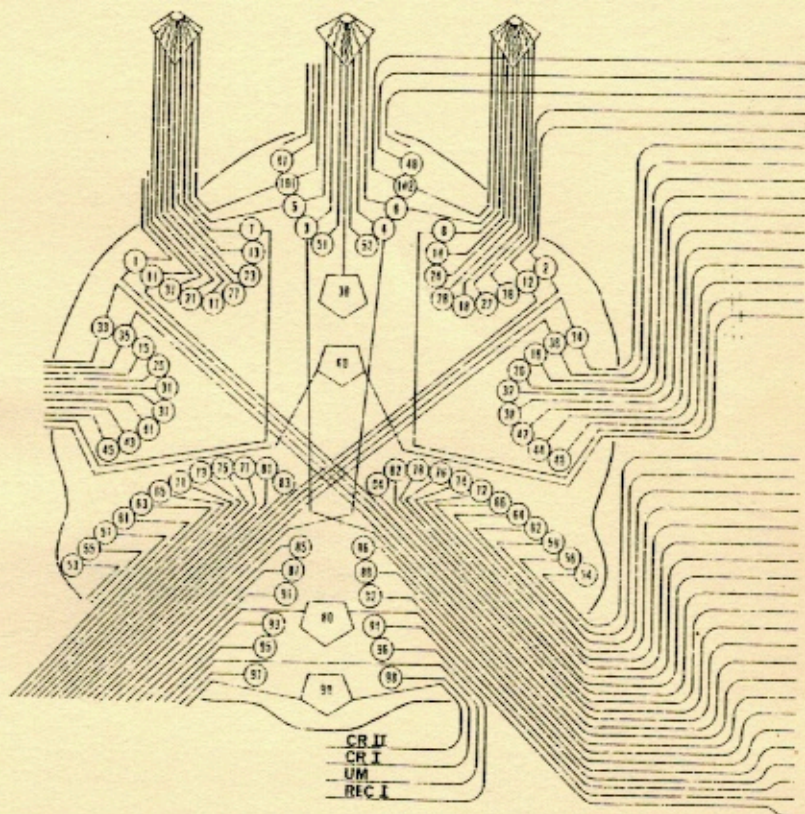


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ANNUAL MIDWESTERN CONFERENCE OF PARASITOLOGISTS



EASTERN MICHIGAN UNIVERSITY
YPSILANTI JUNE 12-14, 1980

AMCOP XXXII 1980

Affiliate American Society of Parasitologists

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ACKNOWLEDGEMENTS

AMCOP expresses its gratitude to the following organizations for their contributions to this 32nd meeting to make it enjoyable and meaningful.

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AMCOP-32 PROGRAM

(All times are Eastern Daylight Savings)

June 12	3:00-12:00 PM	Check in. Hoyt Conference Center.
June 13	8:00-9:30 AM	Registration. Lobby, Jefferson Science Bldg. Set up demonstrations. 317, 325 Jefferson.
	9:00-11:30	General Session. Contributed Papers. 101 Jefferson.
	1:00-2:00 PM	"Reexamination of the Functional Morphology of Acanthocephala." Drs. Dunagan and Miller. Dept. of Physiology, Southern Illinois University at Carbondale. 101 Jefferson.
	2:00-4:00	Demonstrations. 317 and 325 Jefferson
	4:00	Business Meeting. 101 Jefferson.
	5:30	Social Hour (Cash bar). Hoyt Center
	7:00	Banquet Buffet (\$8.50). Hoyt Center
	8:00	"Tropical Parasitology at the Junction of the White and Blue Nile Rivers." Dr. J. R. Williams, Department of Microbiology and Public Health, Michigan State University. Hoyt Center.
June 14	8:00-9:00 AM	Rolls and Coffee. Lobby, Jefferson.
	9:00-11:00	Contributed Papers. 101 Jefferson.
	11:00	Business Meeting. 101 Jefferson.

AMCOP-32 RESERVATION REQUEST

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	Price*/person/nite	June 12	June 13	Amount
(Available Thursday Aft)				
Double w/shared bath; w/private bath	\$7.80; \$15.08	()	()	_____
Single w/shared bath;w/private bath	\$10.30; \$19.66	()	()	_____
Suite w/living room & private bath	\$30.16	()	()	_____
Buffet Banquet 7PM June 13 @	\$ 8.50	No.	_____	_____
Registration (Members \$1.00; non-members \$4.00)				_____
* Includes 4% Sales Tax			Total Amount	_____

Send to Dr. Elizabeth Waffle, Department of Biology, Eastern Michigan University, Ypsilanti, MI 48197

DEMONSTRATIONS

1. PENETRATION OF FASCIOLOIDES MAGNA MIRACIDIA INTO THE SNAIL FOSSARIA BULIMOIDES. WILLIAM H. COIL, SYSTEMATICS AND ECOLOGY, UNIVERSITY OF KANSAS, LAWRENCE, KANSAS. 66045
2. PARASITOLOGY PROGRAM OF ANN ARBOR BIOLOGICAL CENTER. RAY DANLUVEN, MARY DEMOSS, AND ELIZABETH WAFFLE, ANN ARBOR BIOLOGICAL CENTER, ANN ARBOR, MICHIGAN. 48103
3. NEUROANATOMY OF OLIGACANTHORHYNCHUS TORTUOSA (ACANTHOCEPHALA). T. T. DUNAGAN AND DONALD M. MILLER, SOUTHERN ILLINOIS UNIVERSITY, CARBONDALE, ILLINOIS. 62901
- 4.* ACETYLCHOLINE ESTERASE STAINING OF CRYOSTAT SECTIONS OF THE BODY WALL OF MONILIFORMIS MONILIFORMIS. THOMAS A. FRANCIS, DEPARTMENT OF PHYSIOLOGY, SOUTHERN ILLINOIS UNIVERSITY, CARBONDALE, ILLINOIS. 62901
5. A STRANGE METACERCARIA (THAPARIELLIDAE) FROM A SNAIL. JOHN D. GOODMAN, ANDERSON COLLEGE, ANDERSON, INDIANA. 46011
6. POPULATION BIOLOGY OF TWO SPECIES OF SPINICTECTUS (SPIRURIDA: NEMATODA) IN FISHES OF WESTERN LAKE ERIE. R. JILEK AND J.L. CRITES, ZOOLOGY DEPARTMENT AND THE CENTER FOR LAKE ERIE AREA RESEARCH, THE OHIO STATE UNIVERSITY, COLUMBUS, OHIO. 43210
7. THELAZIA SP. EYEWORMS IN CATTLE AND HORSES IN INDIANA. K. R. KAZACOS AND C. A. LADOUCEUR, DEPARTMENT OF VETERINARY MICROBIOLOGY, PURDUE UNIVERSITY, WEST LAFAYETTE, INDIANA. 47907
- 8.* SALMONELLA AND HUMAN BLOOD FLUKES: MECHANISM OF INTERACTION. RANDA F. MELHEM, DEPARTMENT OF BIOLOGICAL SCIENCES, PURDUE UNIVERSITY, WEST LAFAYETTE, INDIANA. 47907
9. PRELIMINARY INVESTIGATION OF THE ULTRASTRUCTURE OF MATURE PLISTOPHORA CEPEDIANAE (MICROSPORIDA: NOSEMATIDAE) SPORES. R. L. PRICE, DEPARTMENT OF ZOOLOGY, SOUTHERN ILLINOIS UNIVERSITY-CARBONDALE, CARBONDALE, ILLINOIS. 62901
- 10.* COMPARISON OF ACANTHOCEPHALAN LACUNAR FLUIDS IN POLYACRYLAMIDE GEL ELECTROPHORESIS. ROBERT J. SHEEHAN, DEPARTMENT OF PHYSIOLOGY, SOUTHERN ILLINOIS UNIVERSITY, CARBONDALE, ILLINOIS. 62901
- 11.* MOTILITY AND HATCHING OF MESOCESTOIDES SP. ONCOSPHERES. R. A. SIDNER, DEPARTMENT OF BIOLOGICAL SCIENCES, UNIVERSITY OF CINCINNATI, CINCINNATI, OHIO. 45221
- 12.* RHYTHMS OF LOCOMOTORY ACTIVITY AND HEARTBEAT RATE IN BIOMPHALARIA GLABRATA. CAROL L. WILLIAMS, DEPARTMENT OF ECOLOGY AND BEHAVIORAL BIOLOGY, UNIVERSITY OF MINNESOTA, MINNEAPOLIS. 55455
- 13.* CEREBROSPINAL NEMATODIASIS IN MICE AND HAMSTERS DUE TO BAYLISASCARIS PROCYONIS. W. L. WIRTZ, DEPARTMENT OF VETERINARY MICROBIOLOGY, PURDUE UNIVERSITY, WEST LAFAYETTE, INDIANA. 47907

DEMONSTRATIONS

14. COMPARISON OF ACANTHOCEPHALAN BODY COMPARTMENT FLUIDS BY ISO-ELECTRIC FOCUSING. ROBERT A. YOUNG, DEPARTMENT OF PHYSIOLOGY, SOUTHERN ILLINOIS UNIVERSITY, CARBONDALE, ILLINOIS. 62901

PAPER PRESENTATIONS

15. SUCCINATE DECARBOXYLATION AND THE ASSOCIATED PHOSPHORYLATION IN ASCARIS SUUM, FASCIOLA HEPATICA AND SPIROMETRA MANSONOIDES. SUSAN M. PIETRZAK AND HOWARD J. SAZ, DEPARTMENT OF BIOLOGY, UNIVERSITY OF NOTRE DAME, NOTRE DAME, INDIANA. 46556
- 16.* EFFECTS OF CARBONIC ANHYDRASE INHIBITION ON SCHISTOSOMA MANSONI-INFECTED BIOMPHALARIA GLABRATA. R. A. SIDNER, DEPARTMENT OF BIOLOGICAL SCIENCES, UNIVERSITY OF CINCINNATI, CINCINNATI, OHIO. 45221
- 17.* PARTIAL SATURATION OF THE UPTAKE OF CHOLESTEROL IN HYMENOLEPIS DIMINUTA. WILLIAM J. JOHNSON, DEPARTMENT OF ZOOLOGY, UNIVERSITY OF IOWA, IOWA CITY, IOWA. 52242
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- 19.* SOLUBILIZATION OF MEMBRANE-BOUND RIBONUCLEASE (RNase) AND ALKALINE PHOSPHATASE FROM THE ISOLATED BRUSH BORDER PLASMA MEMBRANE OF HYMENOLEPIS DIMINUTA (CESTODA). H. RAY GAMBLE, DEPARTMENT OF ZOOLOGY, THE OHIO STATE UNIVERSITY, COLUMBUS, OHIO. 43210
- 20.* ORIGIN OF POLYPLOID BULINUS--COMPARATIVE CYTOGENETICS OF DIPLOIDS AND TETRAPLOIDS. M. A. GOLDMAN, DEPARTMENT OF BIOLOGICAL SCIENCES, PURDUE UNIVERSITY, W. LAFAYETTE, INDIANA. 47907
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- 22.* INNERVATION OF MUSCLES IN THE ACANTHOCEPHALAN, MONILIFORMIS MONILIFORMIS. MATTHEW LINNIK, DEPARTMENT OF PHYSIOLOGY, SOUTHERN ILLINOIS UNIVERSITY, CARBONDALE, ILLINOIS. 62901
- 23.* COMPUTER MODELING OF SCHISTOSOMA MANSONI MIRACIDIAL DISPERSION. GORDON G. FLORIN, DEPARTMENT OF ECOLOGY AND BEHAVIORAL BIOLOGY, UNIVERSITY OF MINNESOTA, MINNEAPOLIS. 55455

- 24.* STUDIES ON THE LIFE HISTORY OF THE TREMATODE ALLOCREADIUM PSEUDOTRITONI RANKIN, 1937. P. A. CATALANO, DEPARTMENT OF BIOLOGICAL SCIENCES, UNIVERSITY OF CINCINNATI, CINCINNATI, OHIO. 45221
25. IMMUNOFLUORESCENT LOCALIZATION AND ULTRASTRUCTURE OF CRYPTIC LEUCOCYTOZOOM SIMONDI MATHIS AND LEGER IN WINTERING GEESE. L. D. SIBLEY, J. FERL, J. H. BARROW JR., HIRAM BIOLOGICAL RESEARCH STATION, HIRAM, OHIO.
26. COMPARISONS OF THE EXTERNAL MORPHOLOGICAL CHARACTERS OF THE NORTH AMERICAN SPECIES OF SPINITECTUS. R. JILEK AND J. L. CRITES, ZOOLOGY DEPARTMENT AND THE CENTER FOR LAKE ERIE AREA RESEARCH, OHIO STATE UNIVERSITY, COLUMBUS, OHIO. 43210
27. ENZYME POLYMORPHISMS AND GEOGRAPHIC VARIATION IN SCHISTOSOMA MANSONI. M. FLETCHER AND P. T. LOVERDE, DEPARTMENT OF BIOLOGICAL SCIENCES, PURDUE UNIVERSITY, WEST LAFAYETTE, INDIANA. 47907
28. PARTIAL PURIFICATION AND CHARACTERIZATION OF THE Kav 0.64 PHEROMONE FRACTION OF THE NEMATODE NIPPOSTRONGYLUS BRASILIENSIS. LEON W. BONE, DEPARTMENT OF PHYSIOLOGY, SOUTHERN ILLINOIS UNIVERSITY, CARBONDALE, ILLINOIS. 62901
29. HEXOSE TRANSPORT BY LARVAL PROTEROMETRA MACROSTOMA (DIGENEA). G. L. UGLEM, PHYSIOLOGY GROUP, BIOLOGICAL SCIENCES, UNIVERSITY OF KENTUCKY, LEXINGTON. 40506
30. RESPONSES OF MIRACIDIA OF PHILOPHTHALMUS GRALLI AND MEGALODISCUS TEMPERATUS TO VARIOUS ENVIRONMENTAL CUES. PAUL M. NÖLLEN, DEPARTMENT OF BIOLOGICAL SCIENCES, WESTERN ILLINOIS UNIVERSITY, MACOMB, ILLINOIS. 61455
31. THE CERCARIENHULLEN REAKTION OF GIGANTOBILHARZIA HURONENSIS. W. T. MCGEACHIN, DEPARTMENT OF ZOOLOGY, IOWA STATE UNIVERSITY, AMES, IOWA. 50011
32. HELMINTHS OF PHILIPPINE RABBITFISHES (SIGANIDAE). FREDERICK J. VANDE VUSSE, SILLIMAN UNIVERSITY MARINE LABORATORY, DUMAGUETE CITY, PHILIPPINES AND GUSTAVUS ADOLPHUS COLLEGE, ST. PETER, MINNESOTA. 56082
33. PHEROMONE ACTIVE SPACE OF NIPPOSTRONGYLUS BRASILIENSIS IN THE MOUSE INTESTINE. GARTH H. GLASSBURG AND LEON W. BONE, DEPARTMENT OF PHYSIOLOGY, SOUTHERN ILLINOIS UNIVERSITY, CARBONDALE, ILLINOIS. 62901

* In competition for Herrick or LaRue awards.

ABSTRACTS

Demonstrations

1. PENETRATION OF FASCIOLOIDES MAGNA MIRACIDIA INTO THE SNAIL FOSSARIA BULIHOIDES. WILLIAM R. COIL, SYSTEMATICS AND ECOLOGY, UNIVERSITY OF KANSAS, LAWRENCE, KANSAS. 66045

Eggs of *Fascioloides magna* are obtained by rinsing bovine or cervid liver capsules. Adult worms may be de-egged by placing them in water. The eggs are cleaned by repeated sedimentation over a period of several days until the water smells fresh after standing overnight. Embryonation takes place at room temperature requiring about 17 days at 25°C. The water is changed every other day. When one can discern numerous eyespots in the eggs, the eggs are placed in the refrigerator at 4-3°C for 5-7 days. Hatching of fasciolid miracidia requires light, oxygen, and the proper temperature. I remove the eggs from the refrigerator, replace the water with de-ionized water at room temperature and stimulate hatching with bright sunlight for 15-20 minutes. Either glass or plastic containers will serve. *F. magna* miracidia will penetrate the snail immediately after hatching, however many workers feel that the miracidia should be aged 3-4 hours. In this demonstration I will attempt to hatch eggs so a live penetration can be observed. Observations of the live material will be supported by both SEM and TEM micrographs.

3. NEUROANATOMY OF OLIGACANTHORHYNCHIUS TORTUOSA (ACANTHOCEPHALA). T. T. DUNAGAN AND DONALD M. MILLER, SOUTHERN ILLINOIS UNIVERSITY, CARBONDALE 62901

The anatomy of the cerebral ganglion resembles that previously described for large acanthocephala from mammals. The cell population is equally distributed between each half of the ganglion, there being thirty-eight cells on each side with nine cells centrally located. The core of the ganglion or neuropile occupies the central part of the ganglion and is the site for the cross over for many cell processes. Many of the axons from these cells exit from the side opposite the soma. The cell bodies predominate on the ventral surface but the dorsal surface is more of a mixture of cell bodies and neurites. The cytoarchitecture of these cells varies considerably but most have a large round nucleus with well defined nucleoli. There are a total of eighty-five cells, two of which are binucleate. The two binucleate cells are located at opposite extremes of the anteroposterior axis of the ganglion. The anterior binucleate cell is adjacent to the dorsal surface whereas the posterior cell is central and near the posterior terminal of the ganglion.

- 4 ACETYLCHOLINE ESTERASE STAINING OF CRYOSTAT SECTIONS OF THE BODY WALL OF *Moniliformis moniliformis*. THOMAS A. FRANCIS, DEPARTMENT OF PHYSIOLOGY, SOUTHERN ILLINOIS UNIVERSITY, CARBONDALE, IL. 62901

Adult worms of the acanthocephala, *Moniliformis moniliformis* were fixed in 10% neutral formalin for 25 minutes, washed for 5 minutes, and then freeze mounted on a stage at -15°C. Cross sections of the worm body wall were made at approximately 8 microns. The sections were transferred to a cold albumin covered slide and subsequently warmed from below. The sections were then allowed to dry overnight. Staining was accomplished by the method of Karnovsky and Roots. Once the histochemical staining was completed, the sections were counterstained with Toluidine Blue. Acetylcholine esterase was found located in the intermuscular areas of the worm body wall. Stained areas are primarily located in a circumferential pattern between the circular muscle layer and the tegument layer.

- 5 While studying freshwater cercariae, 1947-1949, at Reelfoot Lake, Tennessee, an apparently new trematode was found in numerous snails of the genus *Viviparus* near Walnut Log, the then location of the Reelfoot Lake Biological Station. Collections of this snail more recently, 1971-1978, reveal that this trematode still exists in abundance there. *Thapariella* *Srivastava*, 1955, consists of two avian esophageal flukes, from molluscivorous wading birds in Africa and India. Prudhoe, 1957, discovered *Thapariella*-like forms in the snail, *Lanistes*, from Zaire, an operculate (Family Ampullariidae). In India, *Thapariella anastomusa* occurs in viviparid snails (*Viviparus bengalensis*) and as an adult in the Open-bill Stork, *Anastomus lamelligerus*. The metacercariae found in *Viviparus* from Reelfoot, although *Thapariellids*, are distinct and cannot be placed in any presently described genera. There is no information on the definitive avian(?) host(s) at Reelfoot Lake. And, to date, feeding experiments have been unproductive.

- 6 POPULATION BIOLOGY OF TWO SPECIES OF SPINITECTUS (SPIRURIDA: NEMATODA) IN FISHES OF WESTERN LAKE ERIE. R. JILEK AND J.L. CRITES, ZOOLOGY DEPARTMENT AND THE CENTER FOR LAKE ERIE AREA RESEARCH, THE OHIO STATE UNIVERSITY, COLUMBUS, OHIO. 43210
S. carolini and *S. gracilis* are two of the most common nematode parasites of fishes in central and eastern N. Amer. A survey of 1477 fish, comprising 11 species, has shown significant changes in the prevalence of these 2 nematodes over the past 50 years, with an overall increase in the prevalence of *S. gracilis* and an overall decrease in *S. carolini*. New host records and the first dual parasitism by *S. carolini* and *S. gracilis* were observed. Infection rates were highest for rock bass (88%), pumpkinseeds (56%), smallmouth bass (55%), and bluegills (50%). The percent infection of both increase from May through September, with the highest infection rates occurring in young fish. The mean worm burdens exhibit simi-

lar trends, increasing from May through August and then declining. *S. carolini* infections were usually found to be greater in prevalence and mean worm burden than *S. gracilis* infections. Female/male ratios averaged approximately 2:1 throughout the study. Recruitment of 3rd stage larvae was greatest from June through August when the intermediate hosts were most available. Analysis of the weight/length/age relationship of the rock bass infected with *Spinitectus* has indicated an increased growth for infected fish through the first 2 age classes followed by a rapid decline in weight and length over the subsequent 5 age classes studied.

- 7 THELAZIA SP. EYEWORMS IN CATTLE AND HORSES IN INDIANA. K. R. KAZACOS AND C. A. LADOUCEUR, DEPARTMENT OF VETERINARY MICROBIOLOGY, PURDUE UNIVERSITY, WEST LAFAYETTE, INDIANA 47907

Between August 1977 and July 1979, eyes were collected from 320 cattle and 115 horses in Indiana and examined for *Thelazia* sp. eyeworms. Eighty-eight of 320 cattle (28%) were infected; 2 species of cattle eyeworms were found - *Thelazia gulosa* and *T. skrjabini*. Seventeen cattle were infected in both eyes and 65 cattle in a single eye. From 1 to 128 (mean, 6) eyeworms were found per infected cow. Three-year-old cattle had the highest proportion of infection, and infected cattle represented 10 breeds. Thirty-one cattle had *T. gulosa* only, 31 had *T. skrjabini* only, and 20 had both eyeworm species. Twenty-five of 115 horses (22%) were infected with a single eyeworm species, *T. lacrymalis*. Eight horses had eyeworms in both eyes and 14 had eyeworms in a single eye. From 1 to 102 (mean, 8) *T. lacrymalis* were found per infected horse. One-year-old horses had the highest proportion of infection, and infected horses represented 7 breeds. In cattle and horses, *Thelazia* sp. were found on the surface of the conjunctiva and cornea, on the eyelashes, behind the nictitating membrane, in the ducts of the lacrimal and nictitating membrane glands, in the lacrimal canaliculi, and burrowed in the conjunctiva. On occasion, they were also found associated with or protruding from conjunctival nodules.

- 8 SALMONELLA AND HUMAN BLOOD FLUKES: MECHANISM OF INTERACTION. RANDA F. MELHEM, DEPARTMENT OF BIOLOGICAL SCIENCES, PURDUE UNIVERSITY, WEST LAFAYETTE, INDIANA 47907.

In nature an association between human schistosomes and *Salmonella* has been reported. Previous experimental studies have demonstrated that *Salmonella typhimurium* colonized the gut and surface tegument of adult schistosomes. Present studies using strains of *Salmonella typhimurium*, some with mutations, and scanning electron microscopy identify pili (fimbriae) as structures important in adherence of *Salmonella* to the surface tegument of *Schistosoma*. The nature of pili adhesion to the schistosome tegument was examined using D-mannose, D-glucose, D-fructose and α -methyl-D-mannoside to identify the specific sugar moieties involved.

All the sugars tested inhibited to some degree the ability of *Salmonella* to colonize the schistosome tegument. D-fructose and D-mannose were the most effective. The adherence of *Salmonella* to the schistosome tegument is reversible and D-mannose (50 µg/ml) is able to displace salmonellae attached to the schistosome tegument. The data suggests that schistosomes may possess surface receptors for pili of *Salmonella* with certain sugars acting as ligands.

- 9 PRELIMINARY INVESTIGATION OF THE ULTRASTRUCTURE OF MATURE *PLISTOPHORA CEPEDIANAE* (MICROSPORIDA: NOSEMATIDAE) SPORES. R. L. PRICE, DEPARTMENT OF ZOOLOGY, SOUTHERN ILLINOIS UNIVERSITY-CARBONDALE, CARBONDALE, IL. 62901
- Araldite embedded spores of *Plistophora cepedianae* were examined by transmission electron microscopy. General structure is similar to other microsporidians, but some variations are noted. Embedding and other problems associated with preparation of microsporidian spores are discussed.
- 10 COMPARISON OF ACANTHOCEPHALAN LACUNAR FLUIDS IN POLYACRYLAMIDE GEL ELECTROPHORESIS. ROBERT J. SHEEHAN, DEPARTMENT OF PHYSIOLOGY, SOUTHERN ILLINOIS UNIVERSITY, CARBONDALE, IL. 62901
- Lacunar fluids have been isolated from two species of Acanthocephala. Adults of *Macracanthorhynchus hirudinus* were obtained from the Swift Packing Company in East St. Louis, Illinois. Adults of *Moniliformis moniliformis* were isolated from infected rats maintained in the laboratory. Samples from five worms or more were pooled, dialyzed against tris-glycine buffer and ran on polyacrylamide gel electrophoresis. The gels were stained for protein with Commassie Blue G-250. The resultant gels show a pattern of 12 protein bands in *Macracanthorhynchus hirudinus* and 14 in *Moniliformis moniliformis*. The number of proteins and their migration patterns varied between both body compartments within the same worm and in different worms.
- 11 MOTILITY AND HATCHING OF *MESOCESTOIDES* SP. ONCOSPHERES. R. A. SIEMER, DEPARTMENT OF BIOLOGICAL SCIENCES, UNIVERSITY OF CINCINNATI, CINCINNATI, OHIO 45221
- Motility and hatching of *Mesocestoides* sp. oncospheres will be presented in videotape format. Paruterine organs were dissected from freshly collected proglottids passed by experimentally infected hosts. Eggs were isolated on glass slides in Ringer's saline under sealed coverglasses. Motility was observed for up to 5 hr, but hatching never occurred. Using similar techniques, but with trypsin saturated saline, motility was markedly increased and hatching began within five minutes; more than 90% hatched within 20 minutes. Stimulated oncospheres showed vigorous, synchronized thrusting movement of the medial pair of hooklets followed by anterolateral motion of the two lateral pairs of hooklets.

The rate of stimulated movement was demonstrated to be 28 cycles/min, compared with less than 10 in untreated eggs. Dilution of the trypsin solution did not change the motility response much, but the time required for hatching was considerably extended; i.e., more than two hours. We infer that trypsin probably has an important hydrolytic action on the egg membranes which allows rapid hatching by stimulated oncospheres.

- 12 RHYTHMS OF LOCOMOTORY ACTIVITY AND HEARTBEAT RATE IN *BIOMPHALARIA GLABRATA*. CAROL L. WILLIAMS, DEPARTMENT OF ECOLOGY AND BEHAVIORAL BIOLOGY, UNIVERSITY OF MINNESOTA, MINNEAPOLIS. 55455
- The presence of rhythms of locomotory activity and heartbeat rate in *Biomphalaria glabrata* (Puerto Rican strain) was investigated. Thirty snails were maintained between two sheets of plexiglas 5 mm. apart. This allowed the snails freedom of movement but inclined the shell so that the heart could be observed directly without disturbing the snail. Heartbeat rate was measured every two hours for 72 hours under a 12 hour light/12 hour dark schedule. Locomotory activity was measured by taking time-lapse movies of the snails during this period and later analyzing the film with a stop-frame film analyzer. Snails showed a marked circadian rhythm with nocturnal increases in locomotory activity and heartbeat rate.
- 13 CEREBROSPINAL NEMATODIASIS IN MICE AND HAMSTERS DUE TO *BAYLISASCARIS PROCYONIS*. W.L. WIRTZ, DEPARTMENT OF VETERINARY MICROBIOLOGY, PURDUE UNIVERSITY, WEST LAFAYETTE, IND. 47907

The raccoon ascarid, *Baylisascaris procyonis*, has been incriminated as a cause of cerebrospinal nematodiasis (CSN) in animals. To investigate this syndrome, graded doses of embryonated *B. procyonis* eggs were administered per os to mice and hamsters. Groups of mice received 400 and 800 eggs and hamsters received 200, 700, and 1400 eggs. In 7 to 9 days post-infection, central nervous system signs were seen, which included torticollis, incoordination, posterior paralysis, coma, and death. Macroscopic lesions seen at postmortem examination were pleural hemorrhages and encysted larvae on the heart, diaphragm, cecum, and kidneys. Histological examination revealed cross sections of larvae in various tissues (brain, heart, skeletal muscle, tongue, intestine, etc.). These larvae were accompanied by a strong inflammatory reaction. Baermannization resulted in the recovery of large numbers of larvae from the brains. An average of 39 larvae were recovered from mice in the 800 egg group, and an average of 22, 49, and 90 larvae were recovered from the hamsters, respectively. These results indicate that *B. procyonis* is a strong migrator and potent producer of cerebrospinal nematodiasis.

- 4 COMPARISON OF ACANTHOCEPHALAN BODY COMPARTMENT FLUIDS BY ISO-ELECTRIC FOCUSING. ROBERT A. YOUNG, DEPARTMENT OF PHYSIOLOGY, SOUTHERN ILLINOIS UNIVERSITY, CARBONDALE, IL. 62901

Fluids from different body compartments were isolated from two species of Acanthocephala. Adults of *Macracanthorhynchus hirudinus* were obtained from the Swift Packing Company in East St. Louis, Illinois. Adults of *Moniliformis moniliformis* were isolated from infected rats maintained in the laboratory. Samples from each compartment were pooled and dialyzed against tris-glycine buffer and focused on an LKB Multiphore Iso-electric focusing apparatus. Fluids representing the lacunar system, body pseudocoel and lemnisci were utilized. The resultant protein profiles revealed that most proteins possessed a low PI. The number of proteins varied between different fluids of the same species. In addition, the same compartmental fluid from different species also varied in number of proteins.

Papers

- 5 SUCCINATE DECARBOXYLATION AND THE ASSOCIATED PHOSPHORYLATION IN ASCARIS SUUM, FASCIOLA HEPATICA AND SPIROMETRA MANSONOIDES. SUSAN M. PIETRZAK AND HOWARD J. SAZ, DEPARTMENT OF BIOLOGY, UNIVERSITY OF NOTRE DAME, NOTRE DAME, INDIANA 46556

Ascaris suum has been shown to catalyze a substrate level phosphorylation which is associated with the decarboxylation of succinate to propionate (Saz & Pietrzak, Arch. Biochem. Biophys., in press). In addition, this nematode possesses all of the enzymatic activities required to carry out the energy yielding sequence as follows:

- (1) Succinate + Propionyl CoA \rightarrow Succinyl CoA + Propionate
- (2) Succinyl CoA \rightarrow Methylmalonyl CoA
- (3) Methylmalonyl CoA + E \rightarrow CO₂ + E + Propionyl CoA
- (4) CO₂ + E + ADP + P_i \rightarrow CO₂ + ATP + E

Sum (5) = Succinate + ADP + P_i \rightarrow Propionate + CO₂ + ATP

Evidence has been obtained which indicate that this sequence of reactions is not unique to *Ascaris*, but exists also in the cestode, *Spirometra mansonioides*, and in the trematode, *Fasciola hepatica*. In all cases, propionyl CoA stimulated succinate decarboxylation as would be predicted on the basis of the proposed scheme. All of the enzyme activities are demonstrable in the mitochondrial fraction of the parasites. ³²P_i incorporation is associated with the decarboxylation of succinate, and the biotin binding protein, avidin, inhibits both phosphorylation and succinate decarboxylation in all three helminths. These findings support the postulated pathway and the associated substrate level phosphorylation. (Supported in part by NIH grants AI-09483 and AI-10512).

- 16 EFFECTS OF CARBONIC ANHYDRASE INHIBITION ON SCHISTOSOMA MANSONI-INFECTED BIOMPHALARIA GLABRATA. R.A. SIDNER, DEPARTMENT OF BIOLOGICAL SCIENCES, UNIVERSITY OF CINCINNATI, CINCINNATI, OHIO 45221.

Inorganic ion studies with *S. mansoni*-infected *Biomphalaria glabrata* showed that the carbonic anhydrase inhibitor, acetazolamide (AZA), reduced cercarial emergence. To test and quantify this further, 40 adult snails were individually exposed to 5 *S. mansoni* miracidia, maintained routinely for 3 weeks, then placed in 2 groups of 20 each, one of which was kept in water containing 0.01 M AZA. On days 35, 37 and 42 post-exposure (PE) all snails were isolated in vials of spring water and evenly illuminated for 90 Min; then infection rates were found to be 65% in control snails and 63% in treated snails, but the number of cercariae produced by the treated snails was only 6-20% of those from control snails in the three sampling periods. In a second experiment, patent snails infected for 60 days were also divided into two groups of 7 and 8, and treated as stated above. Cercarial emergence in AZA-treated snails declined by 25% and 65% on days 5 and 12, compared to untreated snails. Hemolymph ion determinations in the two groups showed that Ca and Cl ions were significantly reduced compared with controls, while Na and K ion levels remained normal. We infer that carbonic anhydrase is essential for snail shell calcification and *Schistosoma* development, since shell calcification ceased while periostacum growth occurred and cercarial emergence was inhibited in all AZA-treated snails.

- 17 PARTIAL SATURATION OF THE UPTAKE OF CHOLESTEROL IN HYMENOLEPIS DIMINUTA. WILLIAM J. JOHNSON, DEPARTMENT OF ZOOLOGY, UNIVERSITY OF IOWA, IOWA CITY, IOWA 52242

In the rat's small intestine, cholesterol absorption by the tapeworm *H. diminuta* is an essential and specific process. Work by others has shown that the worm cannot synthesize sterols from simple precursors, but that it has large amounts of cholesterol and very little of any plant sterol in its tissues. As a way of investigating the worm's apparent preference for cholesterol, we have performed uptake experiments on adult worms *in vitro*. Measurements of steady state uptake of ³H-cholesterol from a 20mM sodium taurocholate/saline solution have demonstrated the following:

- 1.) Uptake is linear with time for at least 10 minutes.
- 2.) Through the range of 0 to 50 μ M unlabelled cholesterol, a maximum of 75% inhibition of tracer ³H-cholesterol uptake occurs, implying saturation of some cholesterol binding or translocating function. Additionally we have shown that 20 mM sodium taurocholate (replacing 10 mM sodium sulfate) has no effect on the volume of the worm's external unstirred water layer, which is evident from the retention of ¹⁴C-polyethylene glycol-4000. Further work aimed at determining the specificity of the saturable uptake function and at examining uptake at cholesterol concentrations higher than 50 μ M is in progress. (Supported by NSF Grant PCM-79-11770 and NIH Cell and Molecular Biology Training Grant 5 T32 GM07228-03.)

- 18 EFFECTS OF 4-ISOTHIOCYANATO-4'-NITRODIPHENYLAMINE (CGP 4540) ON THE CARBOHYDRATE METABOLISM OF *HYMENOLEPIS DIMINUTA*. NORMAN F. NELSON AND HOWARD J. SAZ, DEPARTMENT OF BIOLOGY, UNIVERSITY OF NOTRE DAME, NOTRE DAME, INDIANA 46556

The drug 4-isothiocyanato-4'-nitrodiphenylamine possesses chemotherapeutic activity against a number of helminths including schistosomes, filarids and *Hymenolepis diminuta*. The mode of action of the drug is not known. Effects of the drug on the carbohydrate metabolism in *Hymenolepis* were examined. Eight hours after administration, the parasites were recovered and incubated with glucose for 90 minutes. Carbohydrate disappearance, end product accumulation and ATP levels were measured. *H. diminuta* recovered from treated animals, when incubated *in vitro* exhibited a decreased glucose uptake from the medium, a lowered succinate accumulation, and reduced ATP levels. Lactate formation generally, but not consistently, decreased. Total carbohydrate levels in the worm declined as determined by the anthrone procedure. Parasites obtained from animals given 100 mg/kg of the drug at 2 hr intervals from 0-8 hr prior to sacrifice, demonstrated some of these effects after 2, 4, and 6 hours, but the effects were optimal after 8 hours. More dramatic drug activity on the worms was noted when they were removed from drug-treated animals but not incubated subsequently *in vitro*. When the tapeworm was analyzed directly after isolation from drug treated animals, ATP and total carbohydrate levels in the cestodes were 50% lower than control worms from non-treated animals. Decreased carbohydrate metabolism in worms from drug treated animals was also indicated by incubating with [¹⁴C]glucose. A significant reduction in the incorporation of isotope into glycogen resulted. Whether these are primary effects of the compound remains to be determined. (Supported by NIH grants AI-10512 and AI-09483).

- 19 SOLUBILIZATION OF MEMBRANE-BOUND RIBONUCLEASE (RNase) AND ALKALINE PHOSPHATASE FROM THE ISOLATED BRUSH BORDER PLASMA MEMBRANE OF *HYMENOLEPIS DIMINUTA* (CESTODA). H. RAY GAMBLE, DEPARTMENT OF ZOOLOGY, THE OHIO STATE UNIVERSITY, COLUMBUS, OHIO 43210.

Brush border plasma membrane isolated from the tegument of *Hymenolepis diminuta* contains membrane-bound ribonuclease (RNase) and alkaline phosphatase activities. RNase (yeast RNA substrate) and alkaline phosphatase (p-nitrophenyl phosphate substrate) and additional membrane proteins were solubilized by sonication or treatment with the detergents dodecyl trimethylammonium bromide, β -octyl-D-glucopyranoside, sodium dodecyl sulfate (SDS) or zwittergent 3-12 (N-dodecyl-N,N-dimethyl-3-ammonio-1-propanesulfonate). At optimal conditions, greater than 90% of both enzymes and total protein were solubilized by the latter two detergents while β -octyl-D-glucopyranoside, dodecyl trimethylammonium bromide and sonication were only partially effective. Non-ionic detergents did not effectively solubilize the membrane.

- 20 ORIGIN OF POLYPLOID *BULINUS*—COMPARATIVE CYTOGENETICS OF DIPLOIDS AND TETRAPLOIDS. M. A. GOLDMAN, DEPARTMENT OF BIOLOGICAL SCIENCES, PURDUE UNIVERSITY, W. LAFAYETTE, IN 47907.

Freshwater snails of the subgenus *Bulinus* are of interest because several species act as intermediate hosts for human urinary schistosomiasis, and because they provide evolutionary biologists with a model system for the study of animal polyploidy. Further, there appears to be a relationship between ploidy level and compatibility with the parasite -- the polyploids generally act as intermediate hosts in nature while the diploids do not. We have used G-banding procedures developed in this laboratory to study a population of the diploid *B. tropicus* from Onderstepoort, South Africa, and a population of the tetraploid *B. truncatus* from Luxor, Egypt. Our results support the hypothesis that at least two karyotypically distinct genomes were involved in the evolution of the tetraploids. Specifically, we have found (1) one pair of chromosomes which has a lightly staining short arm of variable length, in contrast to its apparent homoeologue which is submetacentric and uniformly staining, (2) a satellited small metacentric pair, in contrast to its slightly more acrocentric nonsatellited homoeologue pair, and (3) a medium-sized metacentric chromosome with a satellite on the short arm, in contrast to its metacentric homoeologue without a satellite. The remaining 33 groups of four chromosomes appear to be identical cytologically. The single pair [see (1)] with lightly staining short arms has also been observed in *B. tropicus*. *B. tropicus* frequently shows chromosomes with a satellite on the long arm; this has not been found in *B. truncatus*. (Supported in part by grants from the Edna McConnell Clark Foundation and the Purdue Research Foundation.)

- 21 INCIDENCE OF *PLISTOPHORA CEPEDIANAE* (MICROSPORIDIA) IN GIZZARD SHAD (*Dorosoma cepedianum*) OF CARLYLE LAKE, ILLINOIS. R. L. PRICE, DEPARTMENT OF ZOOLOGY, SOUTHERN ILLINOIS UNIVERSITY AT CARBONDALE, CARBONDALE, IL. 62901

A collection of 1,537 gizzard shad taken from Carlyle Lake between 23 February 1977 and 4 April 1978 were examined for the occurrence of *Plistophora cepedianae*. Incidence of infestation increased from 16% among fish 1 month of age to 65% among fish approximately 2 months of age. Development of collagenic connective tissue around cysts, and absence of developmental stages in fish older than 1 year indicated infestation occurred in the first year of life. Examination of 364 specimens of 10 other species of fishes from Carlyle Lake were negative for *P. cepedianae*.

ABSTRACTS

ABSTRACTS

- 2 INNERVATION OF MUSCLES IN THE ACANTHOCEPHALAN, *Moniliformia moniliformis*. MATTHEW LINNIK, DEPARTMENT OF PHYSIOLOGY, SOUTHERN ILLINOIS UNIVERSITY, CARBONDALE, ILLINOIS. 62901

Adult worms of the acanthocephalan, *Moniliformia moniliformis* were fixed in 3% glutaraldehyde for six hours after which they were post-fixed with 2% uranyl acetate. Infiltration with epon was accomplished by moving them through changes of 1:1, 2:1, 3:1 epon to propylene oxide for periods of 12 hours each. They were then put into 4:1 epon/propylene oxide for 2 hours and 100% epon under vacuum for 1 hour. After hardening in an oven for 12 hours at 60°C, the tissues were cross sectioned on glass knives using a Porter Blum MT-1 ultramicrotome. Sections were mounted on glass slides and stained with a solution of toluidine blue type O at a pH of 4.9. Photographs of sections were made on a Leitz microscope and the peripheral nervous system outlined. The peripheral nervous system appears to form a circular layer between the tegument and the circular muscle layer and ramifies to provide numerous extensions into both the tegument and body wall muscle area.

- 3 COMPUTER MODELING OF *SCHISTOSOMA MANSONI* MIRACIDIAL DISPERSION. GORDON G. FLORIN, DEPARTMENT OF ECOLOGY AND BEHAVIORAL BIOLOGY, UNIVERSITY OF MINNESOTA, MINNEAPOLIS. 55455

The dispersion of miracidia is largely unstudied due to the difficulty of extended observation of uninterrupted swimming. To avoid this problem, computer modeling was used to simulate the movements of miracidia over long periods of time. A random number generator provided values for speed, time between turns, and turning angle; these distributions were similar to those observed for *Schistosoma mansoni* miracidia in Artificial Pond Water. A comparison of *S. mansoni* miracidia and computer simulated miracidia under similar conditions did not produce significant behavioral differences. Modeling for extended periods showed that miracidial dispersion may be greatly reduced by their turning behavior, suggesting that this behavior may have evolved to limit rather than to enhance dispersion. (Supported in part by the University Computer Center, University of Minnesota.)

- 14 STUDIES ON THE LIFE HISTORY OF THE TREMATODE ALLOCREADIUM PSEUDOTRITONI RANKIN, 1937. P. A. CATALANO, DEPARTMENT OF BIOLOGICAL SCIENCES, UNIVERSITY OF CINCINNATI, CINCINNATI, OHIO 45221.

The spring salamander *Gyrinophilus porphyriticus* and the mud salamander *Pseudotriton montanus* from intermittent stream sites in southern Ohio were found to have a high incidence (74%) of infestation with the trematode *Allocreadium pseudotritoni*. Flukes were found in the small intestine of both adult and larval salamanders. Eggs recovered from fecal material or released by flukes removed from their host are unembryonated and take 3 to 4 weeks to develop and hatch at 25°C.

Fingernail clams, *Pisidium punctatum*, collected in the salamanders' habitat were found naturally infected with intramolluscan stages of *A. pseudotritoni*. The sporocyst and a single redial generation have been observed. The ophthalmoxiphidocercaria (allockreadiid type) escapes from the clam to penetrate and encyst in amphipods, *Crangonyx* sp. Once encysted, the metacercaria undergoes little growth or development. Various invertebrates were experimentally exposed to the cercariae but only *Crangonyx* sp. and *Hyalolella azteca* (Amphipoda) and *Asellus* sp. (Isopoda) became infested.

- 25 IMMUNOFLUORESCENT LOCALIZATION AND ULTRASTRUCTURE OF CRYPTIC LEUCOCYTOZOOM SIMONDI MATHIS AND LEGER IN WINTERING GEESE. L.D. SIBLEY, J. FERL, J.H. BARROW JR. HIRAH BIOLOGICAL RESEARCH STATION, HIRAH, OHIO. Previous investigators have ascribed recrudescence of *Leucocytozoon simondi* parasitemia to cycling of exoerythrocytic schizogony; infections in geese and ducks also exhibit spontaneous spring relapse after apparent absence throughout the winter. Several reports have attributed this overwintering phenomenon to continuous low levels of exoerythrocytic schizogony. No evidence for this hypothesis was found in our investigations using Canada geese (*Branta canadensis maxima*) and domestic geese (*Anser anser*) exposed to natural infections at Seney National Wildlife Refuge. This report concerns fluorescent antibody tagging for specific localization and subsequent ultrastructure analysis of an intracellular overwintering stage of *L. simondi*. Blood smears taken alternate days, October through December 1977, from yearling domestic geese that had recovered from previous heavy infections showed no gametocytes. Tissue samples from four of these geese, sacrificed in early January 1978, revealed no exoerythrocytic stages. Specific fluorescent antibody applied to 1 µm tissue sections gave consistent fluorescence within epithelial cells of kidney tubules. Transmission electron micrographs revealed that these electron dense structures have a central body surrounded by globular spheres within an irregular cytoplasm. We hypothesize that the overwintering stage remains dormant within some kidney epithelial cells where increased protection is conferred during peak immunity. This cryptic stage may be a general feature of *L. simondi* spring relapse in other hosts. It is not known whether this overwintering stage results from sporozoite or merozoite infections. (NSF Grant #GR27415)

- 26 COMPARISONS OF THE EXTERNAL MORPHOLOGICAL CHARACTERS OF THE NORTH AMERICAN SPECIES OF SPINICTECTUS. R. JILEK AND J.L. CRITES, ZOOLOGY DEPARTMENT AND THE CENTER FOR LAKE ERIE AREA RESEARCH, OHIO STATE UNIVERSITY, COLUMBUS, OHIO. 43210

The genus *Spinictectus* Fournet, 1883, is comprised of 43 species. However, the North American representatives of the genus number but four: *S. beaveri* Overstreet, 1970; *S. carolini* Holl, 1928; *S. gracilis* Ward and Magath, 1916; *S. micracanthus* Christian, 1972. The criteria used for distinguishing and identifying the species of *Spinictectus* vary greatly depending on the authors. The present study indicates that differentiation and identification can be facilitated through the use of scanning electron microscopy. Previously

undescribed sensory structures, deirids, were observed on each of the species. The deirids varied in morphology and location on the worm. *En face* views have revealed anatomical differences in the papillae, amphids, pseudolips, and oral opening, among the four species examined. Lastly, and possibly the most taxonomically important structures, are the spines. There is considerable variation among the North American species in spine number, spine morphology, spine length, and spine pattern. This spine variability, however, was nonexistent within a given species, thus no intraspecific variation. Scanning electron microscopy functions as a useful tool in differentiating species of *Spinitectus*, and may possibly aid in the reduction of some species to synonymy. Supported in part by NSF Grant DEB 76-01414

- 27 ENZYME POLYMORPHISMS AND GEOGRAPHIC VARIATION IN SCHISTOSOMA MANSONI. M. FLETCHER AND P.T. LOVERDE, DEPARTMENT OF BIOLOGICAL SCIENCES, PURDUE UNIVERSITY, WEST LAFAYETTE, IN 47907

To assess the genetic differences underlying geographic variation in *Schistosoma mansoni*, individual adult worms from twenty populations, from East and South Africa, Southwest Asia, South America and the Caribbean, were electrophoresed on starch gels. Fourteen enzyme systems were analyzed. An estimated 7 of 18 loci were polymorphic, with 1 population polymorphic at 6 of the loci ($P = 0.33$). These results suggest that *S. mansoni* is as variable genetically as most other invertebrates ($P = 0.397 \pm 0.201$). Most populations showed low variability, however ($P = 0.13 \pm 0.02$). This can be attributed to small founding populations and passage in the laboratory through low numbers of infected snails, resulting in random fixation of alleles by the action of genetic drift. This finding implies that geographic comparisons of any traits should be based on a number of isolates from each region to adequately represent variation occurring within a region. Genetic distances between all strains were low (mean 0.052, range 0 - 0.275), suggesting that little intraspecific differentiation has occurred in *S. mansoni*, even between Old and New World strains. These results contrast with electrophoretic evidence of significant divergence between geographic strains of *S. japonicum*.

Enzyme subunit structure appears to be the same in *S. mansoni* as in many other organisms. Sexual differences in mobility and in number of bands were found in a few enzymes. The polymorphisms uncovered can eventually be used as genetic markers to map chromosomes and to study various traits such as infectivity to snails and drug resistance.

- 28 PARTIAL PURIFICATION AND CHARACTERIZATION OF THE Kav 0.64 PHEROMONE FRACTION OF THE NEMATODE NIPPOSTRONGYLUS BRASILIENSIS. LEON M. BONE, DEPARTMENT OF PHYSIOLOGY, SOUTHERN ILLINOIS UNIVERSITY, CARBONDALE, ILLINOIS 62901.

Partial purification and stabilization of a female pheromone component from the nematode *Nippostrongylus brasiliensis* was achieved, based on the male's bioassay response *in vitro*. Increased recovery of pheromone activity was obtained from pre-maceration treatment with the enzyme inhibitors PMSF and TPCK at $10^{-4}M$. Maximal activity was

obtained from combined treatment with PMSF and TPCK at $10^{-6}M$ each. Other inhibitors, such as DPF or TLCK failed to yield any enhanced recovery of biological activity. A combination of double treatments with PMSF and Sephadex gel filtration, enabled cold storage of pheromone up to nine days which yielded biological activity similar to a fresh, untreated chromatographic fraction.

The pheromone component had a net negative charge based on retention on DEAE cellulose and an approximate isoelectric point of 7.3. The pheromone was degraded by Pronase and, was labile to heat (50 C) or freezing.

- 29 HEXOSE TRANSPORT BY LARVAL PROTEROMETRA MACROSTOMA (DIGenea). G. L. UGLEM, PHYSIOLOGY GROUP, BIOLOGICAL SCIENCES, UNIVERSITY OF KENTUCKY, LEXINGTON, 40506

Hexose transport capacities of *Proterometra macrostoma* rediae and cercariae *in vitro* were examined in relation to environmental factors. Glucose transport by rediae is activated by Na^+ and is maximal at 50 mM, the approximate Na^+ concentration of snail (*Goniobasis livescens*) hemolymph. The redial transport system is inhibited by various sugars and is more sensitive to phlorizin than to phloretin. Rediae accumulate hexose against an apparent concentration gradient. In contrast, hexose transport by "embryonic" cercariae is blocked by 10 mM Na^+ . Transport by cercariae aged 6 hr in creek water becomes relatively insensitive to Na^+ , and aged cercariae are less permeable to glucose by diffusion. The cercarial system differs in other characteristics from the redial system, including its high sensitivity to phloretin relative to phlorizin, its broader specificity, and its lower V_{max} . The cercarial system apparently functions only as a facilitated diffusion system that serves to move hexose across the tegument down its chemical gradient. Glucose transport by both larval stages is optimal between 30 and 25 C and is negligible below 15 C. Development of *P. macrostoma* thus shows functional transformations of the tegument that may be subject to regulation by environmental factors. (Supported in part by NSF Grant PCM78-16008.)

- 30 RESPONSES OF MIRACIDIA OF PHILOPHTHALMUS GRALLI AND MEGALODISCUS TEMPERATUS TO VARIOUS ENVIRONMENTAL CUES. PAUL M. NOLLEN, DEPT OF BIOLOGICAL SCIENCES, WESTERN ILLINOIS UNIVERSITY, MACOMB, ILL. 61455

Miracidia of *M. temperatus*, when tested in a 4-tube vertical system, showed positive geotaxis in closed tubes but positive phototaxis overrode this when a light was directed at the top of the tubes. Newly hatched miracidia exhibited positive phototaxis in horizontal chambers. In both experimental systems the positive phototaxis was lost after the miracidia had aged for 2 hours. Chemoresponses of both *P. gralli* and *M. temperatus* miracidia were tested by percent contact with return to agar blocks containing various chemicals and aggregation near a point inoculation in phi-chambers. Of the chemicals

tested, *E. gralli* miracidia were most responsive to various concentrations of acetic acid, HCl, and H₂SO₄. Only at higher levels in phi-chambers did Mg⁺⁺ elicit a positive response. Ammonia caused miracidia to aggregate at some concentrations and not at others. In trials completed thus far, *M. temperatus* miracidia are unresponsive to various concentrations of Mg⁺⁺, and ammonia, but do show a significant aggregation response to higher concentrations of HCl (greater than 5.0 mM).

- 31 The Cercarienhullen Reaktion of *Gigantobilharzia huronensis*. W. T. McGRACHIN, DEPT. OF ZOOLOGY, IOWA STATE UNIVERSITY, AMES. 50011

This study was undertaken to investigate the serologic reaction of chickens to infection with *Gigantobilharzia huronensis* and to determine if any antigenic cross-reaction occurs between these cercariae and those of *Schistosoma mansoni*, using the Cercarienhullen Reaktion (CHR). Normal and immune sera were collected from uninfected and infected chickens maintained under identical conditions. Chickens (6-7 weeks old) were infected per os by four applications of 50 cercariae each at two week intervals. Serum was collected two weeks after the final exposure and at least two weeks after all infections had become patent. Freshly collected serum lacked cercaricidal properties. A typical CHR developed around *G. huronensis* cercariae in immune serum whether it had been heat treated or not. A CHR developed around *S. mansoni* cercariae in *G. huronensis* immune serum, although to a lesser degree than around homologous cercariae. Although there have been a number of reports of CHR formation in heterologous antiserum, this is apparently only the second report of CHR formation around human schistosome cercariae in non-human schistosome immune serum.

- 32 HELMINTHS OF PHILIPPINE RABBITFISHES (SIGANIDAE). FREDERICK J. VANDER VUGSE, SILLIMAN UNIVERSITY MARINE LABORATORY, DUNAGUE CITY, PHILIPPINES AND GUSTAVUS ADOLPHUS COLLEGE, ST. PETER, MN 56062.

Siganids are highly esteemed food fishes that frequent coral reefs and reef flats where they feed principally on algae and sea grasses. Research on culture techniques for these fish has stimulated interest in their parasites, especially those that might cause problems during culture. Over 100 individuals representing 9 of 13 siganid species recognized from the Philippines were examined. Helminths recovered include two species of Monogenea, seven of Digenea, two of Nematoda and one Acanthocephala. Examples of two siganid species raised from fingerlings in sea cages and fed brackish water algae had generally lower parasite burdens than those of wild caught fish.

- 33 PHEROMONE ACTIVE SPACE OF NIPPOSTRONGYLUS BRASILIENSIS IN THE MOUSE INTESTINE. GARTH H. GLASSBURG AND LEON W. BONE, DEPARTMENT OF PHYSIOLOGY, SOUTHERN ILLINOIS UNIVERSITY, CARBONDALE, ILLINOIS 62901.

Mouse-adapted *Nippostrongylus brasiliensis* from subcutaneous inoculation was found in the anterior intestine from 5 to 50 or 55% of the pyloric-caecal length. Most worms were located at 15% of the intestinal length from the pylorus. No major differences were noted in the sexual distribution at various helminth ages during the host pre-immune period. However, host immunity or food deprivation caused a posteriad shift in the helminth population.

Chemocommunication between the sexes of the rodent hookworm *N. brasiliensis* also influenced the intestine location as determined by dosage-response analysis of surgically-transplanted helminths. The response of multiple numbers of posteriad males to dosages of anterior females was dosage-dependent. Significant male to female attraction was found at average intestinal distances of 5.3 and 7.3 cm. A 50% male response was elicited by 13 females at 5.3 cm while 30 females were needed for a comparable male response over a 7.3 cm distance. The male's response declined when the sexes were separated by an average 10.1 cm distance and was not evident at an average 18.1 cm distance. Based on two and four hour periods, the male's response was also dependent on the time of pheromone gradient formation.

Presentation of the HERRICK AWARD for best demonstration by a student and the LARUE AWARD for best paper by a student will be made at the Saturday 11:00 AM Business Meeting.

A REVIEW OF THE FUNCTIONAL MORPHOLOGY OF ACANTHOCEPHALA

1:00PM Friday, June 13, 1980 101 Jefferson Bldg.

1. Status of the Body Wall and Lacunar System. Dr. T. T. Dunagan, Southern Illinois University, Carbondale
2. Organization and Function of the Nervous System. Dr. Donald M. Miller, Southern Illinois University, Carbondale

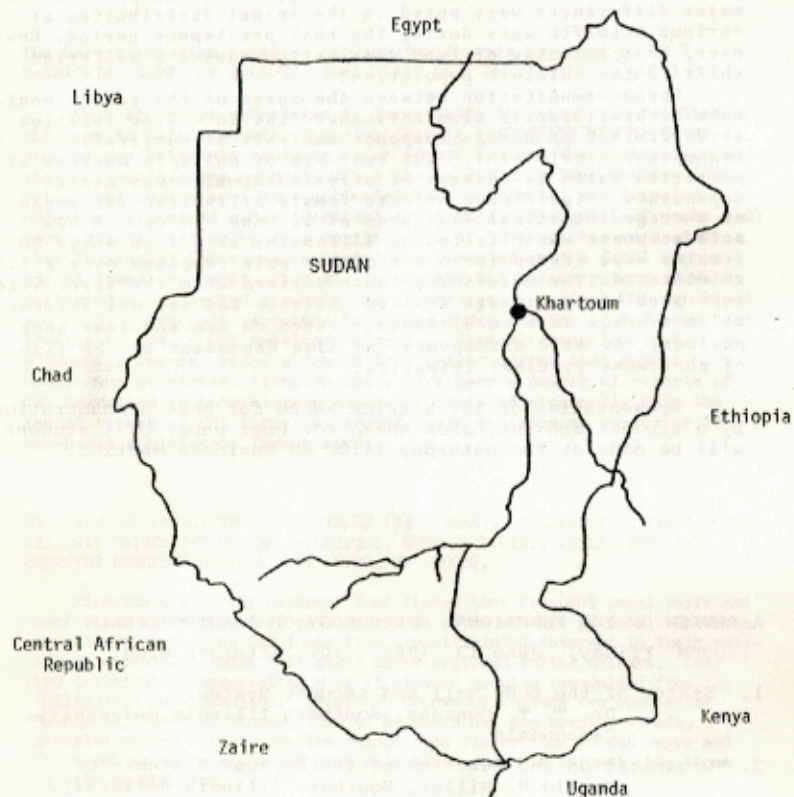
TROPICAL PARASITOLOGY AT THE JUNCTION OF THE NILES

A Report on Michigan State University's Involvement
in Research in Sudan

Dr. Jeffrey F. Williams, Michigan State University

Banquet Address 8pm June 13, 1980 Hoyt Center

Eastern Michigan University



Report of the 31st Annual Midwestern Conference of Parasitolo- gists (Prepared by Dr. William Coil)

The 31st Annual Midwest Conference of Parasitologists was held at Loyola University, Chicago, 31 May-2 June. *Dr. Donald Gilbertson, Presiding Officer, Dr. B.J. Jaskowski, Program Officer*
Approximately 50 members were in attendance. There were eight demonstrations listed in the program; two were added later. There were 15 papers presented. Awards to graduate students were supported by the Ann Arbor Lilly Co. (Herrick Award). The LaRue Award was supported by the Ann Arbor Biological Center and by private donations. The Herrick Award was presented to Gordon Florin University of Minnesota, and to Dennis Minchella, Purdue University. The LaRue Award was presented to Madeline Fletcher, Purdue University.

Dr. Eugene Foor, Wayne State University, presented an outstanding banquet address entitled "Basic studies in reproduction" (of nematodes).

Dr. Murray Fallis, President of the American Society of Parasitologists was present. The membership appreciated his interaction on a personal basis and his contributions to the business meeting.

Routine business was dispatched quickly and the committees listed in the Bylaws reported. The site committee selected Eastern Michigan University for the 32nd annual meeting of the AMCOP.

The history of the new gavel was briefly outlined by William Coil. The handle was made from burly walnut cut on Dr. R. M. Cable's farm in Kentucky. The head is from straight-grained Kaw-valley walnut (Kansas). The gavel was made by W. Coil and presented to AMCOP 30.

The LaRue Award honoring the late George R. LaRue was first given at the AMCOP meeting in Ames. Since its inception, the Award has been heavily supported by private donations. At AMCOP 31, the LaRue Award was supported by Ann Arbor Biological (\$100) and by the generosity of Dr. Waffle and Dr. Whitrock plus private donations made at the AMCOP 27 and carried to date.

It is the feeling of many that the Herrick Award and the LaRue Award should be equal, i.e., \$200. It seems apparent that the membership will have to decide on the source of the funding for the LaRue Award sometime in the future.

The Program for the 32nd AMCOP meeting will include 1) a round-table discussion on biological control; and 2) a discussion on parasitemias in Central America.

Officers elected for 1979-1980 were Allen Johnson, Presiding Officer; Elizabeth Waffle, Program Officer; and George Garoian, Secretary-Treasurer and Representative to the ASP Council.

The report was ordered placed on file.

1980 AMCOP MEMBERSHIP INFORMATION

AHMAD-AMINIAFSHAR
801 Center Street, Apt. #9
Marquette, MI 49855

Verona A. Barr
3810 W. Eddy St.
Chicago, IL 60618

William J. Bemrick
College of Veterinary Medicine
University of Minnesota
St. Paul, MN 55108

Lawrence J. Blecka
915 Stonehedge Ln.
Palatine, IL 60067

Edmour F. Blouin
Dept. of Biology
U. South Dakota
Vermillion, SD 57069

L. W. Bone
Department of Physiology
Southern Illinois University
Carbondale, IL 62901

Susan Bower
Department Microbiology and Public
Health
Michigan State University
East Lansing, MI 48824

Milo C. Brandt
Department of Parasitology Res.
Eli Lilly & Co., Box 708
Greenfield, IN 46140

Betsy Bricker
Zoology Dept.
University of Iowa
Iowa City, IA 52242

Dr. Raymond Cable
820 Carrolton Blvd.
West Lafayette, IN 47906
(Dept. of Biol. Sci., Purdue Univ.)

George D. Cain
Dept. of Zoology
Univ. of Iowa
Iowa City, IA 52242

Paul A. Catalano
Department of Biological Science:
University of Cincinnati
Cincinnati, OH 45221

William H. Coil
Department of Systematics &
Ecology
Univ. of Kansas
Lawrence, KS 66045

David Bruce Conn
514 Lakewood Terrace
Morehead, KY 40561

Kathleen B. Coy
534 S. Washington
Bloomington, IN 47401

John L. Crites
Dept. of Zoology
Ohio State University
1735 Neil Ave.
Columbus, OH 43210

David L. Daniell
Dept. of Zoology
Butler University
Indianapolis, IN 46208

Melvin Denner Ph.D.
Chairman, Div. Sci & Math
Indiana State University at
Evansville
Evansville, IN 47712

T. T. Dunagan
Department Physiology
Southern Illinois University
Carbondale, IL 62901

Donald G. Dusanic
Department of Life Sciences
Indiana State University
Terre Haute, IN 47809

Arthur E. Duwe
Lake Superior State Col.
S. S. Marie, MI 49783

Dr. William G. Dyer
Department of Zoology
Southern Illinois University
Carbondale, IL 62901

1980 AMCOP MEMBERS

Frank Etges
Biol. Sciences - 006
University of Cincinnati
Cincinnati, OH 45221

Belinda R. Fender
801 N. Ann, Apt. 10
Columbia, MO 65201

Dr. Donald L. Ferguson
Department of Vet Science
University of Nebraska
Lincoln, NE 68583

Madeleine Fletcher
Dept. of Biological Sciences
Purdue University
West LaFayette, IN 47907

William F. Font
Dept. of Biology
Univ. of Wisc at E.C.
Eau Claire, WI 54701

Thomas R. Fritsche
Department of Ecology
318 Church St. S. E.
University of Minn
Minneapolis, MN 55455

S. M. Gaafar, DVM
Department of Vet. Microbiology
Purdue University
Lafayette, IN 47906

H. Ray Gamble
Department of Zoology
The Ohio State University
Columbus, OH 43210

Dr. George Garoian
Department of Zoology
Southern Illinois University
Carbondale, IL 62901

Toby Gendron
1220 Center Apt. 7
(Dept. of Biol., Northern Mich.
Marquette, MI 49855

Donald E. Gilbertson
Dept. Ecology & Behavioral Biol.
318 Church St. S.E.
University of Minnesota
Minneapolis, MN 55455

Garth Glassburg
708 W. Freeman, Apt. 9
Carbondale, IL 62901

John D. Goodman
Biol. Dept. Anderson Coll.
Anderson, IN 46011

John H. Greve
Dept. Vet. Pathology
Iowa State University
Ames, IA 50011

Ernest J. Huggins
Biology Dept.
South Dakota State University
Brookings, SD 57007

E. L. Jeska
VMRI ISU
Ames, IA 50011

Reid Jilek
Zoology Dept.
Ohio State University
Columbus, OH 43210

Allen D. Johnson
Biology Dept.
Univ. of South Dakota
Vermillion, SD 57069

William J. Johnson
Department of Zoology
University of Iowa
Iowa City, IA 52242

Kevin R. Kazacos, DVM, Ph.D.
Department of Veterinary
Microbiology, Pathology and
Public Health
Purdue University
West Lafayette, IN 47907

1980 AMCOP MEMBERS

Dr. Donald J. Klemm
Aquatic Biology Section
Environmental Monitoring & Support
Laboratory
U. S. Environmental Protection
Agency
Cincinnati, OH 45268

Verne B. Kniskern
Department of Zoology
Eastern Illinois University
Charleston, IL 61920

Michael H. Kogut
125 Animal Industries Bldg.
University Park, PA 16802

Francis J. Kruidenier
Dept. of Gene. & Dev.
Univ. of Illinois
Urbana, IL 61801

Rex A. Kuye
1107 3rd Street
Charleston, IL 61920

Dr. Norman D. Levine
College of Veterinary Medicine
University of Illinois
Urbana, IL 61801

William D. Lindquist
Department Lab. Med.
Kansas St. Univ.
Manhattan, KS 66502

Dr. Philip T. LoVerde
Dept. Biol. Sci.,
Purdue University
West Lafayette, IN 47907

Stephen R. Mack
3331 Madison
Brookfield, IL 60513

William T. McGeachin
2246 Rutherford Wynd
Louisville, KY 40205

Stuart McIlraith
Department Biology
University Wisconsin
LaCrosse, WI 54601

Gerald McLaughlin
Zoology Dept.
Univ. of Iowa
Iowa City, IA 52242

Dennis M. McNair
Biological Sciences
Wright State University
Dayton, OH 45435

Freddy R. Medina
Dept. Biol. Sc.
University of Cincinnati
Cincinnati, OH 45221

Fred P. Meyer
National Fishery Research Lab.
P. O. Box 818
LaCrosse, WI 54601

Dennis Minchella
Dept. Biological Sciences
Purdue University
West Lafayette, IN 47907

Lawrence G. Mitchell
Dept. of Zoology
Iowa State Univ.
Ames, IA 50011

Patrick M. Muzzall
Department of Natural Science
Kedzie Lab.
Michigan State University
E. Lansing, MI 48824

Donal G. Myer
Southern Illinois University
Biology Department
Edwardsville, IL 62025

Norman F. Nelson
Department of Biology
University of Notre Dame
Notre Dame, IN 46556

1980 ANCOP MEMBERS

Paul M. Nollen
Dept. of Biological Sciences
Western Illinois Univ.
Macomb, IL 61455

Dr. Peter Pappas
Zoology Dept.
Ohio St. Univ.
Columbus, OH 43210

Dr. Lew Peters
Department of Biology
Northern Michigan Univ.
Marquette, MI 49855

Dr. Priscilla M. Peterson
Box 1364
Janesville, WI 53545

Susan M. Pietrzak
Department of Biology
University of Notre Dame
Notre Dame, IN 46556

Gordon G. Florin
375 Marion St. #1
St. Paul, MN 55103

Robert L. Price
Department of Zoology
Southern Illinois University
Carbondale, IL 62901

Mary Hanson Pritchard
W-529 Nebraska Hall
University of Nebraska
Lincoln, NB 68588

Thomas M. Rice
Department of Zoology
Iowa State Univ.
Ames, IA 50011

Bill T. Ridgeway
Department of Zoology
Eastern Illinois University
Charleston, IL 61920

Henry van der Schalie
15000 Buss Rd.
Manchester, MI 48158
(Professor Emeritus of Zoology)
(University of Michigan)

Bruce P. Setlock
Apt. 203 Saracen Courts
Vermillion, SD 57069

L. David Sibley
Department of Biology
Northern Michigan University
Marquette, MI 49855

Richard A. Sidner
821A, A-1 Brodie Sci. Complex
Univ. of Cincinnati
Cincinnati, OH 45221

Jerry Stumpf
Department of Life Sciences
Indiana State Univ.
Terre Haute, IN 47809

Daniel R. Sutherland
Department of Zoology
Science II
Iowa State University
Ames, IA 50011

K. S. Todd
Coll. of Veterinary Medicine
University of Illinois
Urbana, IL 61801

Carl Train
Biology - Southeast Mo. St. Univ.
Cape Girardeau, MO 63701

Dr. Mary Ufford
Dept. Microbiology & Public Health
Michigan State University
E. Lansing, MI 48824

Dr. Gary L. Uglem
Physiology Group, Biol. Scs.
University of Kentucky
Lexington, KY 40506

1980 AMCOP MEMBERS

Martin J. Ulmer
Dept. Zoology
Iowa State Univ.
Ames, IA 50011

Frederick J. Vande Vusse
Dept. of Biology
Gustavus Adolphus College
St. Peter, MN 56082

Elizabeth Waffle
Department of Biology
Eastern Michigan Univ.
Ypsilanti, MI 48197

Jean Watertor
Department Biology
Wichita State U
Wichita, KS 67208

Maurice E. Callender
Lilly Research Laboratories
Greenfield, Indiana 46140

George W. Kelley
Biol. Science
Youngstown State University
Youngstown, OH 44504

Carol Lucille Williams
Department of Ecology & Behav.
Biology
Zoology Bldg.
Univ. of Minn.
Minneapolis, MN 55455

Jeffrey F. Williams
A-15 - Vet Clinic
Michigan State University
E. Lansing, MI 48824

Wendy L. Wirtz
183 Woodland Terrace
West Lafayette, IN 47906

Dr. Darwin Wittrock
Department of Biology
University of Wisconsin
Eau Claire, WI 54701

Donald M. Miller
Dept. of Physiology
Southern Illinois University
Carbondale, IL 62901

Dr. Howard J. Saz
Dept. of Biology
Univ. of Notre Dame
Notre Dame, Indiana 46556

As of June 1, 1980

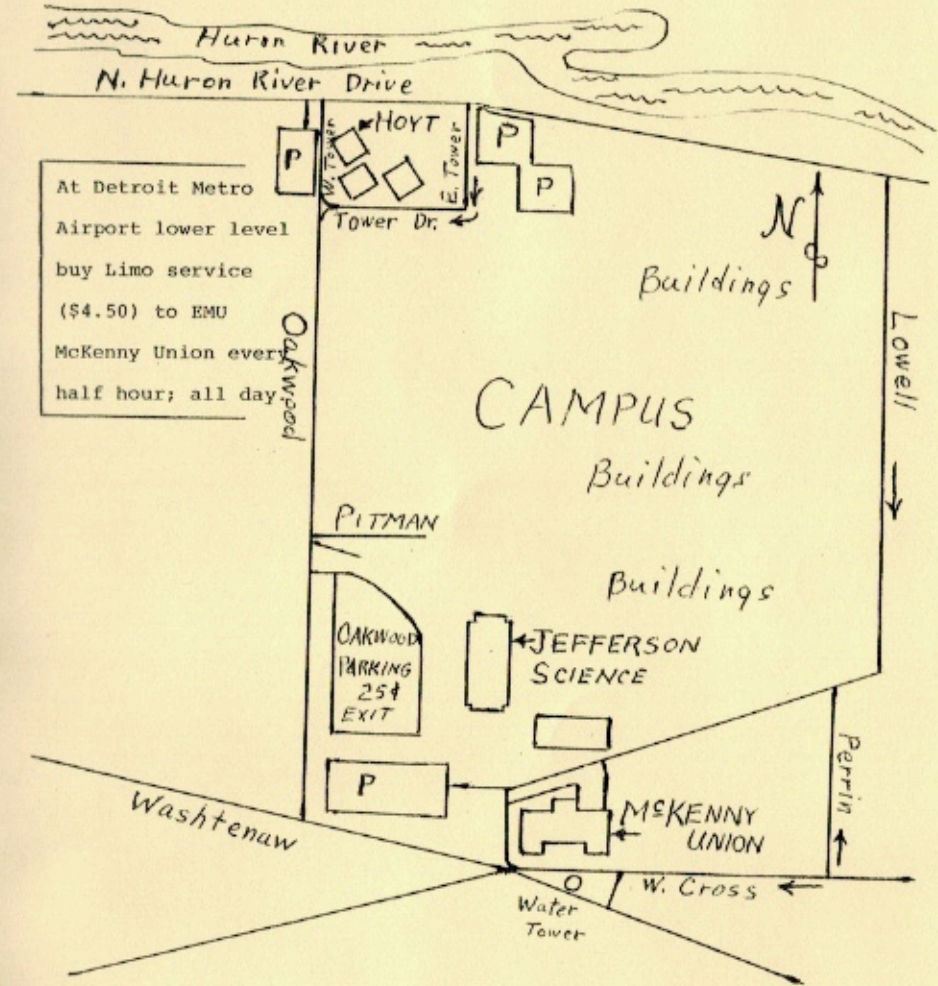
NOTES

NOTES

Ypsilanti, MI June 13-14, 1980

Ypsilanti is on I-94 (E-W) near the intersection of I-94 (E-W) and US 23 (N-S). From US 23 turn east (To Detroit) on I-94. Leave I-94 at exit #183 continue north on Huron which turns west as Huron River Drive. Left on E. Tower Dr. (one way) around to Hoyt Conference Center.

Direct to Jefferson Science Building from Huron Blvd. turn left on Cross Street. Follow W. Cross to campus. Park at Oakwood Lot (25¢ exit).



A.M.C.O.P. 1980 New Members (Added since June 1, 1980)

Harvey D. Blankespoon
674 Larkwood
Holland, MI 49423

George A. Conder
A-15 Veterinary Clinical Center
Michigan State University
East Lansing, MI 48824

Raymond D. Dillon, Ph.D.
University of South Dakota
Biology Department
Vermillion, SD 57069

W. Eugene Foor
Dept. of Biological Sciences
Wayne State University
Detroit, MI 48180

Thomas Francis
Dept. of Physiology
SIU-C
Carbondale, IL 62901

Michael Goldman
Dept. of Biological Sciences
Purdue University
W. Lafayette, IN 47907

Steve Iwinski
P. O. Box 604
Marquette, MI 49855

Robert J. Sheehan
Department of Zoology
SIU-C
Carbondale, IL 62901

Janet E. Watson
503 Woodside
Royal Oak, MI 48073

Robert A. Young
Department of Physiology
SIU-C
Carbondale, IL 62901

Anne Zajac
A-15 Veterinary Clinical Center
Michigan State University
East Lansing, MI 48824

Dr. Dennis M. McNair
Division of Natural Science
Univ. of Pittsburg at Johnstown
Johnstown, PA 15904

Correct
address
(see p24)

Dr. Richard McCracken
213 East College Ave
Brownsburg, IN 46112

(June 18 '80)

Total = 113

1980 AMCOP MEMBERS (ADDED after June 1, 1980)

~~Maurice E. Callender~~
~~Lilly Research Laboratories~~
~~Greenfield, Indiana 46140~~

Dr. W. Hugh Headlee
 762 North Riley Avenue
 Indianapolis, IN 46201

B. J. Jaskoski
 Loyola University
 6525 N. Sheridan Rd.
 Chicago, IL 60626

~~George W. Kelley~~
~~Biol. Science~~
~~Youngstown State University~~
~~Youngstown, OH 44504~~

Dr. Patricia R. Komuniecki
 Department of Biology
 University of ~~Notre Dame~~ Toledo
~~Notre Dame, IN 46556~~ Toledo, OH

Dr. Richard Komuniecki
 Department of Biology
 University of ~~Notre Dame~~ Toledo
~~Notre Dame, IN 46556~~ Toledo, OH

Edwin C. Powell
 Dept. of Zoology
 Iowa State University
 Ames, IA 50010

~~Dr. Howard J. Saz~~
~~Dept. of Biology~~
~~Univ. of Notre Dame~~
~~Notre Dame, IN 46556~~

Todd Sommer
 414 S. 7th
 Marquette, MI 49855

Dr. Charles M. Vaughn
 Dept. of Zoology
 Miami University
 Oxford, OH 45056