Meetings

Golden Lion Marmoset Conference

The Wild Animal Propagation Trust (WAPT) sponsored a meeting to develop a plan that would ensure the survival of the golden lion marmoset, *Leontopithecus rosalia*, both in its native Brazilian habitat and in captivity. A conference of 28 biologists, representatives of zoos and research institutes throughout the United States and Brazil, was hosted by the National Zoological Park, Washington, D.C., on 15 to 17 February 1972.

At the opening of the conference, a survey was presented by the conference chairman, D. D. Bridgwater (Minnesota Zoological Board), on the status of captive and wild populations of *L. rosalia*. The golden lion marmoset was originally distributed along a strip of montane rain forest, approximately 500 by 100 km, within the states of Rio de Janeiro and Espírito Santo in Brazil. Deforestation for plantations, urbanization, and animal trade have had a severe impact on the population of the golden lion marmoset. At present, it is found only in a small 900-km^2 area in the state of Rio de Janeiro. It is estimated that about 500 of these animals remain.

Only limited success has been obtained with breeding the golden lion marmoset in captivity. There are about 130 in captivity, with 70 of these in the United States. These 70 animals are housed in 13 institutions, 11 of which have breeding potential. However, evidence suggests that reproduction will occur only when one or both parents were wild-caught. True breeding in second-generation-captive marmosets has never occurred. Because the last wild marmosets were imported in 1968, and they have a life-span of approximately 10 years, the wild-caught stock now in captivity will become negligible within the next 3 to 5 years. Unless consistent second-generation breeding is achieved soon, the future of this species in captivity is bleak.

The present status of *Leontopithecus* in Brazil was discussed by A. F. Coimbra-Filho (Instituto de Conservação da Naturesa, Guanabara, Brazil) and A. Magnanini (Departmento de Pesquisa e Conservação da Naturesa, Guanabara, Brazil). Although legislation has eliminated the capture and export of this species, their numbers are still rapidly declining due to clearance of the land for agricultural purposes. The species is now completely extinct in the state of Espírito Santo.

Two major efforts are being made by Brazilian biologists to ensure the survival of *Leontopithecus*. First, it has been proposed that a Federal Biological Reserve be established for the golden lion marmoset in the Poco das Antas area where a few *L. rosalia* live in the remnants of a forest. It was hoped that the official decree establishing this biological reserve would be obtained soon. However, because of the urgency of the problem an additional golden lion marmoset breeding facility is being established in the Tijuca National Park on the outsirts of Rio de Janeiro, an area once part of the range of the golden lion marmoset. The Tijuca "Bank" of golden lion marmosets will consist of 30 large breeding cages, and will provide a place to keep marmosets that are translocated from areas where their habitat is being destroyed. It is hoped that the Tijuca breeding center would also supply animals for restocking the Tijuca National Park and the Poco das Antas Biological Reserve.

The status of the two additional species of *Leontopithecus*, never seen outside of Brazil, was described. The golden-rumped marmoset, *L. chrysopygus*, was considered extinct until 1970 when two killed specimens caused the rediscovery of the species. It is estimated that about 100 specimens are living in a state park in western São Paulo. However, there have been many severe fires there which may have destroyed some habitat areas. The golden-headed marmoset, *L. chrysomelas*, is in even greater danger of extinction. This species lives only in a limited area in the state of Bahia. The small remaining habitat is the private property of wealthy families, and is being heavily used as timber- and farmland. The conference recommended that these two species become part of the WAPT golden lion marmoset program.

Several types of conservation efforts were discussed by R. A. Mittermeier (Harvard University). The Tijuca "Bank" of golden lion marmosets has received a grant from the World Wildlife Fund, but additional funds are urgently needed. A "Save the Lion Marmoset Campaign" has been started by Mittermeier in the hope of not only raising funds, but also increasing awareness in the United States and in Brazil of the plight of the golden lion marmoset. In an article (May 1971) in *Oryx*, J. Perry (National Zoological Park), secretary of WAPT, described his visit to Brazil to determine the conservation efforts that would be most effective.

As a member of the family Callithricidae, *Leontopithecus*, like other marmosets and tamarins, displays many social patterns that are distinct from other primates. A pair-bond is the major social unit (J. P. Eisenberg and D. Kleiman, National Zoological Park); there is strong evidence that, no matter how large the group, only one adult pair is sexually active (G. Epple, University of Pennsylvania). Field studies of wild populations of *Saguinus oedipus geoffroyi* at Barro Colorado Island, Panama, have shown that most groups consist of four or fewer individuals (N. Muckenhirn, National Zoological Park). Thus, caging the animals in small family groups is highly recommended.

A golden marmoset breeding facility has recently been constructed at the Monkey Jungle, Miami, Florida (F. V. DuMond). This facility is an attempt to simulate a seminatural environment, with large outdoor cages containing natural plantings. The social and developmental behavior of the golden lion marmosets in this facility is being studied (D. K. Candland, P. Snyder) through a cooperative program with Bucknell University.

Data on the management of other marmoset species in captivity could be usefully extrapolated to provide information on the golden lion marmoset. A

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characteristics of the rod and cone pigments in the goldfish [455, 530, and 625 nm for the cones (*5*) and 522 nm for the rods (*6*)], this behavior is spectacular to observe experimentally. With the wavelength set at 520 nm and the spot of light covering the center of the receptive field, one can observe the response changing from ON to OFF, or from OFF to ON, as one changes from a dark-adapted condition to a light-adapted one. The phenomenon is so clear that a misclassification is impossible.

This association of the rods with the red cones is not limited to the goldfish. The finding is in agreement with Purkinje-shift studies done at the single-unit level, but in most cases recordings involved noncolor opponent cells. This is true in the fish (*7*), the frog (*8*), the cat (*9*), and the monkey (*10*), where the rod input has the same sign as the long-wavelength cone input. However, care must be taken when two cone pigments are known to exist on the long-wavelength side of the rod pigment. Only data indicating a shift to the longest-wavelength peak should be considered as supporting evidence. For retinas that have opponent color cells the data are rare. It is interesting to note that the ground squirrel retina, which has no red cone, has no rod either (*11*). Three opponent color cells have been found in the lateral geniculate of the cat (*12*). Two of them show rods with the same type of input as the blue cones; the third cell shows the rod input with the same sign as the long-wavelength cone input. In the monkey geniculate (*13*), 6 out of 25 cells were found to have a rod input. Four of them were type I cells, which are characterized by having a different spectral sensitivity in the center and in the surround. In one cell, the rod input had the same sign as the green cone input; the type of cone input in the three others was not mentioned. The last two cells that had a rod input were of type III, receiving inputs for possibly all three cones, and the rod input had the same sign as the cone input.

The finding that, in double opponent cells in the goldfish, the sign of the rod input is similar to that of the red cone input can be considered an extension of the Purkinje-shift rule to opponent color cells. However, the few cells that have been found to be exceptions to the rule have to be considered as evidence against a universal generalization that the rod input always has the same sign as the long-wavelength cone input.

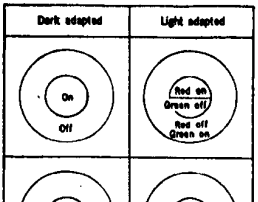


Fig. 2. Receptive field organization in the two states of light adaptation of the opponent color cells, which codes simultaneous color contrast. Note that the rod response is always similar to the red cone response.

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On Carpenter and Smith

We recently published a report on the occurrence of plastic particles on the surface of the open ocean (*1*). We noted that since many plastics contained polychlorinated biphenyls (PCB's) as plasticizers, the plastics could be a source of some of the PCB's found in oceanic organisms. On the basis of new evidence, we wish to add to this statement.

Infrared spectrophotometry of the white cylindrical pellets, the commonest form of plastic on the sea surface, shows that they are polyethylenes. Polyethylenes are not made with PCB's as plasticizers. Polyethylene often contains low concentrations of PCB's as contaminants (one major American manufacturer's polyethylene contains 0.2 part PCB's per million, apparently absorbed from river water with which it comes into contact in its production), but these concentrations are so low that it is unlikely that these plastics are a significant source of the PCB's found in the open ocean.

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