Vocal Repertoire of the Squirrel Monkey (Saimiri sciureus),
its Analysis and Significance

P. WINTER, D. PLOOG and J. Latta

Max-Planck-Institut für Psychiatrie, Abteilung für Verhaltensforschung, München

Received March 16, 1966

Summary. Two hundred and fifty vocalizations of the squirrel monkey (Saimiri sciureus) were selected for spectrographic analysis from a total of 200 hrs. of tape recordings. The vocalizations were classified into six groups according to their physical characteristics. Both intra and intergroup variability of calls was observed. Calls of similar shape were found to have similar functions. Thus each group of calls could be characterized by a functional designation. The functional significance of calls was determined by qualitative and quantitative observations. Four methods were employed: 1. stereotyped vocalizations were elicited by visual stimuli; 2. motor and vocal reactions were evoked through adequate vocal signals; 3. vocalizations were observed when external conditions were held constant and internal factors were permitted to vary; 4. vocal events were related to the total social situation. By these methods the complexity as well as the specificity of the vocal communication system is demonstrated and its evolutionary significance is discussed.

Key Words: Vocal communication — Primate behavior — Saimiri sciureus

Introduction

Our knowledge of sound production in mammals, especially monkeys, is still very scanty. Earlier investigations have led to the assumption that primitive verbal communication in apes appears likely [9, 10, 11, 13, 14, 29]. The findings concerned seem to have been influenced by unwarranted preconceived notions on vocal behavior of such animals. The results of more recent studies no longer support earlier theories [17, 18].

CARPENTER (1934), in the course of studying Alouatta palliata, realized the social significance of vocal communication in primates. His statements have been confirmed by several authors [7, 8, 15, 16, 19]. Nevertheless, up to the present time only two species of monkeys have been intensively studied with respect to vocalization, Macaca mulatta [23, 24], and the Japanese monkey, Macaca fuscata [12].

Although technical difficulties of recording and spectrographic analysis of sounds have been overcome, the problems of the variability of calls and their functional significance still remain. These problems seem to be extremely critical in all high-ranking primates exhibiting an elaborate social group structure. The squirrel monkey is characterized by rich and lively vocalization, even under laboratory conditions [4].
The purpose of this study is to establish a systematically arranged catalogue of the calls of squirrel monkeys based upon their formal characteristics. In addition, an attempt is made to elucidate the function of the calls.

Material and Methods

Maintenance

During the period of investigation — from March to December 1964 — 40 animals of the Brazilian type of *Saimiri sciureus* were available. They were housed in various cages in different rooms:

1. Half of the time (about 100 hours) was spent observing a group of four mature animals, two males and two females. They were kept in an isolation chamber (1.2 m³) adapted for this purpose for over three years, and always seemed healthy.

2. A group of six animals, one mature male, two mature females, one immature female, and two young animals were kept in a 20 m³ observation cage. Both groups were used simultaneously for the investigation of social behavior.

![Block diagram of the apparatus used for sound spectroscopy according to the method developed by Schieidt (1964)](image-url)

On October 23, 1964 an infant was born, whose growth and development followed a normal course according to our previous experiences [5, 22].

2. A group of six animals, one mature male, two mature females, one immature female, and two young animals were kept in a 20 m³ observation cage. Both groups were used simultaneously for the investigation of social behavior.