

ZOOLOGY

Monkey Talk Dictionary

The monkey's vocabulary of sounds for social communication, including those for danger and various emotions, has been compiled into a dictionary by Japanese scientists.

► THE LEADER cried "Kuan" and the troop fell silent ready to meet the enemy.

He said "Ga Ga Ga" and the troop trembled with fear, shrieking "Gyaa Gyaa."

This may sound like code language for guerrilla warfare, but it is actually monkey talk for social communication. Japanese monkey talk to be exact.

Studies by Japan Monkey Center and Japanese Primate Research on the language of troops of wild Japanese monkeys were reported at a meeting of the American Association for the Advancement of Science in Cleveland.

"Kuan," said Denzaburo Miyadi, zoology professor at Kyoto University, Kyoto, Japan, is a signal among the monkeys that danger is approaching. It is uttered by the strongest male on the spot.

Upon hearing "Kuan" the monkeys disappear from sight except for one who keeps watch on the enemy from the top of a tree.

The cry "Ga Ga Ga" or "Go Go Go" often followed by an attack on others, is an expression of threat. "Gyaa Gyaa" are cries of fear.

The monkeys, Dr. Miyadi pointed out, greet each other with certain words as they come and go and have the language to express various emotions. Baby monkeys, like baby humans, have special ways of talking.

"Unlike the human language, however,

monkeys cannot tell their companions such things as 'This tastes good' or 'You should try this' and so on," Dr. Miyadi said. But their language facilitates the "splendid teamwork existing in the troop."

The monkeys also communicate with gestures, he noted. In the way that a human being shrugs his shoulders to indicate "Well, I just don't know what to say," so a monkey dances toward a female with his lips moving to show affection, or he mounts on the back of a weaker monkey as if to say "See, I'm the stronger."

"There are some troops which are more noisy than others," Dr. Miyadi said, "but a larger troop usually has a larger vocabulary than a smaller one." Although some troops have words that others lack, there seem to be no dialects.

Dr. Miyadi told how the monkey troops evolve their own cultures. He told how a monkey discovered how to wash sweet potatoes in sea water before eating them. Before long the habit was picked up by members of the troop and spread to other troops.

There seems to be an optimum group size, he noted, and beyond that size the monkey troop will split. The critical point is not known.

"The monkey troop is undoubtedly a society of mutual acquaintance," Dr. Miyadi said. "Each monkey knows every other

monkey with its ranking status, the mother-child relationship and so on. Some infants, for example, are ranked high because they are the children of influential mothers."

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GENERAL SCIENCE

Public Image of Science Important to Nation

► IF THE PUBLIC does not understand the methods and purposes of scientific research, the nation faces serious consequences, Dr. Paul M. Gross, Duke University chemist, warned in his address as retiring president of the American Association for the Advancement of Science which traditionally is the principal event of the annual meeting between Christmas and New Year.

The image of science in the public mind is compounded of many diverse elements, Dr. Gross observed. These include:

1. Respect and gratitude for the "miracles" of modern medicine.

2. Admiration for the know-how of applied science that can put satellites in predetermined orbits.

3. Awe, verging on fear, of the results of the mysterious release of nuclear energy.

Scientists and laymen, alike, he urged should not lose their perspective and remember that science has "survived pestilence, wars and disasters, and has surmounted barriers of race, religion and language." The central problem for mankind "is still that of understanding nature and attempting to control it."

Dr. Gross cited some of the major scientific endeavors now in progress, emphasizing:

Penetrating earth's crustal layers to acquire a better understanding of the nature, composition, and behavior of the massive interior core—the Mohole project.

Better comprehension of the basis of life processes, through the determination and unraveling of the complex structure of giant molecules, such as RNA and DNA—molecular biology.

Possible modification of the climatic cycle, that brought about the Ice Ages, by modifying the flow of water through Bering Strait by use of nuclear explosives—climate change.

Science is now an instrument of national policy, Dr. Gross observed.

Scientists and technologists are still a relatively small minority group in our total population. Scientists comprise a relatively small part, only about 1.4%, of the total U.S. population, although their number has increased 30 fold since 1900. At the turn of the century the number was perhaps 90,000 in a 76 million population, and the corresponding rough figures for 1963 are 2.7 million scientists in a population of 190 million.

The federal budget for research and development now \$14 billion is about 15% of the annual budget of about \$95 billion, Dr. Gross said. By contrast in 1900 the federal science expenditures were about \$10 million between a half and one per cent of the federal budget.

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Ben-Zvi

MAGNETIC "POD"—Mister Shaul Leibinzohn (left) and Prof. Ephraim H. Frei of the Weizmann Institute, Rehovoth, Israel, illustrate their magnetic pod—a magnet the size of a pencil point that travels through the blood stream of humans to help where nature has broken down. It can be pulled out by an attached thread.