PSYCHOLOGY

Apes Taught to Use Gestures To Enlist Aid in Joint Task

Achievement Never Before Possible to Infrahuman Creatures Is Credited to Yale's Chimpanzees

WHAT means of communication do chimpanzees have?

That is the question scientists are asking themselves as a result of experiments just reported by Dr. Meredith P. Crawford of Yale University's Laboratories of Primate Biology.

Neither circus man nor scientist has ever been able to teach an ape to speak despite the fact that the chimpanzee, nearest kin to man, appears to be endowed with all the necessary vocal apparatus and perhaps with sufficient intelligence to make speech a possibility for him. What he may lack is surprisingly enough, the ability to ape sounds. With the ape it is a matter of "monkey see, monkey do." What he hears, he does not try to imitate.

If chimpanzees ever learn a language, it most probably will be a language of gestures such as that used by deaf-mutes among the human family, so the students of these animals have predicted.

Now Dr. Crawford reports what may be a beginning in this direction!

Compelling gestures that induce another chimpanzee to leave her play and do her share in a common task have actually been learned and used by chimpanzees under Dr. Crawford's instruction. This may not be language as the human knows it, but it certainly serves as a means of communication between apes, understood and acted upon by them.

Not Instinctive

The story of how Dr. Crawford reached this goal is a dramatic one.

Cooperation in solving problems is not a natural instinct among animals. The chimpanzees required long and patient instruction before they learned to work shoulder to shoulder to gain a common reward of coveted fruit. This step was necessary before they could be taught to call upon each other to share in the joint labor.

Five young animals were used, four of them females. All but Alpha, a timid creature of slightly below average intelligence, learned to work together in cooperation. But only two, Bula and Bimba, who are the most intelligent, succeeded in learning to use the gestures to secure aid from their cagemates.

Pulling a weighted box on a rope to secure its reward of fruit was not a difficult task for a single ape at Yale where chimpanzees have already learned to earn money and use it to buy valuables from slot machines, the "chimpomats."

But chimpanzees are individualists of the most rugged sort. When two animals were placed so that either or both could reach a single rope, they might both pull on it, but not at the same time.

One animal would pull on his rope while the other watched. Then the other would try it for a while. Sometimes they would work alternately on the same rope, passing it back and forth between them.

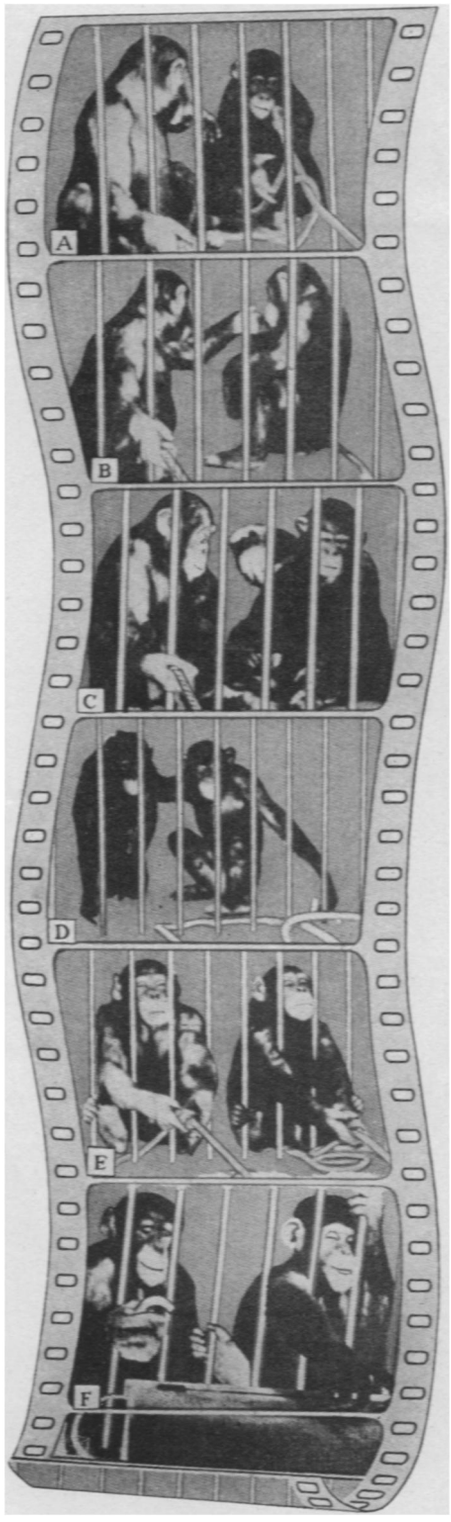
New Tactics

It was obvious to Dr. Crawford that they would never get anywhere that way, so he tried new tactics. Going back to the lighter weight boxes, he used two instead of one and trained the animals so that as soon as the boxes were baited, the chimps would begin to pull. In this way he "fooled" them into simultaneous activity. Then one heavy box was substituted.

Perhaps you picture Bula and Ross at this stage as pulling on their respective ropes, gaining the joint reward, and solving their problem. No, it wasn't that easy. Again the chimps would alternately pull and watch. Sometimes by accident their labors overlapped and they secured the reward. But each animal worked without paying attention to the other, without real coordination. Eventually the system broke down completely and matters were back exactly where they started.

Again Dr. Crawford revised his tactics. Now he took a part of the job and did a share of the labor. He would pull on the rope and call to the chimps, "Pull, Bula! Pull, Ross!"

This scheme was *(Turn to page 30)*



LANGUAGE?

A—Bula beckons Bimba to start work. B—Bula turns Kambi's head toward the grille. C—Bula's hand is on Kambi's, pushing it toward a rope. D—Bimba urges Bula forward with her hand on Bula's neck. E—Bula and Bimba finally pull together. F—Bula and Kambi have reward. These pictures, enlarged from 16 mm. film, were made by Dr. Meredith Crawford.

From Page 23

effective; the chimps learned to pull together on the common task, and man learned something also from the chimpanzees. To teach cooperation, it seems, it is first necessary to take on your own share of the pulling. It may be that nations, as well as individuals, could profit from this lesson learned in the chimpanzee school.

Gradually, Dr. Crawford could do less and less actual work on the box, calling to the animals and timing his "Pull!" so that it would come just before the animals would start to heave.

Later, he could leave all the work to the animals, but he must still bend over the box and touch it as well as call them to the task, for they needed a visual cue as well as the auditory one.

Finally, Ross and Bula would respond to just the call. They could work together if they had the impetus of the "foreman's" voice which served perhaps much the same purpose as did the old chanteys that set pace for seamen as they pulled on the ropes of some old sailing ship.

Signal From Ross

Bula was the first of the animals to reach the next stage in learning cooperation. When she was working with Ross, she noticed a squeak as Ross tightened his rope for a heave and the rope rubbed against the box. Thereafter, that squeak was as good as a command for Bula. When she heard it she pulled. Later she learned to watch other signs in Ross' behavior that were signals that the task was on. Then Dr. Crawford's call could be omitted. Real cooperation had been attained.

Bula it was, too, who first learned what had never been expected of an animal lower in the evolutionary family line than man. She learned to obtain with gestures work from another animal. Here is the picture of what took place.

The box was baited. But Kambi, Bula's partner, was not at her place at the ropes. Bula was excited. Back to the rear of the cage she ran, approaching Kambi with hands outstretched, palms down, fingers bent, arms beating up and down. Crouching, she would bounce up and down excitedly on flexed legs, whimpering and hooting as she always does when excited. Now Bula would tap Kambi on the shoulder or grasp her elbow and turn her about.

Misinterpreted

Not always did Kambi know what Bula wanted. She soon learned to know that the gestures meant, "Do something for me," but sometimes she would respond by offering to start the two-by-two lock-step marching that is such a favorite diversion of chimpanzee companions. Sometimes she would start grooming her. She would even present to her some treasure that she might have in her possession.

But Bula would persist until at last Kambi was at her post pulling her share of the burden.

Amusement came with the later pairing of the trained ape Bula with Bimba. It was comparatively easy to teach Bimba to cooperate with the already willing Bula, but after Bimba had also learned the way to pull with another, Bula lost interest in the job.

Then it was that Bimba turned the tables on Bula. She was the one to say in ape gestures, "Come on now, get busy!"

Her technique was very different from Bula's. She did not get excited over it, she did not cry out, she just went ahead persistently and doggedly gesturing, taking hold of the back of Bula's neck, drawing or pushing her toward the grill.

Finally Bula grew annoyed at Bimba's persistent urging. She would even whimper sometimes as Bimba drew her to the task, but still she did not refuse to join in the pulling.

Some of the observations made by Dr. Crawford in teaching these simple man-like animals the difficult social task of cooperation for mutual benefit may carry over into the sphere of human relations.

Once an animal has learned to cooperate and solicit the cooperation of one other animal, he can easily cooperate with any others and attempt to secure their aid, Dr. Crawford found.

Friendship makes for easy cooperation. Chimpanzees, like humans, have their preferences in companionship. The animals who had become very fond of each other and were constant pals, delighting in the lock-step marching of chimp chums, could most readily learn to pull together in rhythm for a common reward.

May Compel Compliance

The dominant animal, the natural leader in any pair, can compel compliance with her urging though the other is decidedly reluctant to take hold of the task.

This taking hold and pulling with the mate is sometimes done with no hope of sharing in the fruit reward. Occasionally it happened that one animal's share would fall off the box as it was being drawn in. That animal would go on pulling under the urging of the leader, despite the discouragement.

Cooperation requires intelligence. Only the most talented animals were able to learn the gestures and to take their part as leaders in cooperation.

The results of this experiment are reported for the scientific public in the *Comparative Psychology Monographs.*

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