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The Rockefeller University

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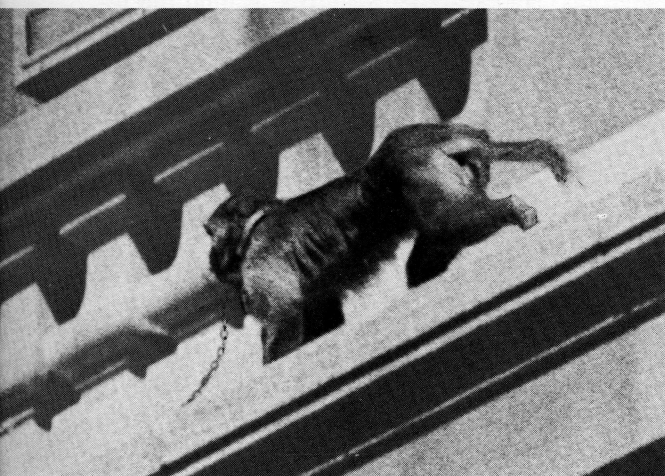
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## MONKEY EXTENDS LABOR DAY HOLIDAY

Rhesus 135 is a light brown, adult, female monkey (*Macaca mulatta*) that is about forty inches from head to hind paws, weighs nineteen pounds, and, until three months ago, lived somewhere in the subtropical basin of the Ganges River in northern India. On July 23, in a wooden crate with forty-nine other macaques, she embarked on the



Rhesus 135, third floor, Nurses' Residence, October 2.

long overnight trip from New Delhi to John F. Kennedy Airport via BOAC jet. Instead of casual travel care and gruel, she began receiving intensive attention and solid food, first, at the airport ASPCA shelter — monkey's Travelers Aid, so to speak—and, next, when she arrived on campus at the Population Council primate center in the Cystoscope building. There she was given a clean bill of health by veterinarian Ashley O. Brinson and his staff and transferred to a metal cage with private water fountain in an air-conditioned room.

By now—and during the thirty-nine days of quarantine which followed—change of food and water, adjustment from a wooden to a metal cage, frequent handling, and other new factors were causing Rhesus 135 to have a mild emotional upset. This is hardly surprising. Her protohominid physical constitution and behavioral responses are what make her desirable for the Population Council's research in the physiology of human reproduction.

One symptom was her refusal to

eat, a not unusual reaction. "When this happens," Dr. Brinson explains, "We feed the monkey through a tube to keep her strength up until she becomes used to her new surroundings." In its native habitat, the *M. mulatta* roams freely on the ground as well as in trees, and is held sacred by the Hindus, who allow it free access to temples and to the produce of gardens and orchards. In most macaques, play is pre-adaptive (wrestling, biting, and chasing), but the *mulatta* invents apparently nonfunctional games such as twenty- to thirty-foot jumps from trees into pools of water.

Rhesus 135's departure from the primate center on Labor Day was totally in keeping with her heritage of playfulness and independence. Perhaps sheer boredom struck her, or the green plane trees in the park across the way looked inviting. Anyway, the air conditioning was not working and the temperature was over 90°, so windows were open. When the attendant reached into her cage with his heavy protective gloves to give her the next feeding, freedom called her, and she went.

"A million ancestral years went into that jump," said Dr. Brinson a few days later, standing at the second floor window through which she made her exit and looking down at 63rd Street eighteen feet below. Rhesus 135 had threaded her way through the traffic surging into East River Drive, crossed the street, climbed the seven-foot fence, scampered in the direction of the Tower Building, and was gone.

But not for long. To the surprise of Press personnel, she scaled the Nurses' Residence a few days later and looked in on the Journals Office and Order Service operations through second and third floor windows. Security guards and primate-center attendants have tried vainly to catch her in the weeks that have followed. The peripatetic rhesus has been reported in a variety of locations, ranging from the north parking lot esplanade and the door of the Hospital to the roof of Sophie Fricke Hall. Dr. Brinson left apples containing a mild sedative at strategic locations around the grounds, in hopes

of slowing her down. But she appears to eat the apples, sleep them off, and return to the chase the following day with zest.

In its native India, *M. mulatta* traditionally raids plantations and villages for food, and this conditioning has probably helped Rhesus 135 forage for herself on campus. She has also been observed eating the foliage of flowers and bushes. But with the first frost a few weeks away, Dr. Sheldon Segal, Director of the Population Council's Biomedical Division, expresses concern for the monkey's welfare. "On Thursday noon, October second," Dr. Segal said, "she was watching us at lunch in Welch Hall, from the second floor balcony of the Nurses' Residence." The photograph, left, was taken a few minutes later by Lewis Koster of Graphic Services. The following Sunday, the main reading room in the Library was practically deserted. William H. Beers, Graduate Fellow, looked up to see Rhesus 135, a table length away, peering at him. "Probably looking for the map section," he remarked as he followed her down the stairs.

## STAFF PROMOTIONS



LILLIE MAE CURRY



ANGEL BLANCO

The University announces the promotion of Lillie Mae Curry to Senior Night Cleaner and Angel Blanco to Assistant Security Officer. Mrs. Curry started working at the University as a Mouse Attendant in the Animal House in 1947. She later changed to evening cleaning, where the shorter shift gave her more time for raising her five children. Betty Jean, the oldest, is nineteen and studying nursing at Bronx

Community College. In her new position, Mrs. Curry—together with Amilcar Negrón—supervises the staff of thirty-three cleaning ladies who do the night housekeeping in six campus laboratory and office buildings.

Mr. Blanco arrived in the United States from Lugo, Spain, in 1947, and

became a citizen six years later. Before joining the University as a Guard in 1964, he was foreman of the shearing department in a metal box company. Mr. Blanco, who received his bars on October 16, will assist Captain Robert L. Davis. Many have been cheered by Angel's greeting at the Main Gate.



## about the laboratories

structure of the dictionary. Miss Wilkinson has been studying how we group nouns and what this shows about the way we organize the meaning of words. Mr. Anglin is testing the hypothesis that language develops from the concrete to the abstract. Associate Professor Bever, with Research Assistants Ann Balsam and Richard Hurtig, has been studying the way in which adults understand spoken sentences.

A husband-and-wife team from the University of California at San Diego, Dr. Edward Klima and Dr. Ursula Bellugi-Klima, is compiling a grammar of negation and evaluating reports on Washoe, a female chimpanzee trained in sign language; Graduate Fellow Alice Fennessy is studying how responses to sentences differ if they are heard with only the right or only the left ear; Graduate Fellow Stephen M. Reder is investigating mathematical psychology and memory; and Graduate Fellow Keith Stenning is interested in philosophy and language.

Another approach to studying language behavior is to examine how children acquire the ability to talk and think like adults. The laboratory methods seem, at first sight, very simple. For instance, in a basic experiment to study language development in children, two rows of clay balls are laid out on a table like this:

O O O O  
OOOOO

The children are asked, "Which row has more balls?" Children two and six years old answer correctly. The four-year-old consistently chooses the longer row. Why?

This experiment is one of a series of investigations of the development of language and thought in young children, going on under the direction of Dr. Bever. The two-year-old, he ex-

plains, apparently has a mechanism that lets him pick properly. The six-year-old counts the balls or matches one row against the other. But the four-year-old has learned just enough to believe that what looks longer is "the most"—proving the saying "a little knowledge is a dangerous thing."

The four-year-old attempts to find "easy solutions" in other aspects of his life. For example, he ranks low in probability learning tests: toy animals are placed on two inverted cups, one of which hides a candy more often than the other, in a random order. Two-year-olds choose the cup that most frequently hides candy. The four-year-old searches for a rule behind the reward schedule and tries to beat the random system.

The four-year-old's attempt to organize all perceptual experience extends to intersensory associations, as tested by Dr. Bever, Joan Epstein, and Hatice Morrissey. For instance, four-year-olds agree with each other that red liquids taste sweeter than liquids of other colors, while two- and six-year-olds do not.

Another four-year-old failure appears in the study of understanding sentence constructions. For example, children are given four sentences like these and asked to act them out with toy animals as puppets.

- a) The elephant jumped before he walked.
- b) The elephant jumped after he walked.
- c) After the elephant jumped he walked.
- d) Before the elephant jumped he walked.

Curiously, children of four years act out the sentence according to the *order* of the verbs, not according to the *meaning* of the sentences. As a result, they perform a) and c) correctly, and are wrong on b) and d). Two-year-old and six-year-old children pay less attention to the order of the verbs and more attention to the meaning of "after" and "before." The four-year-old appears to use the superficial generalization that the order of events in the world always corresponds to their order in sentences.

The four-year-old's preoccupation with superficial rules also explains a good deal of why a four-year-old often seems so rigid or "stubborn" about his world: he doesn't want changes made in any of the rules he has learned.

Neurological developments may also be involved. For instance, in 95% of the population, the left side of the brain seems to control speech *after* the

We use language every day of our lives and take it for granted. But how did it develop, how is it used, how does it change during an individual's lifetime? Dr. George Miller and his colleagues want to know—which explains the procession of children, aged one to six, who troop in and out of the Psycholinguistics Laboratory on the second floor of the Hospital.

The tools in this laboratory seem, at first glance, better suited for a nursery school than for anything as serious as psycholinguistics, which is the psychology of language. Lumps of clay, toy animals, paper cups, and chocolate candies are being used to try to answer such questions as: What is the most natural way for a child to construct a sentence before he learns grammar rules? In what natural way do we organize the dictionary we carry around in our heads? How does our environment influence the way we think and speak?

The experiments carried on in the laboratory are designed to find answers to these questions by examining the behavior of both children and adults. Dr. Miller, together with Research Assistants Jeremy Anglin and Carol Wilkinson, has been studying the way in which adults internalize the



age of about four. Why? What are the neurological or environmental influences that cause the change? Dr. Bever, with Joan Epstein, Richard Hurtig, and Ann Balsam, has been analyzing data collected on four-year-old boys from poor and middle-income families. Do children from culturally deprived homes show the same amount of localization of speech in the left hemisphere of the brain as those from more privileged backgrounds? Is it a physiological condition common to all children? How much of a role does environment play in its development?

Of particular interest to Dr. Miller is another program with culturally deprived children being carried out in the playroom of the Pediatric Clinic at Mount Sinai Hospital. Here mothers from the Harlem community learn how to stimulate and interact with their children, who—like culturally deprived children from many areas—may be silent, uninterested, or withdrawn. Ghetto mothers often think the good child is the quiet, withdrawn child. The hope is to convince parents, by demonstration and training, that talking and playing are worthwhile and can help the child to learn. For instance, one tool is a “shape box.” A child puts his hand into a hole in the side of a box that contains, perhaps, a block, a ball, a pencil, and a toy. By feeling the objects he cannot see, the child learns to recognize and name shapes. At the same time, parents learn to guide their children in performing activities appropriate to their ages. Anne Morris, formerly of Rockefeller University, has been very helpful in devising these experiments.

It is Dr. Miller's hope that, if the program is successful, pediatric clinics throughout the country will adopt the method.

## IDENTIFICATION CARDS

Personal identification cards are being issued to everyone at the University as a general security measure and to provide authoritative identification for cashing checks. Work on the new cards will begin the last week in October. First of all, each of us will go to Graphic Services. There, a full-color portrait photograph will be taken and incorporated into a wallet-size plastic card. Each card will also carry the employee's payroll number.

## PRESIDENT ADDRESSES NEW STUDENTS

“Graduate work, which began here fifteen years ago, has given an entirely new goal and vitality to our institution, which is now nearly seventy years old,” President Seitz told the entering class of graduate fellows in Caspary Hall on October 24.

“I can assure you that all of us on the faculty and staff are doing our best to help you play your roles as professional scientists and as productive and creative human beings. There are inevitable constraints, however. Perhaps the most serious arise from limitations on money. We are generously endowed and have been supported, in addition, from private and public sources. Yet the funds available are finite and not quite enough to do all of the things we would like to, particularly in these days of high taxes and federal cut-backs.

“Those of you who will be spending a number of years living on campus may get a bit bored with food or lodging—like resident students anywhere. All I can say is that we will provide as much variety as we can. In another year or so we will have a new cafeteria, and may be able to provide more space at Socony Hall across the street.

“Whatever else we have to offer on campus and in the surrounding community, our predominant theme is scientific research and its application. We have no monopoly in this area, yet it is safe to say that, as an educational institution, we have a higher concentration of such interest than any other campus in the country.

“This does not mean that we lack interest in human affairs. Quite the contrary. As our motto *Pro bono humani generis* indicates, our institution was created to help advance the well-being of man.

“In the period ahead, your day-to-day work will naturally be with immediate associates on the faculty and staff, and with the office of the Dean. But I wish to make it clear that my door will always be open, regardless of what professional or personal matters may be on your mind. There is ample room in my schedule for the issues which concern you. I also hold regular monthly meetings with the graduate students as a group.

“You may ask what constitutes a reasonable period of study and research for a doctor's degree. There is no precise answer, since individuals

and circumstances differ. However, conditions here are so favorable for graduate study that, normally, you should look forward to getting a degree in about four years. Some of our students have finished their work in two or three years. My suggestion is that you spend your first year orienting yourselves to the institution and its work, and expect to complete your study and thesis within the next three years.

“There are certain invariants in present-day society which are the same for all generations. These invariants represent common ground, and should become the center of mutual interest on our campus. In particular, Rockefeller University, which has evolved from a scientific research institute, is primarily concerned with the advancement of science and the problems of making science relevant to human society.

“Let us agree, then, that this is our joint and major goal: to pursue good science with the understanding that we shall contribute our best to our society through that course.”

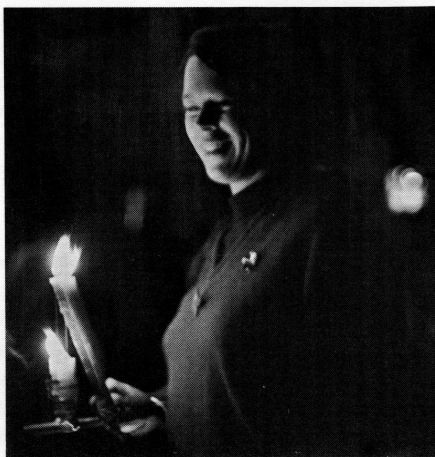
## extracurricular

BRUNO NUÑEZ, Painter, had a fishing permit in his pocket as he piloted his nine-foot outboard northward out of Havana Harbor one afternoon in 1960. He and his sailor friend, Rigoberto Chorot, were not, however, headed for fishing grounds in the Florida Straits; their goal was the United States mainland. By nightfall, the motor died and they drifted without food until the third day, when they were spotted by a plane, and a United States Coast Guard cutter towed them into Key West. The following spring, Nuñez started work as a painter in the Paint Shop at Rockefeller under the father of the current foreman, Herman W. Richter. A year later, the Cuban government permitted his wife and little girl to join him. After hours, Nuñez directs his band, Bruno y sus Estrellas Sextet (Bruno and his Six Stars), which he organized in 1963. They play regularly at Spanish nightclubs in the city, and at the Calderon Country Club in the Catskills on summer weekends. He became a citizen in 1966.



## MORATORIUM DAY

One hundred and thirteen individual members of the University faculty resolved on Wednesday morning, October 15, "that the war in Vietnam must not continue" and urged "the rapid and complete withdrawal of the United States forces." Two faculty voted no and six abstained (a few days before, the Student Representative Committee had denounced "the continuing U.S. military aggression in Vietnam"). Also on Wednesday morning, students manned Vietnam Moratorium "talk tables" at the Main Gate and on 1st and 2nd Avenues, and in the afternoon presented addresses and a panel discussion in Caspary Auditorium. In the evening, more than one hundred



students, faculty, and staff chanting "Peace Now," joined the candlelight procession to the ecumenical service in front of St. Patrick's Cathedral.

## A CRAFTSMAN BEHIND EVERY SCIENTIST

Behind every scientist stands a craftsman. Craftsmen help scientists extend their eyes, ears, and touch; refine their laboratory techniques; and free them from routine for research. The demand for craftsmen to produce instruments for biological and behavioral research is so great that the work in the Instrument Shop on B floor of Theobald Smith Hall has more than doubled in the last ten years.

Before Professor Robert B. Merrifield and Research Associate Bernd Gutte announced their pioneer laboratory synthesis of ribonuclease last January, they needed an automated instrument to carry the process through what would otherwise have been a specially tedious phase.

The University's twelve skilled instrument makers, led by Nils Jernberg, Instrument Design Engineer, developed with Dr. Merrifield and his associates a machine which accomplishes the 169 reactions and 11,931 steps required for the synthesis of the enzyme. The instrument adds six amino acids to the peptide chain in a twenty-four-hour period, whereas by hand only two or three could be added in that length of time. The twelve-port solvent valves are the key feature of the apparatus. Corrosive agents are employed in the synthesis, so there must be no leakage, and the valves are made of stainless steel and Teflon—a

compound better known to us as the no-stick lining for kitchen pots and pans and an insulator in the moon-walk space suits. Especially critical is the tiny intricate plastic seal, which seats on the Teflon and is machined with a diamond tool to achieve the required mirror surface.

The Instrument Shop also contributed to development of the rapid method for detecting antigens announced by Professor Alexandre Rothen and Graduate Fellow Christian Mathot last month (September *news and notes* page 2). Important apparatus in this work was Dr. Rothen's ellipsometer. Josef Blum, Jernberg's predecessor

as head of the Instrument Shop, constructed the first ellipsometer in 1944. Improved models produced by Nils Jernberg and Carl Tiden measure thicknesses within two billionths of an inch and are the forerunners of those now seen in biological laboratories throughout the world.

Other "firsts" since the Instrument Shop was created in 1920 are: the first automatic photoelectrically controlled fraction collector for chromatography, for Professors Stanford Moore and William Stein, in 1946; the first self-centering, direct-drive centrifuge; the first Porter-Blum microtome, designed and built in the early 1950s by Dr. Keith R. Porter, now of the University of Colorado, in collaboration with Joseph Blum; the first robot for Professor Lyman C. Craig's counter-current distribution machine, also in the early 1950s; the photometer for the first automatic amino analyzer built by Doctors Moore and Stein in the late 1950s; the first completely automatic rotor for density gradient centrifugation, designed by Dr. Beaufay, in 1963; and the first automatic recording spectrofluorometer, designed by Doctors Gerald M. Edelman and Paul Rosen, in 1964.

Objects as large as an auto wheel—up to thirty inches in diameter—can be turned on the biggest lathe in the shop. And objects as small as the ball in a ballpoint pen can be turned on the watchmaker's lathe. In 1955, the University imported from Sweden for Mr. Jernberg one of the universal milling machines he had used when learning his craft at Lund University.

*Left to right:* Carl Tiden, Assistant Instrument Design Engineer; John Braun, Ludwig Senden, and Karl Eikamp, instrument makers; Nils Jernberg, Instrument Design Engineer; Rudolph Franz, Shop Supervisor; Guenter Prokesch, Fred Schneider, and Rudolph Josephs, instrument makers. *Not shown:* John Doherty, Bruno Sobik, and John Wynne.

