

search a person or even his luggage without a warrant." And some people are licensed to carry weapons, although they are required by law to check them with the flight crew.

Then there's the ticklish problem of what to do when a passenger walks past a device and the alarm goes off. Since the ticket agent cannot be authorized to take the passenger aside and search him, this means an armed guard at every gate.

The airlines could get around the searching problem by asking an individual who sets off the alarm to empty his pockets voluntarily and then walk past the device again to make sure the gun isn't hidden in his clothing. Any suspect passenger who refused could legally be kept off the aircraft. But false alarms would cause a nightmarish customer relations problem for the airlines. And if the passenger is in fact planning a hijacking, he is liable to be highly dangerous.

Finally, there is the problem of economics. Since one detection device would have to be installed at every boarding gate, cost is a major consideration. "If money were no object," says FAA engineer Max Collins, "it might be possible to develop a reliable device with several sensors, an image recognition unit and a computer. But you could hardly afford to put one at every boarding gate."

One way to circumvent the cost problem would be to put detection devices at every fifth or tenth gate, and then to post signs at all boarding gates to the effect that passengers are being searched for weapons by hidden electronic devices. This approach would be similar to the use of "speed checked by radar" signs posted along certain highways.

In spite of all the obstacles, the FAA and the ATA are continuing to look for solutions, primarily for more reliable detection devices. Until such time as an inexpensive, almost foolproof gun detection device is available to the airlines, their present policy of accommodating hijackers will no doubt continue. For the immediate future, the best hope for the hijacking problem is still that it will simply go away, perhaps by the resumption of normal relations with Cuba.

Castro, meanwhile, has made it known that he strongly disapproves of the hijackers who have been diverting planes to Cuba. In fact, several of the hijackers have been jailed, according to Moises Pérez, an official of Cuba's Ministry of the Interior. Pérez adds, however, that "some of the hijackers have been released after showing the proper revolutionary attitude." Pérez says it is unlikely that hijackers would ever be regarded as revolutionary heroes.

MASCONS

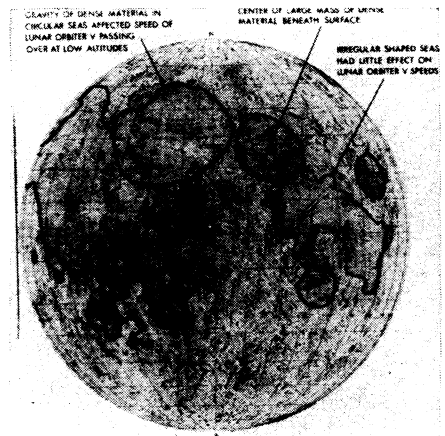
Lumps beneath the maria

The moon may have relics of ancient collisions with heavy bodies buried beneath the surface of its maria. So conclude Drs. P. M. Muller and W. L. Sjogren of the Jet Propulsion Laboratory of California Institute of Technology, who have used lunar orbiter tracking data to make a gravimetric map of the near side of the moon.

The force of gravity is not uniform over the surface of the moon—or the earth for that matter—but varies slightly according to the density of the matter below a particular spot. As it moves across the face of the moon, the orbiter responds to these changes in force by slight variations of its motion. Analysis yields the gravimetric data.

There appear to be concentrations of dense matter—or mascons, as the observers abbreviate mass concentrations—under six of the nearside maria—Imbrium, Serenitatis, Crisium, Nectaris, Humorum and Orientale—and in the area between Sinus Aestuum and Sinus Medii.

The maria are flat areas sometimes ringed with ridges, and their appearance has led some observers to suggest that they may have been caused by collisions with heavy bodies. It could be, say Drs. Muller and Sjogren, that the mascons are the impacting bodies



NASA

Mass concentrations on the moon.

buried beneath the lunar surface—the one in Mare Imbrium, for example, would roughly equal a nickel-iron sphere 100 kilometers in diameter.

Whether the mascons actually are asteroidal-sized bodies that caused the associated maria by impact is a question the Caltech researchers present for future study. If the mascons are not simply the original impactors, they say in the Aug. 16 *SCIENCE*, then one must find out how they were formed in the lunar interior. Another question is whether the mascons are consistent with the notion that the moon has a molten interior.

SPECIES DIFFERENCES

Chimp study shakes theory

Rhesus monkeys reared in isolation never learn to copulate. Chimpanzees reared in isolation do.

Although the chimp never becomes quite normal, given time with an experienced partner, a chimp can at least learn the techniques of becoming a parent, while a rhesus monkey, except for the rare female, remains completely inadequate.

Human psychologists, extrapolating from animal behavior, consistently fail to appreciate the magnitude of species differences. In this case, the classic experiments on the long-term effects of isolation on rhesus monkeys, by Dr. Harry F. Harlow in Wisconsin in the 1950's, have influenced a generation of psychologists.

Dr. Harlow's monkeys were permanently impaired socially and sexually by their early isolation in wire cages. The males would attempt copulation, but without success. The females retreated from bigger experienced males and, in rage, attacked the smaller ones. When four females were eventually impregnated by patient partners, they became terrible mothers, abusing their

offspring and refusing to let them nurse.

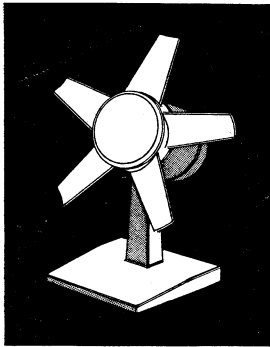
The behavior of the rhesus monkeys ranged from cowering fear, to stereotyped motion, aggression and self-mutilation.

Animal behaviorists reacted to this information with: "Well, isolation certainly ruins a rhesus monkey." But to the public and many psychologists, jumping further than the animal behaviorists would, the parallels to human behavior were provocative.

New results on chimpanzees from Yerkes Primate Center in Atlanta, Ga., leaves untouched the basic theory that social isolation damages behavior. But it shows the extent of that damage and the form it takes to be quite specific to the species involved.

Of 12 chimpanzees reared for three years in closed boxes, eight later learned sexual behavior from wild-born animals.

This represents considerable recovery, although the animals are still abnormal in duration and frequency of sexual activity. Often their copulation is interrupted by a sudden access of stereotyped repetitive motion, says Dr. Charles M. Rogers, co-author of the



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study with Dr. Richard Davenport.

The chimp will poke a finger in its eye or rock or sway back and forth. Such stereotyped activities appeared at about the age of six months and have continued somewhat diminished throughout the years following isolation. The chimps are now about 9 to 12 years old.

Dr. Rogers gingerly attributes chimpanzee recovery to the ape's greater capacity to learn from experience. It is more adaptable than rhesus monkeys.



A chimp: greater sexual recovery.

Unexpectedly the Yerkes scientists discovered that chimpanzees reared by humans suffer greater damage than those raised in complete isolation. Sexually the human-raised animals seem to lack drive. The best explanation for this at the moment is that nursery-reared animals somehow fail to recognize their own species and therefore cannot learn typical behavior.

In both rhesus monkeys and chimps, sexual drive appears undiminished, except for chimpanzees reared by humans.

Of 10 nursery-reared chimps, only three learned to copulate. Among restricted animals the reverse was true. Only one male never attempted copulation and only one female avoided all contact. Two of these chimpanzees have now given birth to offspring, and the Yerkes scientists expect them to be inadequate mothers. But whether the animals will be as punitive to their young as rhesus monkeys, or simply indifferent, is an important point.

Dr. Raymond Carpenter, an authority on primate behavior at the Pennsylvania State University, says he will be very surprised if the chimpanzee mothers are

as terrible as rhesus mothers.

He also suggests that neither primate study has fully explored the range of possible therapies. What effect, for example, might hormone drugs have on the neurotic animals? Can some of the damage be corrected by releasing them for long periods into an enclosed natural environment?

Dr. Carpenter expresses surprise at the persistence of stereotyped movements. He says they have no utility and according to psychological theory should eventually vanish. Yet a chimpanzee, years after release from its box, continues to poke fingers in its eyes, probably originally to stimulate inter-ocular sensation.

Some schizophrenic children also engage in repetitive, useless action. There is no way of gauging the source and cause of such abnormality from primate studies, but a therapy which helps chimpanzees might perhaps help humans.

APOLLO PACER

Lunar module flight delayed

Though the Apollo program has seemingly gotten back on the track after being derailed by the launch pad fire that killed three astronauts in January 1967, the lunar module is now holding things up enough to be considered the "pacing item," an engineers' euphemism for the key foot-dragger. There have been recent problems with the radar, electrical and lighting systems, as well as weight difficulties that reportedly have the 35,000-pound craft up to its last ounce.

Last week the space agency revealed that the delays had taken their toll. The module has been dropped from the first manned flight, now set for Oct. 11. Nor will it be aboard the second in December. Astronauts will not get to practice with it, in fact, before February, which could be as few as two—but probably four—flights before a lunar landing attempt.

October's flight, therefore, will be planned solely to test the Apollo command module, during a stay of up to 10 days in orbit around the earth. The following flight will be one of four possibilities, not to be decided until the preceding mission's data are evaluated. Most likely is an earth-orbital flight with an apogee of either about 2,000 miles or a greater amount (for more accurate simulation of the return from the moon). Circumlunar and moon-orbiting missions are also being considered, in hopes of giving the astronauts flight practice to make up for the slippage.

The space agency is still talking optimistically about U.S. men on the moon before the end of next year.