

NATURAL SCIENCES

The six-million-dollar man

High school science textbooks used to make a big point about the materials that make up the human body only being worth about 97 cents. Yale molecular biologist Harold J. Morowitz finally got fed up with this piece of reductionist nonsense when he was reminded of it again in a birthday card. He got out a biochemical company's catalog and added up the cost of the synthesized materials, such as hemoglobin (\$2.95 a gram) and bradykinin (\$12,000 a gram), and came up with . . . guess what? . . . a six-million-dollar man, (\$6,000,015.44 to be exact).

Professor Morowitz's calculations originally appeared in *HOSPITAL PRACTICE* and have frequently been reprinted, most recently in the July 19 *Washington Post*. He uses this public exposure to drive home a more important point, however—that "information is more expensive than matter." What the biochemical companies offer is simply the highest "informational" (most organized) state of materials commercially available. And even these are mostly taken from living animals; if synthesis of all the compounds offered had been done from basic elements, their cost might be as high as \$6 billion.

The logical extreme of the exercise, obviously, is that science is nowhere near getting close to synthesizing a human. Just to take the next step of organization—the organelle level—would cost perhaps \$6 trillion. Morowitz thus offers a new dimension to what scientists have been trying to say for the last century: "Dr. Frankenstein was a fraud."

Polyphonic gibbons

In a paper refreshingly devoid of the usual jargon, two naturalists report in the July 16 *SCIENCE* on the "finest music uttered by a wild land mammal"—the great call of the Kloss gibbon and related species in Southeast Asia. Ostensibly trying to determine the number of gibbon species along an area centering on the Malay Archipelago, Joe T. and Elsie R. Marshall present detailed descriptions of the gibbons' songs with the fond acuity of music critics.

Gibbons sing to stake out a territory, to announce the presence of a junior willing to mate, and to broadcast other information concerning the number and sex of individuals present in a band. Each song is specific to a given sex and species throughout the range and can be used to identify the number of species.

The songs are very elaborate, with various individuals joining a set score at the appropriate intervals in recognizable harmony. The Marshalls describe one song as ending "in a polyphonic *tour de force* marked by a rise in pitch of the female's bass line to harmonize with the thunderous pouch booms of the male."

Dinosaur hypertension

Among other things zoologists fight over 100 million years after the fact are these: Were dinosaurs warm blooded and were the long-necked kind aquatic? Roger S. Seymour of the University of Adelaide addresses both questions, in the July 15 *NATURE*, from the point of view of blood pressure.

Because of their extreme size, dinosaurs would have had blood pressures many times greater than any known in living reptiles. Since warm bloodedness also requires higher pressures, the two conditions would have complemented each other. But to push blood to the admittedly tiny brain of the long necked sauropods would have required an inefficient 1.6 ton heart, Seymour concludes. This requirement would be lessened only if these species spend most of their time in the water, which supplied additional pressure.

Protection for eagles and grizzlies

Two symbols of the American wilderness—the bald eagle and the grizzly bear—are in line for protection by the federal government. The bald eagle was proposed this month for inclusion on the endangered species list in 43 states and on the threatened list in five others, by the Department of Interior's endangered species office. That office will also propose next month the specific areas in Idaho, Montana, Washington and Wyoming that are critical to the grizzly's survival.

The bald eagle has been reduced from large populations in the lower 48 states to only 700 active breeding pairs. Populations are still healthy in Alaska: 10,000 nesting pairs are estimated. This national symbol has been a victim of habitat destruction, eggshell thinning by DDT, and hunting. Shooting continues to be the leading cause of premature death among adult and immature bald eagles.

This inclusion on the endangered and threatened lists, which comes after more than three years of bureaucratic deliberation, will protect the animal from hunters and from destruction of its habitat due to any action authorized, funded or carried out by the federal government.

The grizzly bear was added to the threatened list earlier this year. About 1,000 grizzlies remain in the lower 48 states—the remnants of more than 1.5 million. Because the bears live on valuable timberland and near grazing land and deposits of gas, oil, coal and other minerals (lands which could be used commercially, thus eliminating the bear's habitat), the Department of Interior is determining now those areas which must be left undisturbed.

That Department has announced it will list the critical survival areas in the *Federal Register* in August, and will hold public hearings in the Fall. This action, many observers state, will test the strength of the Endangered Species Act of 1973.

Bee traps for picnic pests

Hungry bees are about as much fun at a picnic as food poisoning or a hailstorm. Midsummer brings all of these outdoor diversions, but especially the bees—starving, due to the declining numbers of flowers in July and August.

Instead of swatting them as they hover over your soft drink, says a California pest control supervisor, trap them several feet away. Arthur J. Slater of the University of California at Berkeley extension service recommends homemade beetraps, an "effective, safe, easy-to-use and ecologically sound" way to rid your picnic of unsightly bees.

The aspiring bee-trapper must first be a mustard aficionado, or at least be friends with a public school cafeteria worker: the traps are built with clean, gallon-size mustard jars made of yellow plastic. (Perhaps other large containers such as inexpensive yellow plastic buckets might work, too, for those without a passion for mustard.) The color, Slater says, attracts the bees away from picnic tables.

Sweet liquid in the bottom of the traps will lure the bees inside to a watery death by drowning. Translucent orange or orange-pineapple flavored mixes work well; opaque cola solutions don't. Pesticides are unnecessary, Slater says, and are dangerous to children and dogs. The traps themselves, in fact, should be located away from inquisitive youngsters and pets.

Such homemade traps can be used in recreational areas for several weeks by replacing evaporated water and removing dead bees periodically, and by changing the sweet liquid only when it sours. Additional traps for yellow jackets and other wasps can be made, Slater says, by fitting gallon tin cans with funnels. The traps are placed in the sun and baited with meat, fish or pet food. Wasps will enter and be killed by heat.