am virtually certain that it is not an extinct reptile" on the basis of a newspaper report and photographs sent to him by a Japanese biologist. "It is probably a small whale. It was so rotten that most of the flesh was sloughed off." Richard Rosenblatt, head of the Scripps fish collection agrees, "Rotting whales have been identified as all sorts of things." Hubbs is very skeptical that any unknown ancient reptiles lurk in the sea, because they would need to surface frequently for air. "But if I'm wrong, I'd like to know," he insists. It would add an intriguing section to his lecture on "Monsters of the deep: What are and what ain't." □

Nuclear laser power up 100-fold

Physicists at NASA's Langley Research Center have successfully tested a 10-watt argon laser pumped by nuclear energy—a power increase of 100-fold compared with previous experiments. The achievement marks an important step in development of a "self-critical" laser, a nuclear reactor that emits much of its energy directly as coherent light.

Today's nuclear power reactors are still trapped in the "steam age," for their energy is first used inefficiently to heat water before being converted again into electricity. Theoretically, nuclear energy could be converted directly into light, but early experiments had to rely on the cumbersome process of irradiating a uranium foil around the laser with neutrons (SN: 10/12/74, p. 229).

Then came "volume pumping," a process in which neutrons from a reactor induced fission in helium-3 nuclei mixed with the lasing gas (SN: 5/15/76, p. 309). The latest achievement has resulted by optimizing the volume-pumping process—selecting the right gas concentrations, increasing the pressure and so forth.

This accomplishment now opens the way for what may be the climactic experiment—volume pumping with uranium hexafluoride (UF_6) present. For self-critical lasers to be developed, a lasing medium must be found that is compatible with UF_6, which will eventually be used as the fuel, thereby creating an internally powered reactor-laser. So far, however, the presence of UF_6 has stubbornly quenched the lasing process.

Karlheinz Thom, director of the program, says successful completion of the next stage of experimentation could lay the groundwork for providing "proof of principle" of the self-critical laser concept within two or three years. Once a simulated reactor, still externally powered, can be caused to lase, NASA scientists should feel confident enough of their design to request funding for a prototype reactor-laser. Parallel work on the "plasma core" design is proceeding at Los Alamos. □

Exotic forest saved by foreign sting

Parasitic wasps have rescued a Colombian pine forest from destruction by leaf-eating moth larvae. The researchers who bred, released and observed the parasites hope that this example will spur efforts to control pests without use of dangerous chemicals.

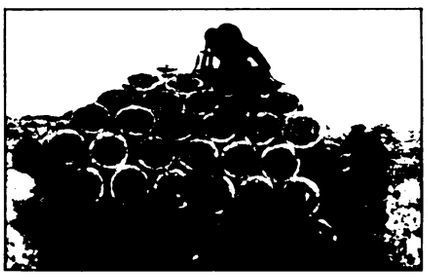
The pine forest in Colombia is one of many extensive plantations of exotic tree species being established in that country to produce pulp and paper. With the new trees comes an opportunity for insects that were previously unimportant to cause serious problems. For example the defoliating moth larvae (*Oxydia trychiata*) has already eliminated plantations of cypress.

Formerly foresters believed that only parasites, predators or diseases that naturally keep an insect in check are likely to control it in a new environment. But Arnie T. Drooz, Gerry F. Fedde and Vicki H. Fedde of the U.S. Forest Service Southeastern Forest Experiment Station and Alex E. Bustillo of the Instituto Colombiano Agropecuario decided to try an unorthodox procedure. They collected small wasps (*Telenomus alsophilae*) from North American fall cankerworms, which defoliate broadleaved trees such as oaks, maples, hickories and elms. The most aggressive parasites were collected from a field in Virginia. In the laboratory the wasps were successfully raised on eggs of a surrogate host.

About 18,000 wasps were released in a plantation seriously infected with moth larvae in the winter of 1975. The wasps parasitize by inserting their own eggs into moth eggs. The adults walk across a clump of moth eggs laying wasp eggs in one moth egg after the other. By December over half the moth egg clumps were thoroughly parasitized. At the normal emergence time in April, few moths could be located. "The absence of larvae anywhere in the area in May confirmed the outbreak had been controlled," the researchers say in the July 22 SCIENCE.

The advantage of these parasites, Drooz points out, is that they are long-lived. They can attack moth eggs for six to eight months, while producing succeeding generations of offspring. He hopes that once they have diminished their supply of moth eggs they will spread out and maintain themselves on related insects.

Drooz has no worry that the parasitic wasps will get out of control. "We'd love for them to get out of hand," he jokes. "They attack essentially within two orders, both of which are harmful groups of insects to agriculture and to forestry. There's only one beneficial Geometridae I know of and that was just discovered in Hawaii and it catches fruit flies." The researchers conclude, "Our experience with *T. alsophilae* shows that use of egg parasites offers many control possibilities and requires only imagination, cooperation and support. □



Arnie T. Drooz

Laying an egg in an egg: Wasp parasitizes eggs of the fall cankerworm.

Five new 'far-out' quasars found

Discoveries of five more have increased to ten the number of known quasars that inhabit the farthest reaches of our universe. Among these, a newly discovered quasar Q0420-388 is the brightest and most luminous. According to conventional wisdom, their large redshifts—all greater than 3—are an index of their tremendous distances from us.

Cosmologists are particularly interested in high-redshift (remote) objects because they offer a coveted look into the past, when the universe was still an infant. Light just now reaching earth from Q1442+101 (the most distant) first escaped from the quasar's surface about 10 billion years ago.

In addition to discovering four of the new quasars, Patrick S. Osmer of the Cerro Tololo Inter-American Observatory in Chile and Malcolm G. Smith of the Anglo-Australian Observatory also reported on two somewhat closer ($z=2.28$ and $z=2.16$) but peculiar ones. The farther one is unusual because it apparently has dimmed substantially (from magnitude 18.5 down to 20.4) since it was discovered in 1974. The other of the pair seems not to be producing the dominant quantity of Lyman-alpha radiation typical of quasars. Lyman-alpha is a spectral line (particular wavelength of radiation) characteristic of hydrogen,

Most-Distant Quasars

NAME	REDSHIFT	DISTANCE (billion light years)
Q1442+101	3.530	10.63
Q0642+449	3.402	10.58
Q0347-383*	3.23	10.5
Q1402+044*	3.20	10.5
Q0938+119	3.190	10.48
Q2204-408*	3.18	10.47
Q0420-388*	3.12	10.44
Q0324-407	3.056	10.41
Q0130-403	3.015	10.39
Q0351-390*	3.01	10.38

(*) indicates newly discovered quasar
(These calculations were made for SCIENCE NEWS assuming the current value of Hubble's constant, $H_0=55$ km/sec/Mpc, and a popular hypothetical model of the universe named after Einstein and DeSitter. Distances are those traversed by a quasar's light.)

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presumably present in most quasars.

The popular association between redshift and distance derives from an apparent, direct linear correlation, first noted by the American astronomer Edwin P. Hubble in 1929, between the distances of certain celestial objects and the speeds at which they are receding from us (and every other point in the universe for that matter). Using telescopes—in this case optical ones—astronomers can infer a body's recession speed by measuring the amount by which its radiation is shifted toward the red end of the spectrum; the amount is assigned an index value, z.

The two authors, reporting in the July 15 ASTROPHYSICAL JOURNAL, note that the six quasars were selected from a larger assortment recently observed using Cerro Tololo's 1.5- and 4-meter telescopes, outfitted with a special prism spectrometer. The astronomers' goal is to infer the prevalence of high-redshift quasars in the sky from those seen.

The fifth high-redshift quasar (Q1402+044) was identified by David L. Jauncey of the Commonwealth Scientific and Industrial Research Organization in Australia and Phillip Hicks and James J. Condon of Virginia Polytechnic Institute and State University. Their discovery will be announced in a forthcoming issue of ASTRONOMICAL JOURNAL.

Although many quasars of all redshifts surely remain undiscovered, there were 637 in the latest published list of February 1977 (AP. J. SUPPLEMENT, 33:113). □

Language in deaf children: An instinct

The acquisition of language has always been one of the more intriguing aspects of childhood development. "The child of English-speaking parents learns English and not Hopi, while the child of Hopi-speaking learns Hopi, not English," note Susan Goldin-Meadow of the University of Chicago and Heidi Feldman of the University of California at San Diego School of Medicine.

"But what if a child is exposed to no conventional language at all?" the researchers ask in the July 22 SCIENCE. "Surely such a child, lacking a specific model to imitate, could not learn the conventional language of his culture," they say. "But might he elaborate a structured, albeit idiosyncratic, language nevertheless? Must a child experience language in order to learn language?"

In attempting to answer that question, Goldin-Meadow and Feldman videotaped six deaf children in their homes for one to two hour sessions at six- to eight-week intervals. The 17- to 49-month-old children—four boys and two girls of "normal intelligence"—had not been exposed to manual sign language because their parents wanted to expose them to oral education. Yet none at that point had acquired significant knowledge from their oral-education program.

The youngsters were observed and taped during informal interactions with a researcher, their mother and a standard set of toys. The researchers found that the deaf children "developed a structured communication system that incorporates properties found in all child languages. They developed a lexicon of signs to refer to objects, people and actions, and they combined signs into phrases that express semantic relations in an ordered way."

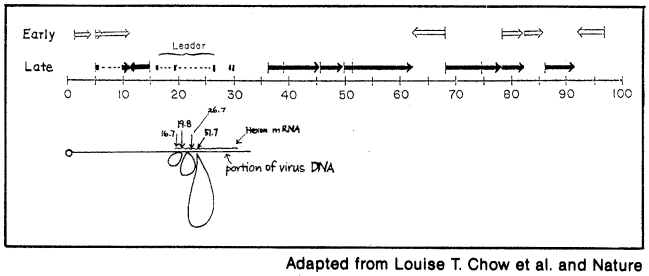
Perhaps most importantly, the experimenters found, through a complex coding system, that it was indeed the children, and not their parents, who actually devised the communication system. Though the mothers did use "some gestures" in their interaction with the youngsters, "a comparison of the mothers' and the children's signs suggests that indeed it was the children who first produced the system," report Goldin-Meadow and Feldman. Only 25 percent of the signs produced were common between mother and children, and there was "no evidence" that the children were imitating their mothers, say the researchers.

The deaf youngsters' systems were composed of:

- Lexicon. Two types of signs were developed to refer to objects and actions. For example, they would point to signify words such as "this" or "there." Or, a closed fist bobbed in and out near the mouth referred to a banana or the act of eating a banana; hands flapped at shoulder height referred to a bird.
- Syntax and Semantics. The children linked their lexicon into multisign phrases that conveyed relations between objects and actions. For instance, one child pointed at a jar and then produced a twisting motion in the air. Another child opened his hand with his palm facing upward and then followed this with a "give" sign with a point toward his chest.

"We have shown that the child can develop a structured communication system in a manual mode without the benefit of an explicit, conventional language model," the researchers conclude. They compare the findings with the "meager linguistic achievements of chimpanzees," where chimps have been shown to develop languagelike communication, but only with training. "Even under difficult circumstances, however, the human child reveals a natural inclination to develop a structured communication system," say Feldman and Goldin-Meadow. □

Animal genes do it differently



DNA loops reveal spliced nature of messenger RNA for an animal virus protein, hexon.

Adapted from Louise T. Chow et al. and Nature

Geneticists were recently amazed, fascinated and bewildered by results relating to how information in DNA is conveyed to the protein factories of the cell. Years of experiments on bacteria and their viruses had produced a clear model: The information carrier, messenger RNA, is copied from a continuous stretch of DNA. The copy begins with a start signal, continues through one or more related genes, and ends at a stop signal. Now it appears that animal genes may issue their directives in a substantially different way.

During a week-long meeting at the Cold Spring Harbor Laboratory in New York early last month, several different laboratories presented independent evidence that messenger RNA of a virus infecting human cells must be synthesized by a novel mechanism. (Investigators expect the genes of a simple animal virus to operate similarly to those of animal genes, since both kinds of DNA can direct protein synthesis in the same type of cells.)

The unexpected result of studies using a variety of techniques is that the messenger RNA copied from at least five different adenovirus-2 genes all begin with the same "leader" stretch of about 150 nucleotides. The pattern for that leader is located in three separate pieces on the viral DNA molecule, a distance from any of the genes (shown by the filled arrows to the right of the leader on the diagram).

All the messenger RNA molecules with the apparently identical leader sequences represent what biologists call late proteins. These proteins are synthesized only during the later phases of cell infection, at the time when DNA is also being made to pack into the new viruses. The leader sequence may play a role in regulating the expression of late protein genes, the researchers propose.

Evidence for the spliced messenger RNA includes direct analysis of the molecules. All the major species of late messenger RNAs appear to begin with an identical (or very similar) 11-nucleotide