

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<sub>6</sub>) present. For self-critical lasers to be developed, a lasing medium must be found that is compatible with UF<sub>6</sub>, which will eventually be used as the fuel, thereby creating an internally powered reactor-laser. So far, however, the presence of UF<sub>6</sub> 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.

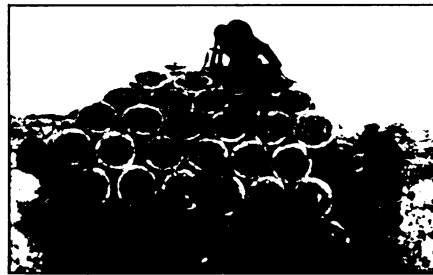
The pine forest in Colombia is one of many extensive plantations of exotic tree species being established in that country to produce pulp and paper. With the new trees comes an opportunity for insects that were previously unimportant to cause serious problems. For example the defoliating moth larvae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