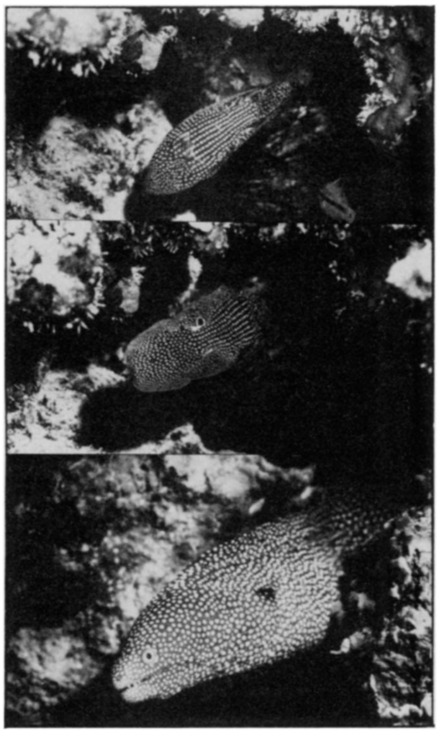
segment. These are the results of Richard E. Gelinas and Richard J. Roberts at Cold Spring Harbor. The other techniques involve binding of messenger RNAs to partially separated strands of the DNA sequences that produced them. For example, when the messenger RNA for a late protein lines up with its DNA template, unmatched DNA regions loop out, as shown in the diagram (which describes a result of Phillip A. Sharp and co-workers at the Massachusetts Institute of Technology). Several groups of researchers at Cold Spring Harbor including Louise T. Chow and Daniel Klessig also observed late messenger RNAs binding to the three leader segments as well as to individual genes.

The composite messenger RNA molecules, each with a three-segmented leader and copy of one gene, might be produced by several mechanisms. Four possible means were discussed at the symposium, Joe Sambrook, a Cold Spring Harbor researcher, reports in the July 14 NATURE. The enzyme that links together the nucleotides of new messenger RNA might jump from one section of DNA to another, or the DNA itself might rearrange to correctly position segments for a particular message. It is also possible that each DNA segment is independently copied and the resulting RNA pieces are joined. Finally a long messenger RNA containing all the leader and gene segments may be made, but later trimmed to produce any of the messenger RNA molecules that have been identified outside the cell nucleus.

Sharp and most others strongly favor the last explanation, which is consistent with the work of James E. Darnell at Rockefeller University. In the nucleus of infected cells during the late stages of infection, Darnell and co-workers observed lengthy RNA molecules that are more than 20,000 nucleotides long. (The entire adenovirus DNA molecule is only 35,000 nucleotides long.)

The important question now is whether this phenomenon of mosaic messenger RNAs is widespread. Darnell reported at the symposium that the adenovirus messenger RNAs produced continuously during an infection (somewhat illogically called early messenger RNA), seem to be controlled in the bacterial gene fashion. The start signal for copying lies at the beginning of each group of genes. However, Heiner Westphal of NIH presented evidence that messenger RNA for one of the early proteins is also spliced and might be derived from a larger precursor that loses sequences during processing. Yosef Aloni and George Khoury, working at NIH, report some messenger RNA from another animal virus, SV40, is composed of a leader sequence joined to a copy of a nonadjacent gene. "Perhaps it is not too optimistic to hope that what has been so clearly shown for adenovirus 2 may also help to explain how host cells regulate their own genes," Sambrook says. □

How to mimic an eel: Look mean



Dave Powell, Steinhart Aquarium

In one of the few instances of defensive, intimidating mimicry documented among fish, the Indo-Pacific plesiopid fish, *Calloplesiops altivelis*, adopts a posture and appearance that mimics the head of a noxious moray eel. In field photographs taken at Grande Comore Island, Indian Ocean, the fish (top) swims in its normal posture. When threatened (center), *Calloplesiops* transforms its entire 15-centimeter body into a copy of the 15-centimeter-long head of the moray eel (bottom). Unlike the strategy of other reef fish prey species, which hide when threatened, the *Calloplesiop*'s mimicry is designed to convey intimidation, John E. McCosker of the California Academy of Sciences' Steinhart Aquarium reports in the July 22 SCIENCE. "Rather than flee into the refuge of the reef when it encounters a predator, *Calloplesiops* simulates the abundant and aggressive moray, frightening away a predator and thereby reducing the time spent ... in less productive activities," McCosker says. *Calloplesiops*, an uncommon species, is known from the Phillipines eastward to Mozambique in coral-reefs. □

Microsurgery for pituitary tumors

Tumors of the pituitary gland, the master hormone gland of the brain, represent 10 percent of all brain tumors. Although such tumors may be only one-eighth of an inch in diameter, their interference with hormone production can drastically upset the body. For instance, a pituitary tumor can lead to Cushing's disease, in which a patient experiences growth failure and general obesity due to overproduction of the hormone ACTH (adrenocorticotropic hormone). A tumor can trigger vision defects or loss by pressing against the optic nerve that runs across the top of the gland. Or it can provoke a loss in sex drive or in the menstrual cycle or lead to an abnormal production of breast milk.

Until recently, treatment for pituitary tumors—radiation or hormone therapy with occasional surgery—was only variably successful. Also, surgery on the pituitary was a hazardous operation, because access was usually through the forehead, lifting aside the frontal lobes of the brain. Now a far more successful and safe technique is looming large—microsurgery.

Charles Wilson, chairman of neurosurgery at the University of California at San Francisco, has performed microsurgery on more than 300 pituitary tumor patients during the past five years. All operations have been successful, and details of the results are in press with NEUROSURGERY. Wilson's experiences with 16 Cushing's disease patients were also described at the annual meeting of the Endocrine Society in Chicago.

The microsurgical technique is a delicate surgical procedure conducted under an operating microscope with high magnification and strong illumination. The neurosurgeon makes an incision in the patient's gum, beneath the upper lip. He sweeps the facial tissues up, removes some of the cartilage at the base of the nose and enters the sphenoid sinuses, behind the nose. (There are also sinuses above and beside the nose.) The surgeon then proceeds to cut a tiny hole through the bony wall at the back of the sphenoid cavity. The wall is thin at this point; the pituitary lies on the other side of the wall, inside the brain. The surgeon proceeds to make small incisions in the gland and to remove all visible tumor. Any remaining tumor cells are cauterized (seared) with alcohol, a method that has proven valuable in preventing regrowth.

The entire procedure can be completed in about two hours. Patients are up and about in a day or two and are back to normal activities within several months. The only mark left from surgery is a thin scar across the gum above the front teeth.

The idea of gaining access to the pituitary gland through the sphenoid sinuses is not new, going back to the early 1900s. But the concept has not become practical until the advent of microsurgery under high-magnification microscopes with strong lighting. □