medical sciences

Muscles of the trumpeter

Little is known about the muscles of the face. John V. Basmajian and Elmer R. White of Emory University decided to use electromyography—electrode probing of muscle activity—to find out what it takes to blow a trumpet with a great degree of proficiency.

They recorded muscle activity in 18 trumpeters with experience ranging from concert artists to students. They found that advanced trumpeters use more muscles surrounding the lips than muscles in the lip itself. This discovery negates the general belief that the lip muscles must be pitted against other facial muscles. Advanced trumpeters showed a smaller ratio of upper-lip to lower-lip activity than beginners. "This finding," the authors conclude in the Jan. 5 NATURE, "suggests that beginners should either concentrate more activity in the lower lip or less activity in the upper lip, or both. . . ."

'Doctor' computer and health care

The main uses of computers in patient care have been in record keeping, scheduling admissions and taking medical histories. Two groups of clinicians report in the Jan. 15 JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION that they have developed computer programs with diagnostic and treatment value.

Researchers at Massachusetts General Hospital and at the University of California School of Medicine, headed by Stuart J. Menn, have devised a program that gives physicians guidelines in caring for patients suffering from acute respiratory failure. The program operates on a typewriter-like terminal connected through telephone lines to a remote computer. Information about the patient, his respiratory functions and gases in his blood vessels is entered by the physician. The computer calculates the variables and prints out a current respiratory profile of the patient.

Martin Goldberg and his team at the University of Pennsylvania School of Medicine have devised a program in which the computer looks at the acidity and alkalinity of a patient's blood and at other information about the patient, then prints out probable and possible diagnoses.

Another virus in human cancer tissue

In the 1960's a DNA (herpes-type) virus was cultured from blood cells of patients with Burkitt's lymphoma. In 1971 an RNA (C-type) virus was taken from a child with Burkitt's; a herpes-type virus was taken from patients with Hodgkin's disease. Several months ago a herpes-type virus was found in a human cervical tumor; RNA virus material was taken from human leukemia cells. In the Jan. 26 SCIENCE, Arthur Y. Elliott and his co-workers at the University of Minnesota Health Services Center report still another RNA virus in three tumors of the human renal pelvis. The blood of patients with the tumors contained antibodies against the virus. The virus has not yet been identified.

Although this latest finding is added fuel for the theory that viruses cause or trigger human cancers, many questions remain. Can DNA viruses and RNA viruses both transmit human cancers? RNA viruses are the leading candidates because there is evidence for how they might transmit cancer at the subcellular level (SN: 12/2/72, p. 357).

earth sciences

Uncapping the earth

A favorite pastime of climatologists is speculating what might happen to earth's climate if polar ice caps were removed. With the advent of computer models of the atmosphere it is possible to make some good guesses, and R. L. Newson of the British Meteorological Office in Bracknell decided to find out what would happen if the region of the Arctic that is usually covered by ice in the winter were replaced by open ocean at a constant freezing temperature.

As expected, he relates in the Jan. 5 NATURE, the model predicted that the air over the Arctic would warm up. But over the continents at the middle latitudes, it predicted considerable cooling, with mean temperature decreases of as much as eight degrees C. This lessening of the temperature differences between polar and mid-latitude regions would cause a southward displacement and weakening of prevailing westerly winds.

'Eddy-fying the weather

A little over two years ago, the U.S. Navy observed and tracked a giant cold-water eddy that swirled southward along the Atlantic coast. Since then other such eddies have been detected and now a National Oceanic and Atmospheric Administration oceanographer has determined that the eddies affect the weather.

The giant eddies, up to 100 miles in diameter, are only a few degrees cooler than the surrounding waters of the gulf stream. But this difference is sufficient, says Alan E. Strong, to dissipate low-lying clouds. "Just as warm water can generate clouds, the reverse is also true." Strong had suggested last August that the eddies might influence weather, but it wasn't until a NOAA satellite launched Oct. 15 provided high-resolution infrared images that cloud-dissipation effect could be observed.

From satellite and ship observations, oceanographers have found that the cold-water eddies move slowly down the coast at a rate of one to two miles a day. They form when a part of the gulf stream breaks off to encircle colder water to the north. Strong suggests that the eddies may be carried south by a very deep current below the surface. They appear to be absorbed by the gulf stream by the time they reach Cape Kennedy. So far only five such eddies have been detected, but Strong believes "It's possible, indeed likely, that these cold-water eddies have always been present. . . ."

A 'sloshing' inner core?

It is generally believed that the earth's magnetic field is generated by the flow of molten metal in the outer core. The question is, what sets the fluid in motion? I. J. Won and John T. Kuo of Columbia University believe energy from earthquakes sets the solid inner core to oscillating and this gets the metal moving.

The two calculated how much energy from an earthquake of Richter magnitude 8.5 might reach the inner core. They found that such an earthquake could set off an inner core oscillation with an amplitude of about 60 centimeters. The trouble is, present instruments cannot detect such a small motion, so it is hard to test the theory. But the Columbia scientists point out that experiments elsewhere indicate that a sphere (such as the inner core) oscillating in a viscous fluid (such as the outer core) does act as a good pump of the fluid.