Heavy allegations on 'Watt's Wrongs'

The latest strategic salvo in the environmentalists' campaign to force the ouster of Secretary of Interior James Watt is a two-inch-thick compendium cataloging the Secretary's alleged misdeeds. Developed and circulated by the Wilderness Society last week, *The Watt Book* includes a list of "Watt's Wrongs." These are 43 actions or proposed actions that the society claims illustrate how "Watt has begun a campaign to systematically dismantle two decades of environmental progress in the United States" with measures "that run counter to federal law or clearly established public sentiment."

The 45,000-member Wilderness Society is a national conservation group whose primary focus for the past 46 years has been the preservation and management of all federal lands. In a statement accompanying the looseleaf-bound tome the Society's executive director William Turnage says: "It is both incredible and tragic that a Cabinet official can go so astray so quickly that he prompts production of a four-pound book on his actions this early in his tenure." But Watt "will, as he has said, use the budget to achieve his ends and he will modify, weaken or eliminate rules he doesn't like. Furthermore, when he cannot override a law, he will frustrate the objectives of that law by undercutting the enforcement power of agencies he controls."

Similar charges were leveled a week earlier by the National Wildlife Federation as justification for its entry into the war against Watt (SN: 7/25/81, p. 55).

The Watt Book tries to document those assertions with facts—often drawing from Interior Department data, texts and regulations or from Watt's own speeches to make its point. It also contrasts the Wilderness Society's attitude toward federal-land stewardship with Watt's stated positions on the subject. Reprinted news stories, editorials and features have been selected to highlight apparent conflicts between Watt's actions and congressionally mandated responsibilities. Additionally, the book provides background on Watt and laws that the Interior secretary has been accused of abusing or not enforcing. □

Fetal feat: Operating the womb

Sophisticated diagnostic tools and precise intervention techniques are allowing medical science to treat the most delicate of patients—the fetus. Several months ago a fetus with an inherited vitamin deficiency was diagnosed and treated successfully by a University of California at San Francisco team who prescribed large doses of the vitamin for the pregnant woman (SN: 5/23/81, p. 326). Now Mitchell Golbus, who was involved in that case, and UCSF colleagues Michael Harrison and Roy Filly report successful surgery to correct a life-threatening urethral blockage in a fetus. A description of the operation is in press with the AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY.

When Filly, a radiologist and prenatal diagnostician, performed a routine ultrasound examination of a woman pregnant with twins, he found that the male fetus had a blocked urethra. Of four infants Filly and colleagues had previously seen with the condition, three had died shortly after birth. The blockage can lead to a potentially fatal backup of urine into the bladder and kidneys.

With the permission of the parents, the physicians operated to temporarily correct the urethral blockage. Using ultrasound equipment to monitor the movement of the fetus, they inserted a catheter through the woman's abdomen into the bladder of the fetus. The first attempt failed because the catheter did not stay in place, but two weeks later a differently shaped catheter did hold. It stayed in place, drawing urine, until the twins were born on May 10. The doctors plan to correct the blockage permanently before the child is one year old and predict that there will be no long-term adverse effects.

Although the UCSF researchers are calling the procedure a first, similar operations have been performed before. For several years Rh incompatibility disease has been treated by transfusing small amounts of red blood cells into the abdominal cavities of fetuses carried by unvaccinated women. And, more recently, excess fluid has been drained from the chest and abdomen of a fetus by John C. Hobbins of Yale University and from fetal brains by doctors at Boston's Peter Bent Brigham Hospital and at the University of Colorado. □

Stiff joints clue to diabetic problems

A way to predict which patients with juvenile diabetes are most at risk of developing blood vessel damage with resulting blindness or kidney failure has been found by Janet H. Silverstein and colleagues at the University of Florida College of Medicine in Gainesville. As they report in the July 24 NEW ENGLAND JOURNAL OF MEDICINE, the indicator is stiff joints.

Silverstein and her co-workers studied 309 juvenile diabetics aged one to 28 years old and found that 92 of them (30 percent) had stiff finger joints. The investigators also calculated that if juvenile diabetics have stiff joints they face an 83 percent risk of damage to their blood vessels after 16 years of having diabetes, whereas if they do not have stiff joints the risk of such blood vessel damage is only 25 percent. And when juvenile diabetics suffer blood vessel damage, it often results in blindness or kidney damage.

Why do stiff joints in juvenile diabetics tend to predict later blood vessel damage? Silverstein and her team do not know. But they suspect that the blood vessel damage per se might be due to too little insulin because insulin insufficiency is a major characteristic of juvenile diabetes. In that event, they say, juvenile diabetics with stiff finger joints might possibly avoid later blood vessel damage if they receive increased insulin therapy. □

Peruvian quake prediction modified

Reports that Brian Brady, the U. S. geophysicist who predicted three major earthquakes off the coast of Peru this summer, has formally retracted those predictions stretch the intent of of his statement, the scientist told SCIENCE NEWS. "All I am saying is that without the occurrence of the first one, the probability of the larger ones occurring is very small," he said.

Brady, of the U. S. Bureau of Mines in Golden, Colo., gained notoriety last October when he predicted the tremors from evidence analyzed according to his complex "inclusion collapse theory." The first quake, measuring from 7.5 to 8.0 on the Kanamori scale, would have occurred around June 28, according to the prediction, and would have been followed by two larger quakes in August and September. The National Earthquake Prediction Evaluation Council discounted evidence for the forecast as "speculative and vague" (SN: 2/14/81, p. 100), but Peruvian officials took the prediction of the U. S. scientist quite seriously, alerting hospital personnel at the end of June to be prepared for a possible emergency (SN: 7/4/81, p. 5).

While Brady still stands by the tenets of his theory, he says he regrets any panic that publicity of predictions may have triggered in Peruvians.

"It's too bad this thing was hyped up so much in the public media," he said. Brady maintains that he introduced the theory and predictions to Peruvian colleagues in hopes that they would initiate a more detailed local seismic and geophysical network in the seismically active area. Any warning of the public if and when necessary, he said, could then have been considered and issued by Peruvian scientists and officials on the basis of the data an expanded network would provide.

Seismologists familiar with the history of earthquake activity in Peru agree with Brady that such a network is needed, says Jerry Eaton of the U. S. Geological Survey in Menlo Park, Calif., but they disagree with Brady's methods of gaining support for such a program.

"Science is so open that you can't de-

velop a theory and keep it within the scientific circles," said Eaton, who spent two weeks last summer with members of the Institute of Geophysics in Peru, helping put Brady's prediction in perspective in light of other U.S. seismologists' views.

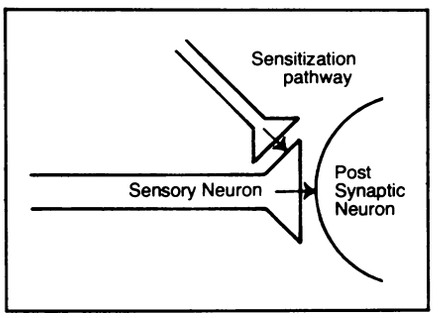
Despite his feeling that Brady was premature in publicizing a theory still unsubstantiated in the eyes of most seismologists, Eaton says that in the long run, the attention focused on the need for a better seismic program in Peru may be beneficial. While scientists have a responsibility to disclose all facts and theories regarding earthquake prediction as soon as they can be evaluated, Eaton asserts, private citizens worried about earthquakes must understand the tentativeness of such information. Just as weather forecasts can predict only the probability of storms and sunshine, even the best quake prediction program will only be accurate part of the time. □

Basics of learning: Enzymes and pores

Simple marine snails may not play the piano, write poetry or do calculus, but they do learn behaviors appropriate to their life-styles. Because their nervous systems have only a few thousand cells, which are large and identifiable (SN: 9/29/79, p. 218), these snails are accessible subjects for the scientists who dissect behavior. At the recent meeting called "Physiology: The Next Decade" at Cornell University, Eric R. Kandel described in minute detail the basic biochemistry of a simple form of sea snail learning.

The behavior Kandel studies at Columbia University in New York is a defensive reflex. When disturbed by a light touch to its siphon, the marine snail *Aplysia* withdraws its gill and siphon. With repeated touches and no dire consequences, the animal habituates and stops withdrawing its mantle organs. In contrast, a strong stimulation elsewhere on the body enhances the defensive reflex for up to an hour. It is this sensitization that Kandel now describes in great biochemical detail.

Kandel and colleagues have worked out the exact nerve cell connections involved in much of *Aplysia*'s behavioral repertoire. The gill withdrawal reflex, with the sensitization pathways, involves about 36 cells.



Twenty-four sensory neurons carry a signal from the skin at the siphon and synapse, or make contact, both on the six motor neurons that make the gill contract and on an intermediary neuron. This interneuron also synapses on the motor neurons that withdraw the gill.

The sensitization pathway studied by Kandel runs from the tail surface to the sensory neurons that respond to light touch on the siphon. A group of five interconnected cells contact the sensory neurons at their endings and modify the signals the neurons send. In the presence of a sensitization message, the sensory nerve cells release more of their transmitter chemical and thus send a stronger message to the next cells in the gill withdrawal pathway.

The message from the sensitizing cells to the sensory cells is conveyed by the transmitter chemical called serotonin. Kandel reports that serotonin binds to a receptor on the sensory cell synaptic membrane and blocks a previously unrecognized channel for potassium ions. When that channel is blocked, the signals that travel along the sensory cells have a longer influence on the synapse, so the sensory cell releases more neurotransmitter.

The biochemical steps between serotonin binding and potassium channel blockage are being worked out. As in the case of other receptors, the binding appears to activate the enzyme that makes cyclic AMP (often called the "second messenger"). The increase in cyclic AMP activates yet another enzyme. This one, a kinase, adds a phosphate group to a protein, either the potassium channel itself or a molecule that regulates it.

Which step of the biochemical path allows sensitization to last an hour? Experiments using an enzyme inhibitor indicate that the kinase must be active throughout the period, so cyclic AMP levels probably remain elevated the entire time. Kandel expects a new technique that allows scientists to maintain single sensory neurons of *Aplysia* in laboratory culture to allow a more complete answer to this question.

Sensitization may seem far removed from learning, but Kandel believes it has features in common with the behavior called direct conditioning (or associative learning). *Aplysia* can be conditioned to withdraw their gills in association with a tail shock, a stimulus similar to the one that causes sensitization. Experiments with fruit flies also link the phenomena. The mutant fly named dunce, which lacks an enzyme of cyclic AMP metabolism (SN: 11/18/78, p. 344), cannot become sensitized nor can it show associative learning.

The mechanism described by Kandel is expected to whet the appetites of biochemists rather than to definitively explain learning phenomena. Kandel cautions, "Learning is a wide family of events. We have to expect a variety of mechanisms." □

Upright walking: Teeth tell the tale

It's not easy to describe someone's lifestyle when all you have to go on are a few teeth, but that's what anthropologists have to do in their attempts to understand ramapithecines, the apelike creatures that lived between 14 million and 7 million years ago and are believed to have been on the direct line of human evolution. With a few skulls, jawbones and teeth as evidence, some researchers have concluded that ramapithecines were ground-dwelling, possibly bipedal hunters or scavengers. Richard F. Kay of the Duke University Medical Center in Durham, N.C., challenges this theory in the just-released AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY (55: 1981). Based on an analysis of modern primate molars and fossilized ramapithecine molars, he concludes that *Ramapithecus* was a gentle, tree-dwelling animal and suggests that our ancestors may not have come down from the trees until about six million years ago — seven million years later than some researchers have assumed.

One line of reasoning that places *Ramapithecus* on the ground proceeds from what is known about *Australopithecus*, the bipedal hominid that roamed Africa six million years ago. Both ramapithecines and australopithecines had thickly enameled molars. Projecting backward in time from what is known of the ground-dwelling australopithecines to the ramapithecines, some anthropologists concluded that the ramapithecines also were terrestrial. This is not necessarily so, says Kay. His analysis of enamel thickness in extant species suggests that "enamel thickness per se has nothing whatever to do with terrestriallity." *Gorilla gorilla,* for example, is the most terrestrial of all extant apes yet has the thinnest enamel of all apes.

The shape of the molar offers another line of evidence. Ramapithecine molars are distinguished by low crown-relief and poorly developed shearing surfaces. Kay says there is no evidence that ramapithecines were equipped to chew meat. The molars also show a high degree of polish. "This type of wear," he explains, "is seen in living animals with tree-dwelling habits. Ground dwellers have many pits and gouges in their teeth from grit in their diet." He concludes that ramapithecines were well suited for crushing nuts and eating hard fruits — foods that practically never occur in tree-sparse open country.

Kay's arguments do not prove that ramapithecines were necessarily tree dwellers, but if his suggestion that they stayed in the trees until six million years ago is correct it cuts in half the time commonly believed to have been involved in the development of upright walking by hominids. □