NSF

Dr. McElroy: I have enjoyed it.

likewise expressed regret at McElroy's departure.

Davis commended Dr. McElroy "for the legacy which he leaves to his successors," and Dr. McElroy himself says he thinks NSF is on a good course. But the subcommittee and its parent Science and Astronautics Committee have been troubled by NSF's expressed desire to play a larger role in supporting problem-oriented research, and a broad committee inquiry into the policy issues is intended during the coming year.

Both House and Senate groups have recommended only a portion of the increase in funds NSF sought for its Research Applied to National Needs (RANN) program, while restoring most of the cuts NSF proposed in institutional support for science and science education support. But despite the internal budgetary shifts, the agency is assured of a substantial total increase in funds for fiscal 1972. The House on June 30 approved an NSF appropriation of $585 million, $71 million more than the agency received last year. This week the Senate, as a result of an amendment offered by Sen. Edward M. Kennedy (D-Mass.) and two others, voted an appropriation of $648 million, $25 million more than NSF requested. House-Senate conferees were to meet later in the week or early next week. □

DRUG DETOXIFICATION

Isolation of liver enzyme

A liver enzyme essential not just for steroid and lipid metabolism but also for the detoxification of a wide spectrum of foreign compounds—marijuana, alcohol, pesticides and sundry drugs—has drawn increasing attention from biochemists in the past few years. The enzyme is called Cytochrome P-450. Cytochromes, like hemoglobins, are red-pigment proteins that participate in cell oxidation reactions. The "P" stands for "pigment," and the "450" for the wavelength (in nanometers) most strongly absorbed by a combination of the enzyme and carbon monoxide.

It had been known for some time that a liver pigment reacts with carbon monoxide, and some Japanese scientists first identified it by spectral methods in 1962 and named it Cytochrome P-450, but no one had managed to isolate a biologically active enzyme. Nearly all other known liver cell enzymes (some hundred) are located in the liver cell cytoplasm and are soluble and so are easily isolated. But Cytochrome P-450 is tightly bound to the inner membrane network of the liver cell. Now, a biochemistry team at the University of Michigan Medical Center at Ann Arbor, headed by Dr. Minor Coon, has succeeded in isolating the entrenched red enzyme.

Actually Dr. Coon and his colleagues have managed to extract not only a catalytically active P-450 from the liver cell membrane, but also a phospholipid and a reductase enzyme. Apparently the triumvirate is needed to attack foreign compounds; P-450 cannot go it alone. Dr. Coon's team found this to be the case after applying the isolated compounds separately on foreign material in a tissue sample.

Dr. Coon sees the discovery of the phospholipid's role in the action of Cytochrome P-450 as almost as crucial as the isolation of P-450. For, while it is known that 40 percent of the endoplasmic reticulum is comprised of fatty molecules, no one suspected that these molecules might participate in the liver cell's war against foreign materials.

The Ann Arbor biochemists will next attempt to identify the precise structure of Cytochrome P-450. Such characterization, they believe, could eventually assist physicians in drug therapy. "Drug administration at this time is pretty hit-and-miss," Dr. Coon explains. "A physician can only guess in advance how much of a drug to give. A heavy drinker, for example, will have built up large amounts of P-450 to detoxify the large quantities of alcohol he consumes, and if the doctor doesn't know he's a heavy drinker, the amount of drug given will probably be quickly detoxified and produce less than the desired effect on the patient." But if the Michigan researchers can figure out P-450's structure, they may then be able to devise a method whereby physicians can analyze patients for Cytochrome P-450 activity prior to drug therapy, thereby better estimating an effective drug dosage.

Characterization could also eventually show up inherited P-450 structural differences in the population. □

SIMPLER AT HIGH ENERGY

Proton-proton collisions

About a year and a half ago Dr. Richard P. Feynman presented a new suggestion about the probabilities of forming new particles in certain kinds of collisions at high energy. If true, it would give hope that the general laws governing particle behavior under the influence of the strong nuclear force are simpler than was feared and may be easier to dig out of the mountains of data being accumulated. Dr. Feynman's suggestion has now been confirmed, for protons, by one of the first experiments with the new Intersecting Storage Rings at the CERN laboratory in Geneva.

Basically, his proposal is that for what he calls inclusive experiments the probability of producing new particles becomes independent of energy when the energy gets very high. (At about the same time Dr. C. N. Yang of the State University of New York at Stony Brook made a similar suggestion.)

An inclusive experiment is one in which the experimenters look for one particular resulting particle with specified properties, although the collision also produces a variety of other particles. This is often written schematically as A plus B yields C plus anything else. About 95 percent of all proton-proton experiments, a most important class of interaction, are inclusive.

The interactions studied in the CERN ISR are proton plus proton yields pi meson plus anything else. The experimental set-up measured the rates at which pi mesons with different amounts of forward momentum were produced. From this the cross sections could be calculated. When they were compared graphically with results previously obtained at lower energies, all the points fell on the same curve. This, says a CERN spokesman, is a striking confirmation of Dr. Feynman's prediction. The experimental data are reported by Drs. L. G. Ratner of Argonne National Laboratory, R. J. Ellis and G. Vannini of the University of Bologna and B. A. Babcock, A. D. Krisch and J. B. Roberts of the University of Michigan in the July 5 PHYSICAL REVIEW LETTERS.

Some effects of Dr. Feynman's idea can be observed even at much lower energies. One corollary question is whether the nature of the incoming particle makes a great difference in the results. Do the results of various kinds of particles striking a proton show similar patterns? This was tested at Brookhaven National Laboratory by Drs. M. S. Chen, R. R. Kinsey, T. W. Morris, R. S Panvini, L. L. Wang and T. F. Wong of Brookhaven, S. L. Stone, T. Ferbel, P. Slattery and B. Werner of the University of Rochester and J. W. Elbert and A. R. Erwin of the Univer-