a method to test a drug's absorption in an individual patient right in the doctor's office—if resistance from private practitioners can be overcome.

Among the techniques discussed were gas-liquid chromatography, the separation of particles according to their differing speeds of diffusion; radioactive labeling aiding the tracing of drugs and their metabolites through the body; radioautography, in which a thin slice of radioactive-drug-labeled tissue is placed against film, exposing it in a pattern which reveals the distribution of the drug in the tissue; and fluorescence spectrometry, oscillographic polarography, X-ray diffractometry, nuclear magnetic resonance and mass spectrometry—all sophisticated techniques traditionally in the physicist's, not the physician's arsenal.

Most physicians will maintain hotly that their prescription of a drug for a patient is based on long training and experience; and they are right, in most instances. But on top of the different absorption rates among similar patients, human beings may react very differently to the same blood levels of drug. To cap the confusion, identical doses of a drug given to the same individual at different times may have a different therapeutic effect.

Given the variation in effect of standard drug doses, it would be ideal if instruments could be put in the doctor's office which would directly measure not simply blood levels but the intended effect itself.

According to Dr. George J. Cosmides of the National Institute of General Medical Sciences, a member of the Drug Research Board of the National Academy of Sciences and one of the organizers of the Gaithersburg meeting, the techniques and instruments already exist. What is needed is miniaturization of both the hardware and the price tag.

Dr. Cosmides predicts that such miniaturization is coming and will revolutionize the prescribing of drugs. He adds, though, that such a prediction made at a medical meeting would get him laughed down; doctors who learned to prescribe by the seat of their pants are more comfortable sitting down than paying for newfangled machinery.

His pessimism is backed up by reactions from private physicians. Many admit freely that dosage is not an exact science, but they insist that it need not be. One private practitioner says that the dose for most drugs is not critical; a doctor simply prescribes what he knows to be an amount in excess of that required for the therapeutic benefit he wants.

Another doctor agrees. He says there is little need to achieve a minimum dosage in most cases because few of the often used drugs are very toxic.

HEALTH PROGRAMS

Super-bureaucrat challenged

President Johnson's attempts to reorganize the executive departments have often run into trouble from a Congress organized along its own lines. Executive changes mean power changes in Congressional relations.

Last week, the President was trying again. As part of the long-pending third phase of the reorganization of the health side of the Department of Health, Education and Welfare (SN: 4/13, p. 353), he implemented a decision to make HEW Secretary Wilbur J. Cohen coordinator of the sprawling, $15.6 billion health and health research programs operated by some 15 Federal agencies. But the task he laid out will tax even Cohen's abilities as a superbureaucrat—abilities honed over several decades of Federal service during which he has been principal architect of many of the programs now identified with the Great Society.

Cohen, on paper at least, will be the Government's policy-maker for such questions as:

- The rationality of the doctor draft in relation to the health needs of the rest of the nation.
- The suitability of the health research programs of the National Aeronautics and Space Administration, the Atomic Energy Commission and the Veterans Administration, in relation, for instance, to the needs of his own department's Regional Medical Centers (heart, cancer and stroke) program.
- The wisdom of policies that make available to veterans, through Veterans Administration hospitals, health care more sophisticated than that available to the public at large.

Cohen's ability to make decisions stick in these and similar areas will depend on his ability to win Presidential support, issue by issue, as well as to deal with the Congressional committee structure. These are problems which have hamstrung other coordinators.

Within his own department, he may have more success. The establishment of the new Consumer Protection and Environmental Health Service, for example in HEW, should give him little trouble. But even here he will have to cope with such watchdog committees as the Subcommittee on Intergovernmental Relations which, under Chairman L. H. Fountain (D-N.C.), regards itself as guardian of the militancy of the Food and Drug Administration and critic of the form, if not the function, of the National Institutes of Health.

Highly organized pharmaceutical manufacturers have expressed interest in having Dr. James A. Shannon's National Institutes of Health become scientific monitor—a kind of court of last resort—over FDA regulatory decisions regarding drug matters.

Shannon, who has been seeking leverage for several years by which to make money available for expanded programs in pharmacology and toxicology, is proposing that NIH have some $50 million for an FDA-monitoring role.

Any such role now, since it would require revision of the Food, Drug and Cosmetics act by Congress, would come principally under the eye of Representative Fountain, who is wary of any move that might diminish FDA's new-found effectiveness.

Food and Drug, then, remains essentially unchanged under the reorganization, despite the fact that it becomes, rather than an independent agency in HEW, a piece of the broader consumer agency which includes as well the Air Pollution Control Division, radiological health functions, urban and industrial health and the Communicable Disease Control Center in Atlanta. Charles C. Johnson, Jr., assistant commissioner of health for environmental services in New York City, and a sanitary engineer by training, will head the new agency.

Under the new arrangement, plugged into FDA are likely to be such functions as the supervision of milk and shellfish production which had been Public Health Service functions. And FDA will seek its own ways to take advantage of the toxicological and pharmaceutical capabilities now widely scattered in the divisions of NIH, but ultimately to be coordinated.

WORLD HEALTH

Debugging the jet set

According to international quarantine regulations, all international flights originating in countries where disease-carrying mosquitoes could be aboard should be sprayed before they land. An insecticide from an aerosol bomb, most often DDT, is used.

This procedure, even if followed to the letter (as it often is not), still leaves the possibility that many insects jet from one country to another. One reason is that the aircraft's air conditioning system removes the aerosol spray before it has had much chance to affect mosquitoes or other insects.

World health authorities have now approved a system that should end this problem:

Tomorrow's jumbo jet planes and their passengers will be disinfected in flight by a 30-minute automatic vapor

bath demonstrated to be foolproof.

The automatic system using dichlorvos insecticide was devised by Public Health Service scientists and has been adopted by the World Health Organization Assembly for standard use on all aircraft starting Jan. 1, 1971.

Because the odorless dichlorvos is circulated within all compartments of the plane for 30 minutes, it can be used in very low concentrations, with the passengers aboard. Dichlorvos chemically is 2,2,-dichlorovinyl dimethyl phosphate. It has no odor in its pure form.

The chemical is related to such insecticides used in orchards as malathion and parathion. However, it is a much more volatile, lighter molecule and not as poisonous to humans. Dichlorvos kills insects when inhaled, not by contact, as malathion and parathion.

It is broken down into components non-toxic to humans by water vapor. Therein lies both its safety factor and

Agriculture

Getting the bugs out.

its failure to leave residues that could be toxic.

Tests lasting some two years with Federal prisoners and other human volunteers who breathed dichlorvos at the very low concentrations used for 10 to 20 days showed no adverse symptoms. Other tests have shown, however, that even very low concentrations of the insecticide act as a poison to the nerve system of mosquitoes.

Humans can, without any noticeable effect, take a dose about 20 times that necessary to kill mosquitoes and some other insects in normal aircraft treatment.

Not all international flights are now subject to disinsectation, and this has not changed.

The automatic disinsection will occur only on international flights originating in the tropical or near-tropical zones. Flights from Copenhagen to Seattle, for instance, would not be treated, but those from Vietnam to San Francisco would be.

The World Health Organization Assembly did not approve the dichlorvos system as the only mandatory one. Countries and airlines can continue to spray DDT with an aerosol bomb, although one drawback, in addition to lost time, is that many crews do not carry through on the procedure.

"If they must bring the empty bomb to the health stations as evidence," says one public health expert in Geneva, "a chap simply lets the spray out as he walks there."

URBAN TRANSPORTATION

Grasping the nettle

For some time, transportation engineers have been saying that someone will have to gamble on a sophisticated, advance-concept mass transportation system to help unplug auto-choked city streets.

Any experimental system chosen would be expensive, and the chances are the first ones could be expensive failures (SN: 1/27, p. 89). But somebody is going to have to pick up the tab.

Predictably, it is the Federal Government that is grasping the nettle. Last week, a survey by the Department of Housing and Urban Development released by President Johnson picked a number of advanced transportation programs as the most promising, and proposed that the Government spend more than $1 billion over the next 5-15 years to study and build prototypes. The survey's conclusions were presented to Congress, along with a request for $25 million in the next year and a recommendation for a research and development program involving $908 million over the period of the research and development effort.

The department, aided by 17 nongovernmental contractors, analyzed proposed solutions to urban transportation problems and selected for presentation in the report those it thinks most likely to succeed.

Most of the solutions proposed involve vehicles that spend all or most of their journeys on exclusive rights of way separated from street traffic.

Such systems, in the form of rail rapid transit, already operate in a number of cities and are still favored by many planners. New ones have recently been built in Montreal and Toronto; Washington, D.C., is planning such a system, and New York is extending its old one. The report recommends modernization of rail transit where it can be economical.

But most American cities are spread out too thinly to provide the high density of use that makes rail routes useful. For these areas the report recommends several kinds of systems using lighter and smaller vehicles and cheaper roadbeds than rail lines.

One, a so-called personal rapid transit system, would use small cars, carrying as many passengers as an automobile, running at high speeds on special guideways. The passenger who entered at a station would get into a car and program it for the station where he wanted to get out. The car would go automatically to the desired station, bypassing all others.

A variation of this scheme involves privately owned or rented vehicles that could run on city streets but enter the guideway system and run on it when desired.

Especially useful in middle-sized cities, according to the report, are buses that run on the street to make pickups and drop-offs, but use an automated guideway system between boarding and unloading neighborhoods.

Pallets, flatcars that would operate on conventional rails or as hovercraft on special guideways, could be used to transport automobiles from neighborhood to neighborhood.

For high speed transportation between central cities and dense suburban centers, the report recommends automated trains of air cushion vehicles with speeds greater than 100 mph.

To get around in the central business districts pedestrians could use moving sidewalks or automated taxis on special guideways.

Moving sidewalks have been tried, but they have a tendency to knock people down. For the lame and elderly to get on safely the belts must go at speeds that can easily be beaten by pedestrians. Variable speed belts are under study.

And for sparsely populated neighborhoods there is dial-a-bus: fleets of 12-passenger buses which would operate over flexible routes. A computer would direct them to make pickups at stops where passengers had signified by telephone that they would be waiting.

To make operating prototypes of these systems will take up to 10 years, if funded at optimum rates the department figures, and cost nearly $900 million in all. However, the $900 million expenditure the department is now recommending (and which it hopes to spend in five years rather than 15) includes money for improvement of existing systems as well as research and preliminary development of the new ones.

President Johnson has committed himself to the effort to the extent of requesting the $25 million seed money; the request is currently working its way through the Congress, where economy is being weighed against urban need.