

"This does not mean the controller will be replaced," says Bakke, "but that he will be relieved, so far as possible, of making calculations which can be performed faster by machines."

At controlled airports, FAA hopes to install what it calls "Computer Aided Approach Sequencing," in which radar-linked computers will schedule the flow of inbound traffic at shorter intervals than is safe when monitored by the human eye.

Currently the pilot has the burden of calculating his position and reporting by radio to the controller. By the time the information has been relayed, the aircraft may be 10 or 20 miles beyond the reported position. A small computer aboard the aircraft could convert this information into digital form and relay it to the ground in a fraction of a second. Converted again into a visual display, the information would be available to the controller in the blinking of an eye.

The airborne computer could also be used to give the pilot a visual presentation of his computed position, so that he would know his exact geographical location at all times and in all weathers.

The same computer system used on navigation information could handle all types of information from the cockpit to the ground. A pilot's statement of identity, location, air speed, etc.—which might take him several minutes to transmit by voice (once he was able to establish contact with the controller)—could be relayed in digital form in a fraction of a second, and displayed to the controller in any desirable form, including graphic or visual presentation.

With computerized navigation and communication will come an integration of the national airspace system. In the years ahead, FAA hopes to improve the data link between air traffic control facilities so that the entire system will operate as a single unit. Says Bakke, "There is no reason why all information relating to flight throughout the country cannot be passed from computer to computer."

With a fully integrated airspace system, air traffic control facilities would know, for example, before a Washington-bound aircraft left Los Angeles, the exact time it would be possible to land at Washington National Airport, or at Dulles or Friendship. The air speed of the aircraft and the length of scheduled stops could be controlled or modified en route, so that there would be no circling in a holding pattern.

"The next logical step," says Bakke, "would be to integrate surface travel with air travel in the same manner, so that the traveler in the next decade will not be streaking at supersonic speeds one moment 60,000 feet in the air, and

dragging along later in an auto traffic jam."

While technologists struggle with the problem of developing improved air traffic control systems, the unprecedented bottlenecks over major airports in recent weeks have precipitated hearings by the House Government Activities Subcommittee. Chairman Jack Brooks (D-Tex.) says the hearings will be "limited to the immediate problem of delays in air travel that have been particularly noticeable in recent weeks."

TRANSPLANTS

High success in Texas

No statistician would lend much weight to conclusions drawn from as select and tiny a sample as the recipients of human heart transplants. The operation is certainly not routine and each is pretty much a case unto itself.

Nevertheless there is a box score building up which, while not proving anything, suggests a lot.

There have been, as of Aug. 1, 28 transplants of human hearts. Eight of them, by far the largest single group, have been done by a surgical team under Dr. Denton A. Cooley of St. Luke's Episcopal Hospital in Houston.

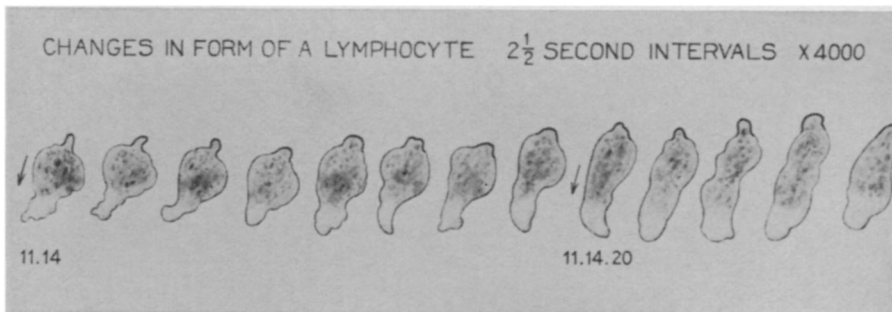
Of all the recipients, nine are still alive. Six of the survivors are patients of Dr. Cooley. Three of them are, for

Brooks' staff has been looking into such long-range solutions as new air traffic control systems for some time. Staff Administrator Ernest Baynard says, "The FAA has to be certain that any new air traffic control system that it wants to install will be effective, workable and safe. Too many lives and too much money are involved for the system to be otherwise. The development of new air traffic control systems takes time." Many of today's airline passengers will ruefully agree.

last December when the first operation was done in South Africa. Transplant recipients now are given injections of anti-lymphocyte globulin, ALG, along with chemotherapy designed to suppress the immune reaction and thus control the recipient's rejection of the foreign organ (SN: 5/18, p. 474).

It is significant that while many of the recipients did not receive ALG, at least at first, all of Dr. Cooley's patients were treated with it from the start. The French transplant recipient, operated on May 12 and doing well, has also been given ALG therapy.

The longest-lived recipient, Dr. Philip Blaiberg, was operated on in January in Cape Town and did not receive ALG.



Amoeba-like lymphocytes, apparent villains in the transplant rejection.

heart recipients, long-term survivors. Two have been discharged from the hospital. One has even returned to work.

It might be that Dr. Cooley is a better surgeon than the others. But differences in surgical technique and ability would most affect the performance of the transplanted heart, and most of the recipients who died were victims either of infection, rejection, already diseased organs, or unsuitability of the donor.

None of these are problems of the knife; the first two are laid to mistakes and misfortunes in patient management, the last two to poor circumstance.

The uniformity of the Texas success is believed to be attributable to a treatment that has gained acceptance since

At the time it wasn't considered for use in heart transplants. Dr. Blaiberg's quick recovery and early discharge were attributed to his excellent general health and delicate management by surgeon Christiaan Barnard.

Early in July, however, Dr. Blaiberg fell seriously ill with liver and lung trouble, complications resulting from the immunosuppressive chemotherapy he has been receiving. He was given ALG, and Dr. Barnard credits the treatment with Dr. Blaiberg's subsequent recovery.

Dr. Cooley is unequivocal about attributing the progress of his three longest-lived patients to ALG. And at a meeting of 11 of the 16 heart transplant surgeons in Cape Town in mid July, it

was agreed that ALG should be given to all future heart transplant recipients.

Lymphocytes are white blood cells which play a central role in rejection reactions. Such reactions are a form of the mechanism of immunity with which the body fights disease organisms. Lymphocytes collect and multiply around foreign tissue, eventually infiltrating it and, it is generally believed, destroying it.

Measures used to fight this reaction in the first heart transplants consisted of drugs such as the steroid, prednisone and Imuran. These drugs suppressed not only the lymphocytes, but all of the immune response. Thus the patients lay in danger of massive infection by foreign organisms. The first recipient, Louis Washkansky, died of infection.

What is needed, therefore, is something that will suppress lymphocytes but leave the rest of the immune mechanism alone. This ALG does. It is produced by injecting human lymphocytes into horses.

The horses react with their own immune response to the foreign human cells, producing antibodies (globulin)

which destroy these invading cells.

Some of the horse's blood is withdrawn when this antibody production is at its peak. The globulin is isolated and injected into patients, where it continues with its work of destroying lymphocytes. It is highly selective and won't bother any other cells.

ALG has been used in kidney and liver transplants, also with some apparent success. It might be an answer, or at least a substantial part of the answer, to the problem of rejection that plagues all forms of transplants. But it is hard to evaluate ALG when it is only part of a shotgun therapy that includes everything from "steroids to prayer," as one immunologist puts it.

Furthermore, no one knows the effect of long-term suppression of lymphocytes, which presumably play a part in battling infections as well. And studies in Holland indicate that different batches of ALG may have different effects on the retention of grafts in animals.

Even so, ALG appears to have improved the heart transplant batting average. ◇

ing to rely on old state hospitals for inpatient beds—a situation which hampers innovative therapy.

Treating the bulk of the nation's mental inpatients—about one million a year—at home would circumvent this problem to a great extent.

Departure from traditional hospital practice, however, is likely to be spotty.

The National Institute of Mental Health, which funds the new community mental health centers, does not directly establish treatment methods. But as applications for new grants come in, the NIMH can decide to fund those using the latest techniques. Dr. James Lieberman, chief of the center for studies in child and family mental health, calls the Denver work very promising. He says he does not think the principle of home therapy needs further support before it can be widely implemented. NIMH is not likely to fund those applicants who are unaware of the latest research, he says.

Some patients, however, must be hospitalized if only because they lack a family. Dr. Langsley believes that "anyone who would ordinarily be put in the hospital and has a family willing to participate in therapy can be treated at home." The criterion, he says, is not how severe the patient's symptoms are, but how much family support he has.

Some of the most difficult patients to handle are those with prior hospital experience, adds Dr. Langsley. Their resistance to home treatment is only surpassed by the resistance of their families.

GRANTS

Congress waves the cane

Rebellious college students still face an angry Congress—and an especially angry House of Representatives.

When Congressional anger flared last May in response to riots on several campuses (SN: 5/25, p. 493), there were predictions that, given time, less stringent second thoughts would prevail. Recently, in amending the Higher Education Amendments Act, the House showed that its second thought was as harsh as its first.

In the bill, as the Senate had earlier passed it and as the House Education and Labor Committee recommended it, was a provision that gave colleges and universities authority to withhold Federal funds from students who, in the judgment of university authorities, "willfully refused to obey lawful regulations or orders. . . ." This was a softening of earlier language on the matter which the committee thought the House would now accept.

But on the floor, Representative William J. Scherle (R-Iowa) offered an

MENTAL ILLNESS

Treatment goes home

"Mamma has gone crazy again—she's schizophrenic you know." And into the hospital goes mamma where she stays until the acute phase of her illness has passed, usually a matter of weeks.

One goal of modern psychiatry is to make that stay in the hospital as short as possible. The harmful impact of long-term hospitalization has been well established over the past decade, and since mental illness is not a constant condition, but episodic, patients can be kept home and functioning most of the time.

Now it appears that the bulk of mental patients need never go to the hospital at all, even during acute bouts of hallucinations and delusions.

Schizophrenia is no longer an excuse for hospitalization. Nor is the severity of symptoms alone in most cases a sufficient reason for the patient or his family to fall back on hospital care.

Some leaders in mental health have suspected that home treatment was as good and perhaps better than hospitalization, but until recently they have lacked solid evidence.

The first scientific validation came last year when a New York study of 55 schizophrenics indicated that three-fourths of them could be kept out of the hospital altogether with drugs and simple supportive therapy from visiting nurses.

The home treatment did not delay hospitalization, but replaced it. Affir-

mation of this principle on a broader scale now comes from a Denver study still in progress.

The Denver investigators at the University Medical Center, led by Dr. Donald Langsley, stopped 150 patients at the point of hospital entry and returned them home for a type of family crisis therapy.

The patients, pulled out on a random basis, included a full range of mental illnesses, from suicidal depressives to hallucinating schizophrenics. All were candidates for the hospital and all were successfully treated at home with members of the family participating.

About 20 percent of the first 75 treated in this manner eventually entered the hospital over a six months period. But the re-admission rate for hospital treated patients was the same, and they stayed longer. Those initially treated at home spent only a third as much time in the hospital as the others, indicating for the first time that home therapy may actually be preferable to hospitalization for even the most severely mentally ill.

This kind of evidence is expected to have major impact on the field of mental health. Community centers are experimenting with a wide range of treatment modes, from crisis intervention to day-hospitals and home care. There is a good deal of confusion over which patients to hospitalize and for how long. Some of the new centers are hav-