cation of the already inferred presence of argon. Argon has been estimated to comprise up to 35 percent of the air of Mars, but the polar temperatures measured by Viking would indicate that the inert component comprises as much as 80 percent of the *local* atmosphere, Kieffer says, causing a substantial depletion over the rest of the planet. The huge quantity of the inert component, he says, comes from the fact that about a third of the atmosphere takes part in the freezing out that forms the winter polar cap. The total pressure drop (including CO_2) over the planet should be only a small amount, he points out, since the cap in the opposite hemisphere is melting at roughly the same time, but more slowly. □

Insulin: Before and beyond

Scientists have known that the hormone insulin is made from a larger protein—proinsulin. Now it appears that proinsulin itself is derived from a still larger protein. This discovery should help in the eventual isolation and characterization of the gene or genes that makes these proteins and ultimately insulin, opening new approaches to the treatment of diabetics or to the mass production of insulin for such treatment.

Only recently has it become possible to isolate large amounts of the islets of Langerhans, the tissue of the pancreas that makes insulin. Such isolation, in turn, permits the preparation of small amounts of messenger RNA's, the molecules that translate gene messages into proteins. These mRNA's can then be placed in the test tube and primed into making proteins. What are the proteins made by these mRNA's? Shu Jin Chan, Pamela Keim and Donald F. Steiner, biochemists at the University of Chicago, attempted to find out, using isolated islets from rats.

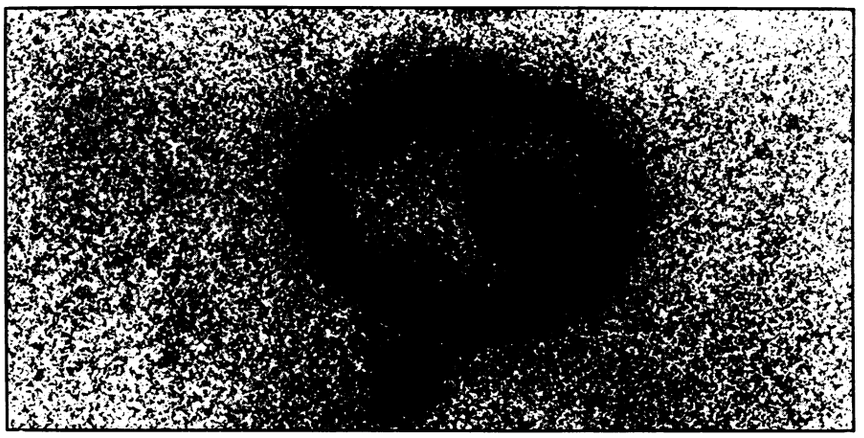
As they report in the June PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES, the initial protein made by these mRNA's is not proinsulin, but a still larger protein. It has a molecular weight of 11,500 daltons—about 2,500 daltons larger than proinsulin. They call the larger protein "preproinsulin."

The positive identification of the mRNA's which make preproinsulin, proinsulin and eventually insulin, the investigators believe, should facilitate the isolation and characterization of the genetic material involved in their production. The gene or genes could then be synthesized, opening new doors to the treatment of diabetics or to the mass production of insulin.

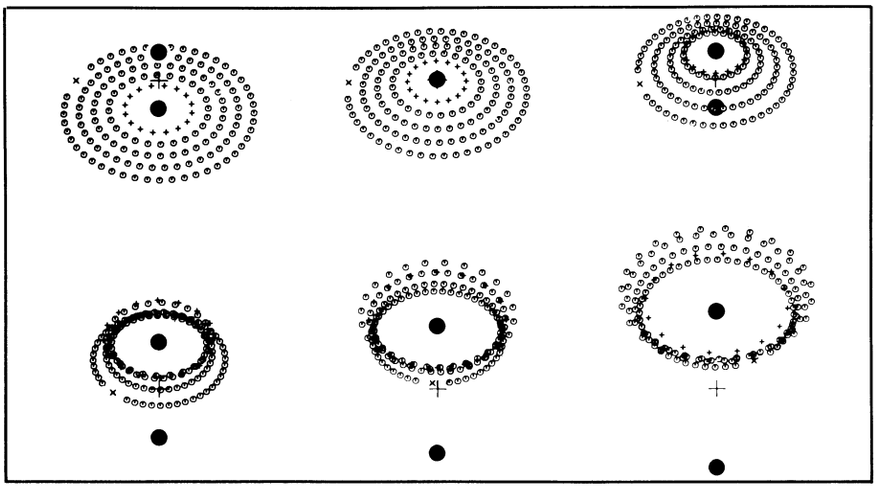
For instance, Walter Fiers of the University of Ghent, one of the first researchers to unravel the chemical composition of a real gene that dictates the production of a protein (SN: 1/6/73, p. 12), suggests that the synthetic gene or genes might be incorporated into the islets of Langerhans of diabetics to make the insulin they lack. Whether the gene or genes would make the desirable preproinsulin, proinsulin and insulin they need is not known. But it is now possible to get a synthetic DNA sequence to make proteins in a living cell, thanks to the new techniques of recombinant DNA engineering (SN: 6/19/76, p. 389).

Recombinant DNA engineering may also eventually allow the rapid mass production of preproinsulin, proinsulin and insulin in bacteria. Such products could then be used to treat diabetics. Such rapid, large-scale production "could be important because we just barely have enough insulin available for our needs today," attests James M. Moss, a diabetes authority at Georgetown Medical School. Livestock sources of insulin used for treatment are decreasing, whereas the number of diabetics is increasing. □

A ring galaxy and how to make it



Among the notables in Halton C. Arp's (Hale Observatories) collection of "peculiar galaxies" is this photograph of a ring galaxy never before published. In a keynote address at the recent American Astronomical Society meeting, Alar Toomre of MIT discussed this and other cosmic oddities. His theoretical work deals with them in terms of "interacting galaxies." His hypothesis for the ring galaxy describes it as the remains of a "collision" in which a massive body (large dot) passes through the disk of another galaxy. The theoretical sequence of events is pictured below where even the displacement of the remnant galactic nucleus is predicted.



Milwaukee project: Nine-year follow-up

The IQs of seemingly retarded children reared in the worst city slums can be increased by an average of 33 points. This surprising finding was made in 1971 by Rick Heber and his colleagues from the University of Wisconsin (SN: 7/10/71, p. 24). Forty children had been selected. Twenty received intensive educational intervention and made impressive gains when compared with control children who had not received special education. But these children were less than four years old at the time, and the question was: Will these gains hold up—especially after the children enter school? The answer is: Yes.

Heber has followed the progress of the children who took part in what is now known as the Milwaukee Project. At nine

years of age, the experimental children are still maintaining a 20-to-30 point IQ advantage over the controls. Heber summarized the project and discussed his most recent findings at last month's annual meeting of the Vermont Conference on the Primary Prevention of Psychopathology.

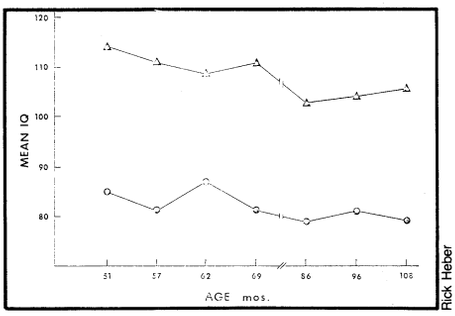
The project began in the early 1960s with questions about so-called sociocultural mental retardation. That is, mental retardation (IQ below 75) that exists in the absence of any identifiable nervous system disorder and is found to run in families from economically depressed areas. In order to find out more about this type of mental retardation, the researchers conducted a series of surveys in a section of Milwaukee characterized by census data as having the city's lowest median family income and education level and the highest population density and rate of unemployment. Though this area contained less than three percent of the city's population, it accounted for about 33 percent of the total number of children classified as educable mentally retarded.

Since most children born in the "slums" do develop normal intelligence, the researchers concluded that something other than economic conditions must be responsible for the high rates of mental retardation. Survey data revealed that mothers with IQs below 80 (less than half of those tested) accounted for almost 80 percent of the children with IQs below 80. Says Heber: "Our simple casual observation suggested that the mentally retarded mother in the 'slum' creates a social environment for her offspring which is distinctly different from that created by the 'slum-dwelling' mother of normal intelligence."

To test this hypothesis, Heber began a long-term intervention program in the survey area. During a period of more than one year, 40 newborn infants and their mothers (with IQs below 75) were selected and put in either experimental or control groups. All subjects were black, and the fathers were absent in many cases.

The experimental families began an intense rehabilitation program with two primary emphases: the education and vocational rehabilitation of the mothers and a personalized enrichment program for the newborns that began in the first weeks of life. In addition to vocational help, the mothers received some remedial education and training in homemaking and child-care skills.

The infant program began in the home, but when the children reached about three months of age it continued in a special education center on a year-round basis, five days a week, seven hours a day until the children were eligible to enter first grade at age six. The general goal of the education program was to provide an environment and a set of experiences that would allow the children to develop to their fullest potential intellectually, socially, emotionally and physically. The



Rick Heber

IQ advantage maintained after 9 years.

program emphasized language development and cognitive skills.

In order to assess the effects of the program, the children were tested often on a variety of measures—medical evaluations, general intelligence tests, experimental learning tasks, measures of mother-child interaction and a number of measures of language development. Both groups took identical tests on a schedule keyed to birth dates. No significant differences were found on medical or physical evaluations, but on every other measure the experimental children did much better. Differences in problem-solving ability and language development were especially significant.

Standardized IQ tests, such as the Binet, were used throughout the study and into the follow-up period. Results from the nine-year level have just been evaluated. Heber cautions, however, that these results should not be over-interpreted. Without a doubt, he says, repeated practice on the Binet (for both groups) has had some undetermined effect on the results. What is important, he says, is the continued difference in performance between the two groups. From 24 to 72 months, the experimental group maintained a 20-to-30-point advantage over the control group (120.7 compared with 87.2 at six years of age). The levels of IQ performance have been substantiated by an independent testing service. At nine years of age, three years after entering school, the experimental group is still performing in the normal range and maintaining more than a 20-point IQ advantage.

After entering school, the performance of both groups dropped. For the experimental group, this can possibly be explained as the result of a change in the treatment they received. While attending the intervention center, they were given breakfast, lunch and an afternoon snack. Some now report going to school hungry. Based on the comments of teachers, these children are also having behavioral and social difficulty in school. Often, explains Heber, these difficulties can be translated to mean "the child talks too much." The experimental children display the same behavioral problems as the controls, but, in addition, they are able to confront their teachers and classmates verbally. Whether this will be seen as an asset or a liability to the children is yet to be determined. "Nevertheless," concludes Heber, "the performance of our experimental children three years into follow-up is such that it is difficult to conceive of their ever approaching the [lower] performance standards of the control group . . . our data, to this point in time, do nothing to inhibit the hope that it may indeed prove possible to prevent the high frequency of mental retardation among children reared by parents of limited intellectual competence under circumstances of severe economic deprivation." □

New portable phone and new satellite


Hughes Aircraft Co.

Communications satellite for Indonesia.

Telephone communication may soon be easier for hurried urban dwellers in the United States and for remote islanders of Indonesia, because of two recent developments. A Philadelphia firm, International Mobile Machines (IMM), Inc., has patented and demonstrated a three-pound portable phone, and a Hughes Aircraft Company satellite was scheduled for launch this week to provide communications service to Southeast Asia.

The new portable phone is designed to fill a gap between the CB radio, which is lightweight and convenient but not compatible with the telephone system, and the conventional mobile telephone unit, which is heavy and takes up as much as half the trunk space of a car. The new unit is as portable as a CB, but interfaces with the telephone system through a control center, which must be within 5 to 10 miles of the user. The manufacturers foresee use by such diverse subscribers as doctors, journalists, construction companies and people in inaccessible rural areas.

Called an UltraPhone, the IMM device employs a frequency scanner to respond to calls coming in on one of several dif-