caloric reserves in its mother.

As the Los Angeles investigators—Stephen Zamenof, Edith van Marthens and Ludmila Grauel—report in the Nov. 26 SCIENCE, restriction of the amount of calories given rats from day 10 to day 20 of pregnancy results in significant decreases in body weight, placental weight, cerebral DNA (cell number) and cerebral protein of the offspring at birth. But decreases did not usually occur if mothers on the restricted diet were treated with GH. GH had little effect on fetal development in mothers whose diets were adequate to start with. These results, the investigators comment, make sense in view of other known facts—that GH is known to enhance carbohydrate metabolism and that glucose is the nutrient most critical to the fetus.

Whether these animal experiments will offer therapeutic applications for pregnant women is too early to say. However GH is known to rise naturally in women late in pregnancy. The purpose of this increase could well be to get maternal nutritional reserves to the fetus. Thus, Zamenof says, it is quite possible that in cases of maternal malnutrition, GH injections might mobilize reserves that the fetus needs. □

Cosmic antimatter and gamma rays

One of the great mysteries of cosmology is: Where is the antimatter? According to basic laws of particle physics there should be equal numbers of particles and antiparticles, but observation shows that our region of the universe is composed overwhelmingly of matter.

Various cosmologists have proposed to explain this by separating the matter and antimatter into large regions belonging exclusively to one or the other. If this is so, then at the boundaries between regions, matter and antimatter should come together to produce a steady rate of annihilation reactions. Annihilations would produce large numbers of pi mesons, and these in turn would decay to gamma rays.

If enough of these gamma rays are being produced, evidence of it should show up in the spectrum of cosmic gamma rays received at the earth. In the Nov. 22 PHYSICAL REVIEW LETTERS F. W. Stecker, D. L. Morgan Jr. and Joseph H. Bredekamp of the Goddard Space Flight Center report the possible find of some such evidence. They have calculated the cosmic gamma-ray spectrum that annihilation would produce, and they see a possible fit between their calculated spectrum and measurements made by J. I. Vette, Duane Gruber, J. L. Matteson and L. E. Peterson in the energy range around one million electron-volts.

They make the suggestion subject to a number of conditions, however. First, annihilation is not the only contributor of cosmic gamma rays. At energies below one million electron-volts, the spectrum appears to be definitely that of a power law and thus there must be an important source not related to annihilation. Second, at energies well above one million volts, the observations are not conclusive enough to decide and several rival hypotheses have been introduced. More precise measurement here is needed.

Another condition that affects the shape of the calculated spectrum is the assumption of a particular density for intergalactic matter. Absorption and scattering of the gamma rays in interactions with an intergalactic medium of this density cause a peak in the spectrum to appear near one million electron-volts. A fourth condition is imposed by evidence that at certain high red-shifts (that is, distances) the intergalactic medium is strongly ionized. Such ionization would affect the transport of gamma rays through those regions, and changes in the spectral curve are made to account for this.

Rule of amino acids in ribosomal RNA synthesis

To molecular biologists the cell is a murky, yet intriguing underworld. The more one explores, the more there is to discover. This is certainly the case with ribosomal RNA.

About 15 years ago only one kind of RNA—messenger RNA—was thought to be present in the cell to help carry out DNA's instructions for protein production. Since then several other kinds have been identified as well. One is transfer RNA, a molecular adaptor that attaches to a free amino acid in the cell. Another is ribosomal RNA. Ribosomes are made of both RNA and protein. They serve as stepping stones across which messenger RNA moves. When messenger RNA moves along the ribosomes, transfer RNA-amino acids make contact with it. Messenger RNA then orders each amino acid into a sequence—a polypeptide, or protein chain.

The finer points of all this DNA-RNA-protein operation—how RNA itself is made from DNA, for example—are still far from understood. Some light on the synthesis of ribosomal RNA however, is shed in a report in the Nov. 24 NATURE NEW BIOLOGY by T. D. Stamato and D. E. Pettijohn of the University of Colorado Medical Center.

Using a hybridization technique they established that, although about a third of the bacterial cell RNA molecules grown in the presence of amino acids consist of ribosomal RNA, less than seven percent of the RNA molecules grown in the absence of amino acids are ribosomal. They also found that 30 or 40 seconds after restoring amino acids to the starved cells, the synthesis of ribosomal RNA is restored.

These findings, say the Denver biophysicists, suggest that the production of ribosomal RNA molecules is not frozen in the middle or toward the end but rather at the very beginning of transcription. How blockage at the beginning takes place is not known, but they offer two possible explanations. One is that RNA ribosomal transcription depends on a protein activator and in a situation where no amino acids are forthcoming, the activator deteriorates. Then when amino acids are added back to the cell, the protein activator gets working again. Or blockage might be caused by a repressor protein. Such a repressor might sit on the RNA polymerase, an enzyme involved in ribosomal RNA transcription, or occupy the place on the DNA molecule where RNA polymerase usually makes contact in order to carry out transcription. □

Arecibo resurfacing

The largest radio telescope in the world is the thousand-foot-diameter wire mesh reflector built in a natural hollow near Arecibo, Puerto Rico. Astronomers have long wanted to replace the mesh with a more solid surface capable of reflecting shorter wavelengths than now possible.

The funds were finally approved by Congress a few months ago, and last week the National Science Foundation announced that it has let a contract for $3.8 million to the Garland Division of LTV Electrosystems Inc. to replace the mesh wtih perforated aluminum sheeting. This will enable the telescope to receive wavelengths between 6 and 1,000 centimeters. The present lower limit is 50 centimeters.

The accuracy of the new surface will nowhere be allowed to deviate more than 3.2 millimeters from a perfect sphere. This will greatly increase the resolving power: 100 times for radio and 1,000 times for radar. Astronomers using the telescope expect to see 20 times more radio sources than the presently known 5,000. □