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A Geomagnetic Survey of Greene County, Ohio

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such that shallow bodies correspond to smaller slopes. Comparison of the theoretical models with the transformed gravity data taken in Northwestern Ohio allows the deduction of certain characteristic features.
*Submitted by L. P. Fulcher.

C 7 A Geomagnetic Survey of Greene County, Ohio, V.E.D. OBOT and P.J. WOLFE, Dept. of Physics, Wright State University. -- A detailed geomagnetic survey conducted in Greene County, Ohio, has revealed two major magnetic anomalies originating at depths of approximately 0.82km. One of these anomalies is located in the southeastern corner of the county, while the other is located in the northwestern corner. Wells in neighboring counties with similar geology indicates that the depth to the base of the sedimentary layer of rock is of the order of 0.81km. This leads to the conclusion that the large magnetic anomalies in Greene County are caused by differences in the susceptibility of the underlying igneous rocks. Numerical techniques are used to determine the depth to the underlying igneous rocks and the distribution of their magnetic susceptibility.

C 8 Harnessing Solar Energy with Large Mirror Satellites.* H. WEICHEL, AF Inst of Tech, WPAFB OH 45433.--A large, earth-orbiting solar reflector satellite for the purpose of providing solar energy on a nearly 24-hour schedule is described. The satellite which can be launched as a complete package on a space shuttle, consists of essentially three mirrors and weighs about 15,000 kg. Solar energy collected by a 330 m diameter aluminum coated mylar mirror is directed to the earth's surface by a tertiary mirror having a radius of 22 m. A solar farm located in the SW US and illuminated by this orbiting reflector could produce ~10 MW of electrical power nearly continuously throughout the night. Various other potential uses of such a satellite such as extending daylight hours for metropolitan areas, unthawing sea lanes and ports, heating population centers during severe cold weather, protecting crops from frost and desalination of ocean water will be described.

C 9 Electron Beam Rotation with a Betatron. SARAH HAYNES LERUDE, Wright State U. and D. R. RUEGSEGGER, JR., Miami Valley Hopsital. --The advantages of using electron beams combined with rotational therapy for the treatment of malignant tissues and tumors are discussed. In hospital radiation therapy departments, electrons up to 45 MeV are used for this purpose. Three general forms of rotational therapy are described with particular emphasis on the longitudinal (wipe) technique used for the treatment of larger field sizes, small tumors at great depths, and for fields where a steep dose fall off is desired.

C 10 Undesirable Shock Avoidance in Animal Research.* M.S. CRABTREE, Systems Research Laboratories, Inc.-- A.c. shock is often used for conditioning. Cage floors where alternate bars have opposite polarity may be employed. Investigators have hypothesized that animals may learn to avoid shock by placing their feet on bars with the same polarity. This can be avoided by randomly changing bar polarity (scrambling). Nevertheless, much animal research is still performed with unscrambled bars and it is necessary to know if the animal truly is shocked. Hence, an inexpensive electronic device was designed to detect current flow during the shock period. The primary winding of a transformer is in series with the animal and the electric shock source. Its high impedance secondary is coupled to the grid of a triode. The amplified current from the triode is fullwave rectified and drives a PNP transistor whose collector current operates a relay which can switch any voltage to a recording instrument. The device is being utilized in a series of experiments. Preliminary results indicate that no animal has learned to avoid unscrambled shock. But these results may be specific to the particular strain of rats since learning capabilities differ with the strain.
*Submitted by R.K.H. GEBEL

SESSION D
Saturday morning, 7 May 1977
Room 103, Oelman Hall at 8:00 A.M.
James Schneider, presiding

D 1 Characterization of GaAs by Localized Infrared Mode Spectroscopy. M. M. KREITMAN, University of Dayton,* and K. K. BAJAJ† and C. W. LITTON, Air Force Avionics Laboratory, WPAFB, Ohio 45433.--Materials such as high resistance GaAs appear to be well suited for material characterization by the localized phonon mode technique. The method is known to be non-destructive and it can be used to obtain information about the chemical nature of the impurity and its location in the lattice. Both electrically active and inactive impurities can be identified by their absorption spectra. We have recently performed experiments on crystals of high resistance GaAs at 30, 100, and 300 K, with silicon impurity in the 10^{17}-10^{19} cm^3 range in an attempt to study the possibility of using the method for quantitative analysis of the impurity. Localized phonon modes related to the presence of the silicon impurity have been observed as discrete absorptions in the energy interval 300-400 cm^{-1} with a temperature dependence of ~ -0.02 cm^{-1}/K in the 100-300 K temperature range. A preliminary account of the results is to be presented.

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D 2 Depth-Resolved Cathodoluminescence of Implants of Cd, C, and Te in GaAs. B.J. PIERCE and R.L. HENGEHOLD, Air Force Institute of Technology, Wright-Patterson AFB OH 45433--Ions of Cd, C, and Te were implanted in GaAs substrates to doses of $10^{13}/cm^2$ and $10^{14}/cm^2$, using an accelerating potential of 120 kV. Subsequent to implantation the samples were annealed for 15 minutes at 800 to 900 °C and examined using the technique of depth resolved cathodoluminescence. In each case, the luminescence peak characteristic of the implanted species was observed to shift position as a function of the beam voltage employed to produce the exciting electrons. These shifts were found to be toward higher energies as the incident beam voltage was increased and may be qualitatively correlated to the expected concentration profile of implanted ions determined by using the LSS theory.

D 3 Design of a Maxicomputer Data Procession System to Analyze Raman Spectra. M.A. DIETENBERGER and P.P. YANEY, Univ. of Dayton--Various numerical techniques for the evaluation of Raman spectra have been implemented in a maxicomputer configuration. These techniques include cubic splines and piecewise polynomials for selective data smoothings, series-expanded Fourier deconvolutions, flexible spectral background subtractions, least-squares fit of semianalytical convolution functions to the spectra, and effective thresholds of peak detection. Also corrections for count saturation effects peculiar to pulsed laser Raman spectra were included. Smoothed laser power data is used to normalize the spectra and the wavenumber scale is calibrated by specifying the position of a known peak. The basis of the software package is a coding scheme which allows one to select a particular sequence of numerical techniques to match the experiment and the analysis requirements. After obtaining an optimized sequence of techniques, data sets can be handled routinely by either using the time-share data reduction program or by editing the disc file. A laboratory based terminal with a magnetic tape cassette recorder is used as part of the data acquisition system, to record the experimental data and to transmit the data to the UNIVAC 70/70 computer.

D 4 Computer Fits of Calculated Raman Spectra of N_2 to Observed Spectra. P.R. HEMMER and P.P. YANEY, Univ. of Dayton, and W.M. ROQUEMORE, AF Aero Propulsion Lab.--