American thermonuclear computations, which indicated that a laser fusion reactor is theoretically possible (see for example Nuckolls *et al., Nature*, **239**, 139 ; 1972).

For many physicists, the computer dominated this meeting also. After a review of laser fusion calculations by Dr K. V. Roberts (UKAEA, Culham), Dr D. E. T. F. Ashby detailed recent results obtained with the Culham MEDUSA code. This spherical "one-dimensional" Lagrangian code neglects degeneracy and radiative reabsorption effects, but does include D–D, D–T and D–^{3}He thermonuclear reactions ; fusion neutrons are assumed to escape from the plasma, and charged reaction products deposit their energy locally. Assuming heat transport by electron conduction, this relatively simple model predicts thermonuclear gains of ~55 when 140 kJ of 10.6 μm radiation is absorbed by a 250 μg DT pellet, a result in good agreement with the work of Clarke *et al.* (*Phys. Rev. Lett.*, **30**, 89 ; 1973).

There is, however, an upper limit to the power density which can be transported by collision-free electrons ; when this "free-streaming" limitation is introduced in an approximate manner to a previously optimized calculation, the thermonuclear yield is predicted to drop significantly. This new result is sensitive to wavelength, for it is postulated in the MEDUSA code that incident light not absorbed by inverse bremsstrahlung in the tenuous corona is subsequently absorbed at the critical density. (During the subsequent discussion it was suggested from the floor that the predicted decrease in yield could be alleviated by modifying the laser pulse shape to correct for the finite thermal transport time between the absorbing corona and the compressed core.)

Laser wavelength effects were also discussed by Dr G. J. Pert (University of Hull) ; "one-dimensional" numerical calculations indicate that of an incident 1.06 μm, 60 kJ laser pulse, only 1 kJ is absorbed by free–free absorption processes. Parametric and stimulated scattering processes are normally expected to absorb much of the remaining energy ; however, it was claimed that at very short wavelengths free–free absorption would be too weak to compensate for the higher threshold intensities expected for anomalous absorption. Finally, Drs J. A. Wesson and J. E. Crow (Culham) discussed model compression experiments, in which the principle of adiabatic compression by pulse shaping could be demonstrated and heat transport and laser-plasma interaction effects tested using currently available 1–10 GW CO_2 lasers.

Excellent reviews on the physics and technology of ultraviolet, CGE Nd-glass, and CO_2 lasers were given by Professor D. J. Bradley and Dr M. H. Key (University of Belfast), Dr J. Guyot (Laboratoire de Marcoussi) and Dr D. J. James (University of Hull). These talks provided a good introduction to the real world of laser plasma experimentation and gas breakdown phenomena, topics which occupied more than half of the contributions. An understanding of gas breakdown phenomena is of topical interest in the design of high power molecular gas lasers ; it is therefore noteworthy that Professor C. Grey Morgan (University College of Swansea) concluded his lucid review of this subject by observing that there is to date no unified theory which can account for all the existing CO_2 and Nd laser breakdown measurements. This observation was subsequently substantiated by new 3 ns CO_2 laser breakdown data (Dr G. Hill, University of Hull).

The meeting concluded with a contribution from Dr I. J. Spalding (Culham) on the reactor implications of laser fusion. Assuming electrical excitation, lasers having a pumping efficiency of some 15–30% and capable of generating thermonuclear gains exceeding 30, are required for economically attractive reactor applications.

Overall, the meeting left one with the impression of a wide range of interest and of expertise within British universities and research establishments. Many relevant experiments are possible with laser energies of 0.1–10 kJ and intensities of 10^{10}–10^{16} W cm^{-2}.

REMOTE SENSING

Earth Gazing

from a Correspondent

THE first Earth Resources Satellite is in space, orbiting tropical and temperate latitudes and systematically recording by remote sensing systems details of the Earth's surface. Some of the instruments, problems, costs and benefits of obtaining, analysing and applying remote sensed imagery were discussed at a three-day symposium held at University College, London, between April 10 and 12 and sponsored by the British Interplanetary Society.

The symposium was less confined than the title would suggest, as many of the contributions and much of the discussion dealt with Earth observation platforms other than satellites. Several contributions were concerned with the use of the British Skylark rocket as an airborne platform for remote sensing. Dr N. Simmons (Ministry of Defence) assessed the relative merits of various airborne platforms, principally aircraft, rocket and satellite, and then dealt in detail with the particular merits of the operational Skylark rocket system.

Several contributions dealt with sensor technology, some with instrumentation and others with management and development problems and proposals. Dr O. Hofmann (Messerschmitt-Bolkow) outlined a new and quite novel multispectral vidicon scanner

Simple Models for Intramolecular Interactions

INTERACTIONS between acidic proteins and nucleic acids occur in a variety of interesting biological circumstances but the details are little understood. Novak and Dohnal (see *Nature New Biology* next Wednesday, May 30) have used the tactic of investigating the interactions of simple model compounds.

Starting with the supposition, for which there is growing experimental evidence, that strong interactions between purines and aromatic amino acids can occur, Novak and Dohnal manufactured the pentapeptide TGTGT where T is tyrosine and G glycine. This compound, they found, increased the T_m of calf thymus DNA by 6°, an amount significantly larger than that produced by basic peptides such as Arg_4. Moreover, the DNA peptide mixture was hyperchromic and this, they suggest, may result from the tyrosyl chromophores being introduced into a hydrophobic environment.

In support of this Novak and Dohnal found that the absorbance at 265 nm of TGTGT doubled when the peptide was transferred from water to dimethylsulphoxide. By contrast, they found that the analogous peptides TProTProT, in which rotation about the C–N bond is impeded, and the acidic peptide TGluTGluT had no effect on the T_m of DNA.

The effect of TGTGT was not confined to DNA, for it also stabilized poly(rA)·poly (rU) and poly(dG)·poly (dC) which have secondary structures differing from that of DNA ; by contrast, the peptide did not stabilize poly(dA–T)·poly(dA–T) or poly(dA)·poly(dT). These observations clearly do not admit of a simple explanation for the specificity of the stabilization, but some specificity for polymers containing G–C received support from precipitation experiments. Dinucleosides containing G were quantitatively precipitated by TGTGT at a ratio of one peptide to one dinucleoside. Dinucleosides which do not contain G were not precipitated.

Further experiments showed shifts in the NMR spectral lines corresponding to protons in both TGTGT and poly(A) in a mixture of these, and these shifts were all consistent with the tyrosyl residues intercalating between the purines—presumably thus placing themselves in a hydrophobic environment. This notion has obvious attractions, and it will be interesting to see if this proposed mechanism can account for interactions in real biological systems.