The technique is to use what is known as a power-spectrum analysis to find the frequency distribution of the pressure fluctuations which have been recorded, and correlation analyses to look for discrepancies in the arrival times of the fluctuations at pairs of detectors. For example, a correlation analysis of the records from a sub-group of stations spaced within a few kilometres of each other near the Hudson reveals that much of the background noise seems to be moving from west to east across the array at speeds up to 50 m s^{-1}. Records from the US Weather Bureau show that the speeds and directions coincide with measurements of jet stream winds. Herron and his associates speculate that perturbations in jet streams excite gravity waves—waves in which gravity is the restoring force—and it is these which the instruments at ground level are detecting.

Seasonal variations of the power spectra from individual stations can also be correlated with meteorological effects. The level of the power spectrum, for periods between minutes and several hours, has a noticeable minimum during the summer months, for example, which Herron and his associates attribute to seasonal changes in the position of the jet stream over the north-eastern United States.

What probably happens is that the pressure fluctuations are caused by the passage over the array of large-scale weather systems, the paths of which are known usually to follow the core of the jet stream. Evidence in favour of this interpretation is that the greatest pressure fluctuations seem to occur when a storm centre is moving over the array. Herron *et al.* say, however, that the pressure fluctuations are not likely to be due to wind fluctuations, but rather to waves generated by the weather pattern. The reason is that the power spectrum of variations in the wind does not match the spectrum of pressure variations measured by the array.

PALAEOMAGNETISM

Thermal Alteration of Sediments

from our Geomagnetism Correspondent

DETERMINATION of the cause and nature of the natural magnetization in red sediments is one of the most intractable problems in rock magnetism, but the solution remains elusive in spite of much laborious effort. In directional palaeomagnetism, a phenomenological approach to red sediments is generally adopted in which details of the magnetization mechanism are ignored and the assumption is made that the direction of magnetization represents the direction of the ambient magnetic field at the time of deposition. Validity of this assumption is then assessed on the basis of directional consistency within a set of samples and, where possible, by comparison with independently determined directions.

Problems with this approach arise where thermal cleaning" is used to remove secondary components of magnetization, for high temperatures are liable to produce unwanted chemical changes. The nature of these changes cannot be predicted in ignorance of the precise source of the magnetization. A little new light has been thrown on these matters by Schwarz (*Earth and Planet. Sci. Lett.*, **5**, 333; 1969), who has analysed thermomagnetically red beds from the English Pre-Cambrian and the Canadian Palaeozoic. He shows that high temperature may convert the αFe_2O_3 present in the beds to Fe_3O_4 which may then acquire a magnetic moment significant in comparison with the weak stable natural remanence of the unheated rock.

All the red sediment samples investigated by Schwarz contained material potentially capable of producing Fe_3O_4 above 400° C. But the real surprise is that the reaction only occurs if the heating is carried out in neutral conditions (nitrogen atmosphere or vacuum) but not if the samples are heated in air at atmospheric pressure. The implication is that the sediments produce a reducing agent above 400° C the effect of which is only mitigated by an oxidizing atmosphere. The importance of this conclusion cannot be overstated if only because many workers have deliberately carried out heatings in neutral atmospheres in attempts to prevent chemical changes. Clearly the routine heating of sediment samples in these conditions must be suspect until more details of the relevant processes are forthcoming. This is especially the case in the determination of ancient geomagnetic field intensities where the problem of chemical change is even more critical than in directional investigations.

LASERS

Applications in Electronics

from a Correspondent

IN one sense the laser is an electronic oscillator operating at optical frequencies, and it might therefore be expected to give rise to a whole new range of electronic techniques. This, indeed, seems likely to be the case, and optical electronics, or opto-electronics to use the ugly term by which it is usually described, is a rapidly growing field of activity. The conference on lasers and opto-electronics held at the University of Southampton from March 25 to 28 exemplified this trend with thirty-one papers on lasers and forty-three on their applications in electronics. Other applications, such as holography *per se*, metrology, machining and so on, were excluded from the programme.

The conference opened with an excellent review of glass lasers by C. G. Young (American Optical Corporation), who has himself done so much to advance these particular devices, and was followed by a description of the slab laser. This interesting idea, due to J. M. Burch (National Physical Laboratory), involves multiple passes of a light pulse through different regions of a glass slab, but there are many experimental difficulties still to be overcome. Papers on spectroscopic measurements in solid-state lasers produce the interesting and somewhat unexpected result by D. H. Arnold and D. C. Hanna (University of Southampton) that the introduction of a straight edge into the cavity into a laser Q-switch by a rotating mirror produces operation in a single transverse mode and a high degree of repeatability. Interest in laser devices now centres on mould locking, and evidence of pulses produced by dye solvents in the absence of dyes was presented by A. C. Selden (Royal Holloway College) and D. J. Bradley (Queen's University, Belfast) *et al.*, while D. J. Hunt and T. M. Shepherd (AWRE, Aldermaston) reported laser operation in a liquid laser without end mirrors.

Workers at Services Electronics Research Laboratory followed up their recent announcement of an increase