is supported by more than twenty countries which between them will provide coverage of more than 80 per cent of the sources of publications.

No doubt problems will arise in the setting up and day to day operation of what will be the world's largest computer-based documentation service relying on input prepared on an internationally decentralized basis. Much of the information to be included in *INIS Atomindex* is currently contained in *Nuclear Science Abstracts*. But it would perhaps be wrong to look at *INIS* from a narrow point of view—there is, after all, a wider community of scientists equally concerned about information problems and interested to know whether an international approach might effectively supplement the excellent endeavours made by the core abstracting journals. Indeed, Dr S. Adams (National Academy of Sciences) dealt with *UNISIST*, the feasibility study for a programme of increased voluntary cooperative networking of existing and future information services—in effect, a world scientific information system. If international cooperation can succeed in one scientific area this could be a happy augury for other areas potentially able to benefit from an international approach.

The symposium also gave nuclear librarians and documentalists a welcome opportunity to discuss the problems of handling the voluminous nuclear literature. Mr A. Mauperon (European Communities, Luxembourg) gave some idea of the size of the nuclear literature when he said that each year *Nuclear Science Abstracts* covers 40,000 journal articles, 10,000 reports from laboratories, institutes and so on, and 4,300 books, theses and patents.

SUPERCONDUCTIVITY

Promise in Thin Films

by our Solid State Physics Correspondent

HOPES that "high" temperature supercurrents may be induced in thin films have received a boost from a calculation of the effects of lattice orientation on the superconducting transition temperature. R. E. Allen and F. W. de Wette (*Phys. Rev.*, **187**, 883; 1969) have worked out the phonon frequencies for an ultrathin crystal specimen and have shown that the diminution from the values for the bulk material must cause an increase in the superconducting transition temperature. They also found that for aluminium the orientation of the film has a pronounced effect on T_c , which varies by a factor of three between films oriented with the (111) and (110) axes perpendicular to the boundary.

The incentive for this calculation sprang from the measurements of Strongin *et al.* in 1968, who observed a considerable increase in T_c when thin layers of two different metals were fabricated into a sandwich structure. The change in T_c was attributed to a drop in the phonon frequencies compared with the bulk material, although no direct measurement of the frequencies was made. Allen and de Wette decided to calculate the frequency distributions for oriented face-centred cubic films from a simple Lennard-Jones power law potential.

For thin films, of course, the static displacement of atoms cannot be assumed to vanish. Minimizing the static energy, therefore, they found that the vibration spectrum includes a low frequency surface mode which greatly reduces the mean frequency of the crystal.

The transition temperature, which depends on the electron-phonon coupling constant and the mean square frequency, was then found to increase by up to twenty-two times for correctly oriented aluminium, although Allen and de Wette point out that it would be hard to attain this for the imperfect free films that normally exist. In contrast, lead was found to be quite isotropic, with a transition temperature about 25 per cent greater than that of the bulk material.

In practice, it is, of course, extremely hard to manufacture films only a few atoms thick, let alone to obtain them as single crystals and to orient them. But vacuum deposition and sputtering techniques can be used to produce films thinner than 100 Å quite reliably, and the promise of surprises in the superconducting properties must add impetus to refining these techniques.

SEDIMENTOLOGY

Saharan Glaciation

from a Correspondent

THE hottest part of the Earth was once the coldest. Proof of this has come from Algerian and French geologists during the past decade, and between January 11 and 25 the Institut Algérien de Pétrole mounted an expedition to demonstrate the evidence on the spot. Sedimentological specialists of twelve nations participated, led by Dr A. Bennacef of Algeria and Drs P. Rognon and B. Biju-Duval of France. The critical area was in the Central Sahara astride the Tropic of Cancer, near the Niger and Libyan frontiers, where Lower Palaeozoic sediments lap on to the Hoggar pre-Cambrian massif. Two days of discussion in Algiers rounded off the operation, resulting in unanimous agreement that the case had been made.

From the Gautier Mountains to the Tassili Interne, Upper Ordovician glacials (450 million years old) were plainly displayed in a region of tectonic simplicity. The party saw glaciated valleys, sediments grooved by glaciers and icefloes, tillites, iceberg-borne erratics, eskers, and so on. The glacial valleys, opening northwards to the Ordovician sea, may have formed true

North-west Africa, showing the area visited by the members of the expedition.