



NEWSLETTER

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Stoke Poges, Bucks

INTRODUCTION

This is the first issue of a Newsletter which, for a trial period, will be issued quarterly to members of The Institute of Physics and The Physical Society and to persons and organizations likely to be interested in the work of the Fulmer Research Institute. Sponsors and their representatives will realize that the results of research work carried out at F.R.I. must often remain confidential, but it is hoped to draw attention to certain aspects of the work, where this can be done without prejudice to the interests of the sponsors. Comments would be welcome.

1967 - FACTS AND FIGURES

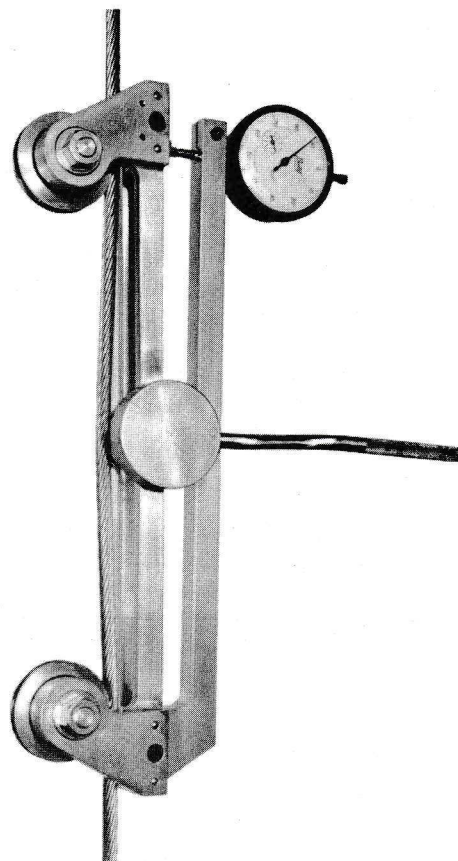
The total income of F.R.I. for 1967 was £265,000, all of which was for contract research and enquiry work. Of this, some 30% came from industry, 10% from the United States and Canada, 18% each from the Ministry of Defence and the U.K. Atomic Energy Authority, and the balance of just over 20% from the Ministry of Technology.

The annual turnover for the year was a record, but the fact that the total number of staff has not increased significantly over the past five years, shows that progress has been steady rather than spectacular.

Some interesting research contracts include work on metal-ceramic bonds for piezo-electric applications, the production of ductile beryllium alloys, and attempts to develop new high strength aluminium-base alloys. We have received another order for a thermal fatigue machine to be supplied to the General Electric Company in the United States, and facilities for testing windows for draught and water penetration have been set up for the Aluminium Window Association.

The major contracts for the fabrication of new aluminium-lead bearings for the Glacier Metal Company; on high rate electroforming for the National Research Development Corporation; on heats of formation of metal halides and other compounds for the U.S. Office of Aerospace Research; and on the structure of superconducting β tungsten-type compounds for the Ministry of Technology, have all been renewed, together with several other smaller contracts.

ROPE TENSION METER



A simple method of measuring the tension in ropes has for some time been a requirement in designing yacht rigging. F.R.I. has designed and built prototype tension meters on behalf of Norseman Ropes and these may have a wider range of application, for example, in the ropes for wireless aerials and transmitters and colliery winding gear. Both electrically recording and dial reading instruments are available. The latter is illustrated.

METAL-ALUMINA LAMINATES

In some so far unsponsored work, F.R.I. investigators have been successful in producing metal-alumina laminates, with a spacing sufficiently close to ensure dispersion-hardening. These laminates have the characteristic of retaining their strength and hardness at temperatures at which the non-laminated metal would recrystallize and soften. The alumina phase also confers increased corrosion resistance and the multi-layer structure makes penetration more difficult. Successful laminates have been produced in copper, nickel and zinc. We would be interested to hear of any possible applications for these interesting new materials. A micro-section (x 1000) of a copper Al_2O_3 laminate is illustrated.

CHROMIUM RESEARCH

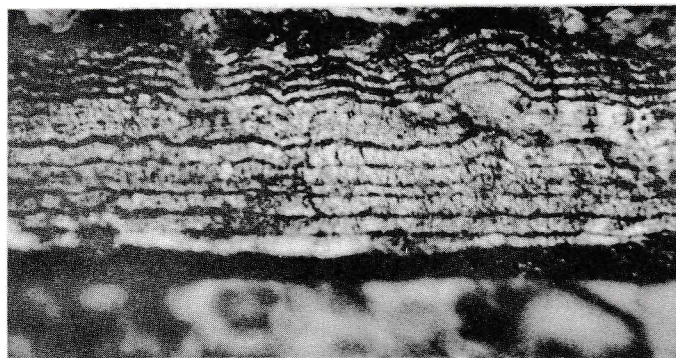
The contract for research on the properties of chromium and its alloys, which was sponsored for several years by the Ministry of Aviation, came to an end last year and so far we have not been successful in obtaining alternative sponsorship, although proposals have been submitted to other potential sponsors. The Monograph "Chromium" in the "Metallurgy of the Rarer Metals" series, which was originally published under the authorship of Dr.A.H.Sully, Principal Physicist at F.R.I. up to 1955, has been revised by Mr.E.A.Brandes and published by Butterworths at 95/-.

PROSPECTS FOR 1968

Although the results for 1967 were very encouraging, there are signs that 1968 is going to be a much more difficult year. Reduction in Government spending on extra-mural research may affect some of the main contracts at F.R.I. and it will be necessary to offset this by increasing research for industry. In this respect the increase in the proportion of work carried out for industry during 1967 is encouraging and the process appears to be continuing, since the level of contracts for industry and general sponsors has risen from 30% to 40% since the end of the year.

RECRUITMENT

F.R.I. is still looking for a laboratory technician and a graduate metallurgist to work in Electron Microscopy and will shortly have vacancies in the Corrosion Department.



STRUCTURE OF LIQUID METALS

One of the more basic researches in progress at F.R.I. is concerned with the structure of liquid metals, which has been investigated using X-ray diffraction. In some elements, and in many alloy systems, it has been shown that the atomic arrangement in the liquid is not entirely random but that a preferred association is present. For elements this may be related to the crystalline structure of the material in its natural form or to an allotrope which may be produced by, for example, high pressure and low temperature; for alloys the atomic configuration in the liquid may be different from that in the corresponding solid so that new and potentially useful structures can be obtained by rapid quenching.

The greater emphasis on work with an immediate technological application has meant that financial support for this work has been more difficult to obtain and there is some risk that it may have to be curtailed, if not stopped altogether. The present requirement is to link the basic knowledge now available to technological application. It seems likely that a better understanding of the characteristics of the liquid will assist in controlling solidification processes which may be used in applications involving the production of large single crystals, or eutectic structures.

ELECTRON MICROSCOPE FOR SALE

F.R.I. has for disposal a 3A A.E.I. Electron Microscope. This instrument is in excellent condition and can be used for electron diffraction as well as microscopy. Since the acquisition of the EM6 and later the Siemens Elmiskop Microscopes, this instrument has been rarely used and the space occupied is needed for other purposes.

Price £1,000