



NEWSLETTER

Issued quarterly by:

FULMER RESEARCH INSTITUTE

NO. 3 OCTOBER 1968

Stoke Poges, Bucks

DIRECTOR DESIGNATE



Dr. W.E. Duckworth, at present Assistant Director (Metallurgy) of BISRA, has been appointed to succeed Mr. E.A.G. Liddiard when he retires next year. Dr. Duckworth was previously Operations Research Manager of the Glacier Metal Co. before being appointed Head of the BISRA Metallurgy Division in 1960, and he has therefore a wide experience of both the ferrous and non-ferrous industries. He is a member of the Councils of the Institution of Metallurgists, the Iron & Steel Institute, and The Institute of Metals, and is Chairman of the London Metallurgical Society. He has written some 50 papers and two books covering many aspects of physical and process metallurgy, as well as managerial, statistical, and operational research topics. He holds a Ph.D degree from Cambridge, where he obtained his first degree in Natural Science, reading Metallurgy in Part II of the Tripos.

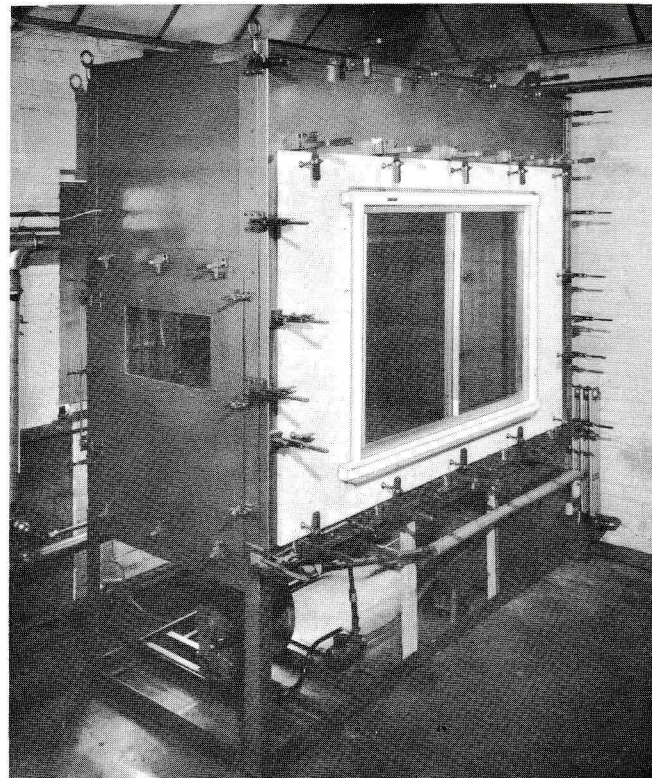
Dr. Duckworth will join FRI on January 1st, so that there will be some overlap. Mr. Liddiard joined FRI when it was founded in 1946 as its first Director of Research and will remain a member of the FRI Board of Directors after his retirement from executive duties on June 1st. 1969.

CHROMIUM RESEARCH

Readers may recall that our first Newsletter, published in April, mentioned that we were seeking sponsorship for continuation of research on chromium-base alloys. We are happy to report that a contract has been negotiated and work has commenced on a two-year programme for the U.S. National Aeronautics and Space Administration.

TESTING OF WINDOWS

A rig for testing the resistance of windows to penetration by air and water has been designed and constructed for use by the Aluminium Window Federation and its members. Subject to the agreement of the sponsors and payment of an appropriate fee, the facility is available to organizations and individuals who do not belong to the A.W.A. The tests are carried out in accordance with British Standards Specification 4315, Part 1, 1968.



Window Testing Rig

SCANNING ELECTRON MICROSCOPE

A Cambridge Instrument Stereoscan has been purchased and installed and is available on a rental basis, with assistance in interpretation for consulting work. The standard charge, which includes operator's time, is £14.0.0 per hour, with a minimum booking of ½-day (3 hours) when the sponsor's representative is in attendance. There will also be a postal service, whereby specimens are examined and photographed, with a minimum charge of £20 per specimen, or batch of similar specimens.

This new service is likely to be particularly valuable when supplemented by the other facilities for transmission electron microscopy and X-ray microanalysis and the considerable experience of FRI staff.

MR. B.A.HATT

In recognition of 20 years' service, a gold watch was presented to Mr. B.A.Hatt last month. Mr. Hatt is one of the youngest employees to qualify for a long service award, having joined FRI as a junior laboratory assistant at the age of 17. He obtained his B.Sc. degree (London) by evening and day release classes and was awarded his M.Sc. in 1957 on a thesis based on his work at FRI in X-ray crystallography. Mr. Hatt is an Associate of The Institute of Physics and Deputy Head of the Physics Section at FRI and is author of several published papers in Acta Met., Acta Cryst., J. Nuclear Materials., and J. Applied Physics.

REFRACTORY METAL DEPOSITION

For some time past FRI has worked on a laboratory scale in studying the deposition of metals and intermetallic compounds from the vapour phase. Many refractory metals have been successfully deposited, including molybdenum, rhenium, tantalum and niobium, but most work has been on tungsten and, in addition to providing coatings, for example, on graphite rocket nozzles, the technique has been used to fabricate tubes, crucibles, and similar shapes in tungsten by subsequent removal of the base on which the metal was deposited. Some of the articles which have been produced are illustrated.

FRI is providing additional facilities for carrying out larger scale work for both development and small scale production.

- A. Tungsten coated graphite rocket nozzle with graded coating thickness up to 1/16".
- B. Open & closed ended tungsten tubes and crucibles with up to 1/10" wall thickness.

Similar specimens were on exhibition at the Farnborough Air Show.

FRACTURE TOUGHNESS TESTING

Metal structures are normally designed on yield or proof stress and a factor of safety in which the ratio of yield to ultimate tensile strength is taken as an indication of susceptibility to brittle fracture. Experience has shown that these criteria are not adequate, in that the effects of inherent defects, such as inclusions or cracks, are not fully taken into account. Recently, the ability of a material to resist crack propagation, described as "fracture toughness", has been studied to give the designer further guidance in the selection of materials and to assist in the development of higher strength alloys.

FRI is currently engaged on several projects, in which fracture toughness and the metallurgical factors which affect it, are being studied, and fracture toughness test facilities are now available to sponsors and as a test service.

SALES OF HARDWARE

Apparatus made and used in FRI continue to attract interest. We have recently received orders for two more Forrest thermal fatigue machines, described in the last Newsletter, and have constructed and sold two high accuracy calorimeters to the Technischen Hochschule, Clausthal, and the University of Vienna.

