

NEWS

Rheology of Surgical Implants

(British Society of Rheology—New South Wales Branch, Presidential Open Letter)

MODERN developments in biomechanics and biological engineering are leading to the progressive application of metals and plastics, in a more or less complex form, as replacements for faulty human tissues.

The most notable are metallic and plastic orthopaedic prostheses, arterial replacements involving nylon, dacron and teflon knitted and woven tubes, heart valves which may be a combination of metal and plastics, foams and adhesives.

The problems arising may be illustrated by the observation that some nylon prostheses lose tensile strength after insertion into the body; teflon patches become rigid and glasslike; aneurysm occurs in some dacron arterial prostheses; porous synthetic grafts lose their elasticity after a time due to fibrous tissue incorporation; Ivalon graft may rupture; teflon valves may occasionally chip or release fluorine.

It should be obvious that the metals and plastics used should be chemically and mechano-chemically inert, they should not cause haemolysis or other body reaction, they should be durable and non-toxic, should have rheological (strength, flexibility, elasticity) properties similar to replaced tissues and should be resilient enough to stand up to cyclic stresses.

There is a tendency to accept the manufacturers product at its face value or to make use of *ad hoc* materials. We believe, in our Society, that better information on the type of produce required, leading to better prostheses, will result if, and when, better co-operation is achieved between engineers, surgeons, rheologists, physicians and pathologists.

It should be the aim of rheologists to define rheological requirements of prostheses. Such definition can be based on rheological and micro-rheological characteristics of normal tissues, on the one hand, and on the personal experiences of surgeons in handling and clinical results of prostheses, on the other hand. It would be the aim of chemical and mechanical engineers to advise on means of producing materials of the required characteristics.

In view of the need for some action in order to facilitate interchange of information, understanding of the problem, and solution of these challenging questions, it is intended to hold a SYMPOSIUM ON RHEOLOGY OF SURGICAL IMPLANTS about June, 1964, at Sydney Hospital. It is proposed to present a series of lectures under the four following headings:

- A. *Surgeons and Physicians look at metal and plastic prostheses.*
 - (i) Heart valves
 - (ii) Arterial and venous grafts
 - (iii) Artificial kidney; extracorporeal circulation apparatus
 - (iv) Orthopaedic prostheses
- B. *Rheology of metals and plastics used in surgical implants.*
 - (i) Rheology of metals and alloys
 - (ii) Rheology of plastics and fibres

- (iii) Perspectives in application of rheology to solution of some problems of surgical implants
- C. *Tissue reactions to metal and plastics used in surgical implants.*
- D. *Engineering problems in manufacture and design of surgical implants.*
 - (i) Design problems in metal prostheses
 - (ii) Design problems in plastic prostheses
 - (iii) Design of textile fabrics for surgical implants

The lectures would be intended to stimulate discussion and interchange of information and, consequently, the same amount of time will be allotted to the discussion as to the actual paper. It is hoped that co-operation of diverse professions will be carried out both on personal and formal levels.

All interested in taking an active part in this Symposium are asked to inform the Hon. Secretary of the Society of Rheology, Dr. A. A. Palmer (Sydney Hospital), or the undersigned (Dept. of Medicine, University of Sydney). Suggestions on the procedure, lectures, round-table talks, etc., will be very welcome.

Dr. LEOPOLD DINTENFASS
President, BSR-NSW.

Third European Conference on Microcirculation

THE Third European Conference on Microcirculation will be held in Jerusalem from March 15-19, 1964 under the auspices of the Israel Academy of Sciences and Humanities and under the patronage of His Excellency, the President of Israel, Mr. Zalman Shazar. During this conference, a meeting on biorheology will be held at the Weizmann Institute of Science at Rehovoth. The address of the Conference Secretary is:

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