concerned with all classes of technological materials: ceramics, metals, polymers, and electronic materials. Indeed the society plans to be involved only in activities which deal with general properties or principles cutting across the boundaries of single materials classes.

The activities of the society will include the usual ones. Sponsoring meetings and providing for the better communication among the members. It was the intention of the founders that meetings for the first few years should concentrate on many small highly focused gatherings carried out by volunteer groups of members in different parts of the country. Likewise, it was felt that there was no urgency in starting a new journal, instead the possibility of interacting with several existing Journals will be considered. The Society should become deeply involved in educational and professional matters at the national level.

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FRONTIERS OF MATERIALS RESEARCH

Biomedical Polymers

We may define biomedical polymers in terms of polymeric materials used either within the body for prosthetic remedial purposes or outside of the body where physiological fluids or material are passed through or stored in contact with the polymer.

In terms of this broad definition, the demand for research in, and sale of biomedical polymers are each rapidly expanding. The challenges in design of suitable materials are also enormous. Apart from the normal design criteria of processability, mechanical properties, porosity, etc., we are faced with such problems as toxicity and biocompatability.

Initial efforts in implantable polymeric material date back to the late nineteenth century when celluloid was apparently the first polymer to be used. It was not however until the past few decades that polymers were used in any volume for biomedical purposes, but use of plastic for heart bypass systems, kidney dialysis membranes, blood storage, etc.; has by now become commonplace. Despite the apparent suitability of plastics for such purposes, there are problems arising from the use of polymers which are not specifically designed for the biomedical purpose. For example most commercial polymers can, and do, initiate blood clotting by surface reaction, and the commonly used blood bag storage material polyvinyl chloride contains phthalate esters (plasticizers) which leach into the blood cells.

Evidently the problems of biocompatability become even more acute where implanted materials are concerned.

Over the past few years there has been a growing movement oriented in the direction of designing polymers specifically for biomedical purposes, particularly for implantation. There seems to be little doubt that surgery of the future will rely heavily upon the availability of replacement part most of which are "soft" and potentially of polymeric origin.

https://doi.org/10.1557/S0883769400049393 Published online by Cambridge University Press

In terms of protheses and their design one has to first be aware of the features underlying biocompatability and this fact is increasingly drawing together plastics technologists, biochemists and medical researchers. Some of the problems to be overcome include immune response and rejection, toxicity, carcinogenesis, trauma (mechanical/irritant), non thrombogenicity, etc.

The approaches used to date are twofold - a) modification of existing materials and b) ab initio design of new ones. Just a few examples of methods will be mentioned here. In the first area one thrust has involved using available commercial polymers and rearranging their physical form and altering surface properties. For example connective tissue is more compatable with and adherent to, porous or "woven" material than solid sheets. As spelled out previously, most plastics are thrombogenic, i.e., they initiate blood clotting. As a countermove, attempts, in some cases relatively successful, have been made to bind anticoagulants e.g. heparin to the surface. Other sources of soft materials, this time biopolymers, include processed fibrin and fibrinogen from blood clots, modified collagen, a major constituent of normal connective tissue. In the latter case many successful heart valves contain collagen as a major component.

As far as designing new materials, there are clearly many difficult problems to solve. Perhaps the most rational approach is that based on testing of copolymers. In this case, varying the ratio of the monomers allows establishment of controls for studying biocompatability. This approach is being used both with normal organic polymers and biopolymers synthesized, for example, from amino acids.

Apart from their use as prostheses, polymers are being researched for their applicability in slow drug release situations. It may, for example, be desirable to release a drug in a discrete location over a long period of time, by implanting a drug release package - uses would range from cancer therapy, through treatment of diabetes and treatment of hard narcotics by slow antagonist release. In these cases the materials researcher is faced with transport through the support matrix and specific interactions with the drug: materials properties are paramount.

The materials requirements thus range from tough strong materials for replacement of structural tissue through softer flexible materials for a range of uses inside and outside of the body to gels and release systems. All this and the physiologic interactions as well! The scope of this area of materials research is clearly limitless in extent, is certainly challenging, but is of very considerable humanitarian importance.

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https://doi.org/10.1557/S0883769400049393 Published online by Cambridge University Press