for him is divided into Bevanites and anti-Bevanites, the former white and right, and the latter black (or blue) and wrong. He begins his chapter on the Health Service by acclaiming the victories of preventive medicine: "Modern communities have been made tolerable by the behaviour patterns imposed upon them by the activities of the sanitary inspector and the medical officer of health." "In this sphere [of preventive medicine] values that are in essence Socialist challenge and win victory after victory against the assertions and practice of the Competitive Society." And yet Mr. Bevan's Health Act has put back the clock of preventive medicine and dismayed and discouraged those in the Public Health Service who under the more enlightened administrations of the Competitive Society had done so much for the progressive improvement of the health of Britons, now engulfed in a sea of free potions and lotions. In a superficial examination of paying for the Health Service through insurance Mr. Bevan inveighs against "local paternalisms." "The benefactor tends also to become a petty tyrant, not only willing his cash but sending his instructions along with it." Mr. Bevan wants only one benefactor—himself?—one tyrant, one issuer of instructions: and so one "pattern of behaviour" imposed from above. What a political pipe-dream!—for the dreamer. So short is his memory that he accuses the B.M.A. of fostering the idea that the N.H.S. was to be paid for out of the insurance contributions; in fact, it was Mr. Bevan's press apologists who did this, and a grave disservice it was. His flimsy defence of the free treatment of foreign visitors is really beneath contempt. Here is what he writes: "The fact is, of course, that visitors to Britain subscribe to the national revenues as soon as they start consuming certain commodities—drink and tobacco, for example, and entertainment. They make no direct contribution to the cost of the Health Service any more than does a British citizen." *O tempora! O mores!*

Mr. Bevan, as might have been expected, does not hesitate to besmirch those who before 1948 looked after the health of the people. He talks of the "innumerable harpies who battened on the sick and who are slowly being eliminated." Again, he writes: "A free Health Service is a triumphant example of the superiority of collective action and public initiative applied to a segment of society where commercial principles are seen at their worst." And, of course, after lip service to the individual doctor, he lambasts the profession thus: "The pretensions of the medical profession as a special social group are resented by the generality of citizens. They savour too much of caste and privilege." He talks of the "collective arrogance" of the profession. What an arrogant man!

Long before Mr. Bevan came into the medico-political arena the B.M.A. in the inter-war years had been making its plans for a comprehensive health service for the nation, and between 1942 and 1948 had advocated that this should be for 100% of the population, with the proviso that opportunities for private practice should be safeguarded. But Mr. Bevan remains true to his "pattern of behaviour" in denigrating the B.M.A., setting up against it—in his estimation—the M.P.U.: "The Medical Practitioners' Union, on the other hand, is a progressive body, affiliated to the Trades Union Congress and more up to date in its views." The trouble with Mr. Bevan is that he is the Peter Pan of politics. He does not grow up. In fact he admits this when he writes this in the second chapter of his book: "As I was reaching adolescence, towards the end of the First World War . . ." He was 19 years old in November, 1916, 20 in 1917, and 21 when the war ended in 1918.

## PLASTICS IN SURGERY

The great progress that has taken place in the plastics industry during the last 20 years has led to the wide use of plastics in the manufacture of medical instruments and appliances.[1] The term plastic embraces many substances of diverse chemical structure which have in common the property that at some stage of their development they can be deformed under mechanical stress, without losing their cohesion. This definition includes those substances which in their final state have the property of rigidity. Plastics may be divided into two main groups, thermoplastic and thermosetting materials. Thermoplastic substances are those which can be softened and resoftened as required by the application of heat, whereas the thermosetting plastics undergo a chemical change when heat is applied and set into masses which cannot be re-formed.

Many plastics when buried in the body, because of their low solubility, cause relatively little tissue reaction and are not absorbed; this property has made it possible to leave large masses of plastic in the tissues. Plastics are used in surgery[2] because they are strong and can be relatively easily moulded to a required shape. They are therefore easier to work with than stainless steel and have the added advantage that they are pervious to *x* rays.

The plastics which have been adopted for surgical use all belong to the group of thermoplastic substances. A variety of materials are available, and the more important members of this group are the cellulose derivatives (" cellophane "), polymethyl methacrylate (" perspex," " lucite "), polyethylene (" polythene," " alkathene "), the super-polyamides (" nylon "), and " teflon." The thermosetting plastics such as " bakelite "[3] and the casein plastics,[4] because they cause a considerable inflammatory reaction, have been found to be unsatisfactory.

The amount of inflammatory reaction produced by a plastic varies both with its chemical composition and also with its physical state. When buried in the tissues masses or sheets of polymethyl methacrylate produce little reaction, but Le Veen and Barberio[5] found that if lucite was implanted into the peritoneal cavity as small shavings it caused an extensive inflammatory reaction. A similar finding has been reported in man by Newman and Scales,[6] who found that a polyethylene cup used for an arthroplasty of the hip-joint was abraded and the small fragments of the plastic caused a marked inflammatory reaction. It seems therefore that, although some plastics may appear to be chemically inert, this property depends on the area of surface presented to the tissues. Teflon, which cannot be wetted with water, has been subjected to similar tests by Le Veen[5] and has been shown to produce less tissue reaction than the other plastics.

Although a plastic may be a pure chemical substance other chemicals may be added to it during the course of manufacture, and these latter substances may sweat out of the plastic and cause a severe tissue reaction. Polyethylene film was reported as causing a marked fibrous tissue reaction by Poppe and Oliveira,[7] whereas Ingraham *et al.*[8] found that their samples were almost inert in the tissues. This apparent paradox was investigated by Yeager and Cowley,[9] who found that pure polyethylene film was inert in the body but that sometimes dicetyl phosphate was added to the polyethylene during the course of manufacture, and this produced a film which was highly irritant and caused a severe fibrous tissue reaction. Another difficulty is that the commercial name of a product does not necessarily indicate its chemical structure. Cellophane, for instance, is a descriptive term indicating a plastic material which is produced in transparent sheets; it is manufactured both from cellulose hydrate and from polyethylene.

The first plastic to be used widely in surgery was nylon, which was introduced as a suture material. Apart from the advantage of using a monofilament suture, it has been shown by Aries[10] to produce less reaction in wounds than silk, and in infected wounds leucocytes were found around silk sutures for a longer period of time than around nylon.

Plastics have been used widely in vascular surgery. The use of catheters made from polythene and nylon for intravenous therapy and cardiac catheterization is well known. Tubes of lucite were used experimentally by Hufnagel[11] to bridge arterial defects. Experience of this method of restoring the continuity of arteries, in the second world war, was not encouraging, although in a few cases the tube remained patent. Apart from the tube filling with thrombus, the end of the tube where it is tied into the artery may ulcerate through the vessel wall. The recent development of stored arterial grafts is likely to render this method of arterial anastomosis obsolete. Polyethylene sheet has been used successfully in the treatment of aneurysms. Poppe and Oliveira[7] have successfully treated syphilitic aneurysms of the aorta by wrapping them in polyethylene cellophane which contained dicetyl phosphate. This produced a marked fibrous tissue reaction around the aneurysm. Blakemore[12] has reported the control of arteriosclerotic aneurysms with a rubber band wrapped in polythene tape.

Polymethyl methacrylate has been used with fair success in cranial surgery to fashion plates which will fill in bony defects.[13] It has the advantage over vitallium in being transparent to *x* rays, but suffers from the same defect as vitallium, since an effusion may form around the prosthesis. Originally, because the preparation of the plate took about one and a half hours, the operation had to be performed in two stages. However, Blaine[4] has described a method of preparing the plate which takes about 15 minutes, and this allows the completion of the operation in one stage. Polyethylene film has been recommended as a dural substitute by Brown, Grindlay, and Craig.[14]

Grindlay[15] has described methods for preparing polyethylene tubes for use in the anastomosis of the common bile duct, trachea, and pelvic colon. Polyethylene is not wettable, and therefore it seems

1 Yarsley, V. E., and Couzens, E. G., *Plastics*, London, 1941.
2 Ingraham, F. D., Alexander, E., and Matson, D. D., *New Engl. J. Med.*, 1947, **236**, 362 and 402.
3 Smith-Peterson, M. N., *J. Bone Jt Surg.*, 1939, **21**, 269.
4 Blaine, G., *Brit. J. Surg.*, 1946, **33**, 245.
5 *Ann. Surg.*, 1949, **129**, 74.
6 *J. Bone Jt Surg.*, 1951, **33B**, 392.
7 *J. thorac. Surg.*, 1946, **15**, 186.
8 *J. Amer. med. Ass.*, 1947, **135**, 82.
9 *Ann. Surg.*, 1948, **128**, 509.
10 *Surgery*, 1941, **9**, 51.
11 *Arch. Surg. Chicago*, 1937, **54**, 382.
12 *Ann. Surg.*, 1951, **133**, 447.
13 Elkins, C. W., and Cameron, J. E., *J. Neurosurg.*, 1946, **3**, 199.
14 *Surg. Gynec. Obstet.*, 1948, **86**, 663.
15 *Surgery*, 1948, **24**, 22.
16 *J. thorac. Surg.*, 1948, **17**, 111.
17 Trent, J. C., Moody, J. D., Hiatt, J. S., and McCain, N. C., *Ibid.*, 1949, **18**, 173.
18 Walkup, H. E., and Murphy, J. D., *Dis. Chest.*, 1949, **16**, 18 and 456.
19 Geever, E. F., and Stone, W. F., *Amer. Rev. Tuberc.*, 1950, **61**, 422.
20 *Thorax*, 1950, **5**, 248.
21 Ibid., 1951, **6**, 209.
22 *J. Bone Jt Surg.*, 1950, **32B**, 166.

unlikely that bile salts will precipitate in the tubes. Such tubes were used to restore the continuity of the common bile duct in animals, and the anastomosis was patent a year after operation. These prostheses have been used for the repair of obliterated bile channels in man with satisfactory results. In view of the advances that have been made in reconstituting the ducts by direct suture it is unlikely that this method will be generally adopted.

Interest in plombage for the obliteration of tuberculous cavities has been revived. Wilson[16] reported 15 cases in which hollow spheres of polymethyl methacrylate were used to fill the dead space after extrapleural pneumolysis, but the method has been adversely reported on in several subsequent papers,[17 18] as infection of the extrapleural space and migration of the spheres has occurred. In one case,[19] following infection, a sphere ulcerated into the trachea and caused death from asphyxia. The bad results produced by this technique are probably due to the insertion of foreign bodies into the extrapleural space, where they will press on and cause necrosis of the underlying lung. More satisfactory results have been obtained by carrying out a modified thoracoplasty in which the plombe is separated from the lung by a layer composed of intercostal muscles and the periosteum of the resected ribs. Lucas and Cleland[20] inserted plastic spheres by this method, and Davies, Temple, and Stathatos[21] a polythene pack. Wound effusions occurred frequently in both series, and in some instances the effusion became infected. The method has a place in the treatment of poor-risk cases, because the operation is less severe than a formal thoracoplasty: it can be performed in one stage, and there is no resulting deformity.

The most striking application of plastics has been made in orthopaedic surgery. Arthroplasty of the hip-joint as described by Judet,[22] using a prosthesis of polymethyl methacrylate to replace the head of the femur, has now been carried out many times, and the immediate results have been satisfactory. Whether these plastic femoral heads will wear well over many years is of course unknown. Should abrasion of the prosthesis occur it is probable that a painful stiff hip will eventually develop, and therefore this procedure should be limited, for the present, to patients whose expectation of life is relatively short.

The use of plastics seems thus to be never completely without danger. There is a natural reluctance on the part of surgeons to bury large masses of a foreign body in the tissues, and probably their use will consequently be restricted.

## HUNGER AND HYPOTHALAMUS

Classical ideas of the nature of hunger are more descriptive than explanatory and usually concentrate on its most obvious physical accompaniment, the hunger pang. Yet denervation of the stomach, or even its complete removal, influences the urge to eat very little; whether "hunger" is abolished is a matter of terminology. This semantic difficulty applies with equal force to such terms as appetite, satiety, bulimia, and polyphagia, which, as Brobeck has pointed out, have all acquired subjective psychological connotations. Recent physiological work has emphasized the need for a term which describes the animal's adjustment of the amount and quality of the food it eats to its nutritional requirements in spite of wide variations in the bulk, taste, and chemical composition of the diet. This automatic calorimetry by the central nervous system has been inadequately explained as the response to afferent stimuli from the gut, and it seems clear that the animal must somehow measure the metabolites available to it only after it has absorbed them. This could be achieved by specialized receptor cells sensitive, like the osmoreceptors postulated by Verney, to changes in the blood. But neither the localization of these receptors nor any agreement on the nature of their sensitivity has been achieved.

The precision with which the rat adjusts its intake of food to extreme variations in diet, in activity, and in environmental temperature, together with the fact that the reaction to each of these variables can be affected separately by hypothalamic injury, led Brobeck[1] to postulate that the hypothalamus acts as an integrative and controlling centre. As each of the variables can affect heat production, and as thermosensitive cells are known to exist in the hypothalamus, he suggested that food intake might be controlled as part of the normal control of body temperature, "that the animal eats to keep warm, and stops eating to prevent hyperthermia." In 1943, Brobeck, Tepperman, and Long[2] located accurately near the ventromedial nuclei of the tuber cinereum an area bilateral damage to which produced a sustained increase in food intake. As there were no compensatory changes in activity or in heat loss, the rats rapidly became obese. In the absence of an adequate existing word, Brobeck and his collaborators coined the term "hyperphagia" for the increased eating, and in a series of biochemical studies they showed that there were no changes in intermediary metabolism that could have contributed materially to the increase in weight. This work provided the first adequate explanation of hypothalamic obesity. Recently the group have carried our understanding of the hypothalamic control of food intake a stage further by the demonstration of a second area, lateral to the first and antagonistic to it in its action (Anand and Brobeck, 1951).[3] Damage here, even after induction of hyperphagia by an initial operation, causes a fatal anorexia.

1 *Yale J. Biol. Med.*, 1948, **20**, 545.
2 Ibid., 1943, **15**, 831.
3 *Proc. Soc. exp. Biol. N.Y.*, 1951, **77**, 323.
4 *Proc. roy. Soc. B.*, 1950, **137**, 535.
5 *Science*, 1950, **112**, 256.