employee's contribution, coming on the heels of a 2s. increase in November, is no mean amount for a man earning £10 a week; and with devaluation his cost of living is rising in other directions. It is true that he can look forward to some increase in family welfare benefits; and the full amount of this increase is to be recovered from those who pay tax at the standard rate. Thus selectivity has been introduced for social-security payments; and the Chancellor of the Exchequer hopes to widen this selectivity. The next step should be to extend it downwards, with special heed to the claims of families living below supplementary-benefit level. The Government has already gone a long way towards establishing the number and the needs of these families,[1] and it should not delay in coming to their aid; for they have been badly hit by successive steps to right the economy.

PROTEASE AND CANCER

DEPOSITION of fibrin may be necessary for the local and metastatic spread of malignant growths. Studying the ear-chamber of the rabbit, Wood [2] observed that thrombosis develops around malignant cells, causing them to adhere to the vascular endothelium and invade the vessel wall. He later showed [3] that treatment with fibrinolysin would prevent this happening by dissolving the fibrin and thus freeing the cells. O'Meara [4] found that fibrin forms in advance of an infiltrating tumour and provides a network on which the tumour cells develop. Cliffton [5] then studied the effects of fibrinolytic treatment and of inhibitors of fibrinolysis on induced metastases of various tumours in animals, and he concluded that the incidence of pulmonary metastases was reduced by fibrinolysin and increased by inhibitors of fibrinolysis. Larsen and his colleagues [6] gave intravenous infusions of plasmin to 11 patients with metastasising or inoperable cancer, and in 4 there was evidence of regression of the size of the tumour.

Hitherto the effects of fibrinolysis in cancer have been studied by activating the plasminogen-plasmin system, but now Dr. O'Brien and his colleagues (p. 173) report the effects of protease I, a fibrinolytic enzyme from *Aspergillus oryzae*, in 13 patients with cancer and 1 with occlusive vascular disease. As expected, blood fibrinolytic activity was increased during treatment, but antiplasmin levels were lowered. Patients with cancer tend to have high levels of antiplasmin and of protease resistance. In vitro, protease inhibited both human thromboplastin and the antiplasmin activity of serum, and unexpectedly the inhibition of antiplasmin by protease was enhanced when thromboplastin was included in the test. Since the thromboplastic factor in human cancer has antiplasmin activity, our contributors argue that should the effect of thromboplastin in vitro apply in vivo then the action of protease within a tumour would be potentiated.

Protease seems to be almost non-antigenic, and side-effects, apart from pathological fibrinolytic activity in 3 patients and a coagulation defect in another, were not serious. O'Brien and his colleagues suggest that, by removing fibrin, treatment with protease may limit the motility of cancer cells and thus render them more susceptible to cytotoxic therapy. This work again draws attention to the importance of fibrin deposition in malignancy, and suggests a further means of attacking the cancer cell by destroying the supporting framework it needs for survival and for dissemination.

1. See *Lancet*, 1967, ii, 141.
2. Wood, S. *Archs Path.* 1958, **66**, 550.
3. Wood, S. *Bull. Swiss Acad. med. Sci.* 1964, **20**, 92.
4. O'Meara, R. A. Q. *Irish J. med. Sci.* 1958, **6**, 474.
5. Cliffton, E. E. *Fedn. Proc. Fedn Am. Socs exp. Biol.* 1966, **25**, 89.
6. Larsen, V., Mogensen, B., Amris, C. J., Storm, O. *Dan. med. Bull.* 1964, **11**, 137.

MARRIED AND NURSING

As the age for marriage gets younger and younger (a trend which is biologically wholly desirable), the time which a woman can give to her profession immediately after qualification becomes progressively shorter; but this is potentially counterbalanced by the increasing span which she may expect after childbearing and early child-rearing are completed. Earlier childbearing and labour-saving houses mean that more and more women could (and would like to) give some time to work outside the house. Are we making the fullest use of this last remaining reserve of woman-power? This problem affects all women, but especially those who have taken a long and expensive professional training: and these include doctors, nurses, social workers, physiotherapists—all people whom the National Health Service desperately needs.

The Dan Mason research committee has been studying this question as it applies to nursing.[1] A questionary was sent by post to a sample of registered and enrolled nurses who had qualified six, eleven, and fifteen years before. Unfortunately only 50% of the registered and 40% of the enrolled nurses returned completed questionaries, and this poor response limits the value of the results, for those who did not reply probably included many women who are not nursing and whose reasons for this inactivity would have been of the greatest interest. Even so the results of the survey are useful and have lessons for other professions as well as nursing.

Of the registered nurses who replied, three-quarters were married, as were four-fifths of the enrolled nurses; 61% of the registered nurses and a still higher proportion of the enrolled, whose age-range was greater, were mothers. In both groups the proportion of unemployed or part-time employed was much higher for those with children under school-age. Many held the view that caring for their family should be a full-time occupation; and to this must be added the finding that the longer a nurse is inactive the less likely she is to return to nursing.

Married nurses, both registered and enrolled, agreed that choice and flexibility of working hours and the provision of refresher courses would be the best means of persuading them to return to or remain in nursing. Increased pay was a third incentive. Both part-time and whole-time nurses said that part-timers were often resented by whole-timers, mainly because the part-timer is unwilling (and often unable) to share evening and weekend duties. But this resentment is apparently limited to certain hospitals, and others seem to have discovered how to eliminate it.

A large proportion of the older married nurses were employed outside the hospital service—often with local health authorities. The report suggests that developments in community-health services, and especially in the provision of health centres, would offer openings to more married and part-time nurses. Other interesting and constructive suggestions range from better changing accommodation to crèches. So many of these could be reasonably applied to professions other than nursing that the report should be read by all who wish to counter the wasteful use of our reserve of trained women.

1. Marriage and Nursing. Fifth report of the Dan Mason research committee of the National Florence Nightingale Memorial Committee of Great Britain and Ireland, 175 Cromwell Road, London S.W.5. 1967. Pp. 112. 7s. 6d.

UROKINASE IN THROMBOEMBOLIC DISEASE

ALTHOUGH heparin and oral anticoagulants can reduce thromboembolic episodes and prevent spread of existing thrombosis, they seem to have no direct effect on the thromboembolus itself. Certain peripheral emboli, such as the aortic "saddle" type, are now often treated surgically; but the indications for operation in the treatment of pulmonary embolism are still controversial. Fibrinolytic agents are theoretically of great interest in these conditions, for they would be expected not only to prevent further serious thromboemboli but also to have a direct lysing action on the embolus. Streptokinase is such a drug, but, being a bacterial product, it is antigenic to man, which complicates treatment. Interest has lately centred on urokinase as an activator of naturally occurring fibrinolytic enzymes. It is a normal constituent of human urine, but in very small amounts, and the chief difficulty has been to obtain sufficient quantities, free from thromboplastic contaminants and virus infection, for clinical testing. Being of human origin, it is non-antigenic to man.

In volunteers Johnson et al.[1] found that intravenous urokinase dissolved experimentally induced thrombi in the arm veins. Fletcher et al.,[2] in a clinical study of 32 patients with acute thromboembolic disease, found that intense plasma thrombolytic activity could be induced by urokinase—to several times resting levels. This activity was maintained with only minor disturbance to coagulation systems, and with negligible toxicity. Venographic examination indicated rapid dissolution of intravascular thrombi in several patients during the urokinase infusion.

Tow et al.[3] studied 13 patients with acute pulmonary embolism before and after urokinase treatment, assessing the amount of lung involved by serial lung scans. Urokinase was infused into a peripheral vein by an infusion pump for six to eight hours. 5 patients responded excellently, and lung scans returned to normal or almost normal within twenty-four hours after the infusion. 2 patients had a good response in that at least 50% of the regions of decreased radioactivity on the lung scan had become normal within twenty-four hours. 6 patients showed no response.

In another trial of urokinase in acute pulmonary embolism, Sasahara et al.[4] infused the drug for eight hours directly into the pulmonary artery through a catheter which had been used to measure pressures, cardiac output, and arterial gas tensions. Lung scans, pulmonary arteriography, and hæmodynamic measurements were carried out before and sixteen hours after completion of urokinase therapy. Heparin was then given intravenously for five to twenty-one days before changing to oral anticoagulants. 8 patients were studied, and 7 improved, although improvement was excellent or good in only 2. Of all objective tests the lung scans showed greatest improvement, and arteriographic changes were less impressive. Neither trial disclosed toxic reactions to urokinase, although recurrent thrombotic episodes in a few patients suggested a possibly increased tendency to thrombosis after urokinase was stopped.

The natural history of acute pulmonary embolism is so variable that no definite claim can be made for urokinase on the basis of these results. Nevertheless, they suggest that it is capable of inducing effective thrombolysis in vivo, and that it should be assessed further in a controlled trial by comparing it with heparin in a larger group of patients with recent pulmonary thromboembolism. Other important possibilities arise in the management of acute coronary and cerebral thrombosis.

1. Johnson, A. J., McCarty, W. R., Newman, J. Proceedings of 9th Congress of the European Society of Hæmatology, 1963.
2. Fletcher, A. P., Alkjaersig, N., Sherry, S., Genton, E., Hirsh, J., Bachmann, F. *J. Lab. clin. Med.* 1965, **65**, 713.
3. Tow, D. E., Wagner, H. N., Holmes, R. A. *New Engl. J. Med.* 1967, **277**, 1161.
4. Sasahara, A. A., Cannilla, J. E., Belko, J. S., Morse, R. L., Criss, A. J., *ibid.* p. 1168.

HUMAN BEHAVIOUR IN DISASTER

How much time and effort should be spent on preparing for something that may never happen—earthquakes, for instance, or floods, or cyclones, or giant explosions? Holland has an elaborate system to cope with floods; and, in Sweden and the Soviet Union, training for civil emergencies is compulsory for young and old. But the practicability of a constant state of alertness to every imaginable form of disaster is another thing. In a manual prepared for the Canadian Department of National Health and Welfare,[1] Prof. Horace D. Beach of Dalhousie University concedes that for the general population to live in these circumstances is neither desirable nor necessary. But he believes that a nucleus (10% is tentatively suggested) properly trained to go into action in crises of this kind is both practicable and desirable. Disaster is an extreme emergency; "an emergency, prepared for, ceases to be an emergency".

But where do we begin? How do people behave when society is disrupted? On Dec. 6, 1917, 225 tons of high explosives in a ship blew up in the harbour of Halifax, the capital of Nova Scotia. 2000 people out of a population of 50,000 were killed, 6000 were injured, 200 were blinded, and 10,000 were rendered homeless. The explosion created a tidal wave which drowned nearly 200 people. "To add to the catastrophe, freezing rain, thunderstorms, blizzards, and seventeen inches of snow descended on the prostrate city in the four days following the explosion". In 1917 this was the greatest recorded explosion in history.

But Halifax survived, the behaviour of its citizens on the whole was admirable, and few of the survivors later manifested signs of psychological damage. Greater disasters since then have confirmed the resilience of human beings to overwhelming catastrophe.

The prime need, as Professor Beach and his collaborators see it, is anticipatory planning of communications, coordination, and control, and the establishment of a recognised authority. A common information centre should handle all information going to and from the disaster area. Direct personal contacts, runners, and the simpler communication of messages (such as were used by civil-defence authorities in the U.K. during the 1939–45 war) may be all that is feasible at first. Later, helicopters, light planes, squad cars, and motor bicycles may come into the picture.

Lack of communication and lack of a clear division of

1. Management of Human Behaviour in Disaster. Department of National Health and Welfare, Ottawa, Canada. 1967.