left over from previous bronchitis. Alternatively, when blood cultures are stubbornly negative[7] an exotic organism which is slow growing, or has special growth requirements, or simply cannot be cultured extracellularly, should be suspected—such as *Brucella, Candida,*[8] or a rickettsia.[9] All reported cases of Q fever endocarditis have so far been fatal, for the rickettsiae are insensitive to bactericidal drugs, and an uneasy truce rather than cure is the best that can be achieved with tetracycline and chloramphenicol.

Cardiac surgery has brought iatrogenic endocarditis, usually a staphylococcal infection introduced during operation.[10 11] The situation is particularly serious when a valve prosthesis becomes infected. Bacteria permeate the valve's woven "skirt," whence they can rarely be eradicated by medical treatment. Surgery can help in desperate circumstances. Well-timed excisions of the valve harbouring inaccessible or antibiotic-resistant organisms or intracellular rickettsia, or exchange of an infected prosthesis, may offer the only hope of cure.

Unexplained fever in a patient with rheumatic heart disease poses a common problem. Infective endocarditis rarely attacks patients in advanced heart disease with heart failure; pulmonary infarction or infection, systemic embolism, or active rheumatism is more likely to be the cause of their symptoms.[12] However, bacterial endocarditis is easy to miss, and treatment has to be instituted if doubt remains. In a patient with apparent mitral valve disease a myxoma in the left atrium can mimic infective endocarditis almost perfectly.[13] Here the combination of an unusually high erythrocyte sedimentation rate, abnormal protein pattern on electrophoresis, and intravascular haemolysis in a patient with unusual mitral murmurs and sterile blood cultures should suggest the need to undertake angiography.

Why infective endocarditis should show a predilection for certain cardiac sites and anomalies has been a source of speculation. S. Rodbard's theory has most appeal.[14] He proposed that infection occurs first on an area of damaged intima, the "jet lesion," which develops at the low-pressure end of a high-velocity stream of blood. The disease is thus common in mild aortic regurgitation, severe aortic stenosis, and mild mitral regurgitation, but rare in mitral stenosis and advanced valve disease with heart failure, rare in congenital defects with pulmonary hypertension, and virtually unknown in the ostium secundum type of atrial septal defect.[15]

Reduction in the incidence of infective endocarditis depends on the patient as well as his doctor knowing that preventive measures are needed. Penicillin cover before dental extraction or tonsillectomy is certainly important. Less well known is it that a transient bacteraemia may follow normal childbirth,[16] which should be covered by penicillin and streptomycin in patients with rheumatic or congenital heart disease. The high incidence of unrecognized minor aortic-valve lesions in elderly men indicates a need for routine bactericidal prophylaxis to cover urethral instrumentation.[17 18]

Prevention of recurrent infective endocarditis depends on removal of the source of infection. As *Str. viridans* invasion through the mouth is by far the commonest cause of recurrence, this means impeccable dental care, and since *Str. viridans* endocarditis is virtually unknown in edentulous persons a second attack despite such care is an indication for dental clearance.

Prescription of long-term antibiotic treatment to prevent infective endocarditis is unwise and rests on a misunderstanding. Unlike rheumatic fever, which follows infection only by the β-haemolytic streptococcus, almost any organism can cause infective endocarditis. *Str. viridans* infection is the usual one only because the mouth is the usual portal of entry. A change in the mouth's flora simply ensures that any recurrence will be with the penicillin-resistant organism which has replaced *Str. viridans*.[19] The decreased proportion of cases of endocarditis seen nowadays due to penicillin-sensitive organisms exemplifies this point, and there is much to be said for using sulphonamide rather than penicillin for prophylaxis against rheumatic fever, since the low dose required to prevent infection with β-haemolytic streptococci is insufficient to remove the less sensitive *Str. viridans* from the mouth.

1 Horder, T. J., *Quart. J. Med.*, 1909, **2**, 289.
2 Osler, W., ibid., 1909, **2**, 219.
3 Bain, R. C., Edwards, J. E., Scheifley, C. H., and Geraci, J. E., *Amer. J. Med.*, 1958, **24**, 98.
4 Hughes, P., and Gauld, W. R., *Quart. J. Med.*, 1966, **35**, 511.
5 Barry, W. E., and Scarpelli, D., *Arch. intern. Med.*, 1962, **109**, 151.
6 Harvey, A. M., Shulman, L. E., Tumulty, P. A., Conley, C. L., and Schoenrich, E. H., *Medicine (Baltimore)*, 1954, **33**, 291.
7 Blount, J. G., *Amer. J. Med.*, 1965, **38**, 909.
8 Andriole, V. T., Kravetz, H. M., Roberts, W. C., and Utz, J. P., *Amer. J. Med.*, 1962, **32**, 251.
9 Evans, A. D., *Brit. med. J.*, 1963, **1**, 1613.
10 Hoffman, F. G., Zimmerman, S. L., Bradley, E. A., and Lapidus, B., *New Engl. J. Med.*, 1959, **260**, 152.
11 Geraci, J. E., Dale, A. J. D., and McGoon, D. C., *Wis. med. J.*, 1963, **62**, 302.
12 Elster, S. K., Pader, E., and Horn, H., *Arch. intern. Med.*, 1963, **112**, 476.
13 Goodwin, J. F., Stanfield, C. A., Steiner, R. E., Bentall, H. H., Sayed, H. M., Bloom, V. R., and Bishop, M. B., *Thorax*, 1962, **17**, 91.
14 Rodbard, S., *Circulation*, 1963, **27**, 18.
15 Sellors, Sir T. H., *Brit. med. J.*, 1967, **1**, 385.
16 Redleaf, P. D., and Fadell, E. J., *J. Amer. med. Ass.*, 1959, **169**, 1284.
17 Barrington, J. F., and Wright, H. D., *J. Path. Bact.*, 1930, **33**, 871.
18 Vogler, R., and Dorner, E., *Bull. Emory. Univ. Clin.*, 1961, **1**, 21.
19 Garrod, L. P., and Waterworth, P. M., *Brit. Heart J.*, 1962, **24**, 39.

T.N.M. Marches On

The International Union Against Cancer (U.I.C.C.) has always given special attention to the problem of the clinical classification of malignant tumours. The practice of dividing cancer cases into groups according to so-called stages arose from the known fact that the crude survival or apparent recovery rates were higher for cases in which the disease was localized than for those in which the disease had extended beyond the organ of origin.

These groups are often referred to as "early" or "late" cases, erroneously implying some regular progression with time. In fact the stage of disease at the time of diagnosis may be a reflection not only of the rate of growth and extension of the neoplasm but also of the type of tumour, the tumour–host relationship, and the interval of time between the first symptom or sign recognized by the patient and the time of diagnosis or treatment. These complex interrelationships are an obstacle to any perfect classification. Though this is a different concept from staging, it is equally a challenge to the recording of precise information on the extent of the disease. This will make possible a clinical description which may serve a number of related objectives. These are, briefly, to aid the clinician in the planning of treatment, in making a prognosis, in assisting in the evaluation of the results of treatment, and facilitating the exchange of information between centres and individual specialists.

The basic requirements of any system are that it should be simple, practical, and sensible. If it is not these things it will have little chance of being adopted on a world-wide scale. The seed of the T.N.M. system, as it is generally called, was planted by P. F. Denoix in Paris and germinated between

the years 1943 and 1952.[1-3] In 1953 the U.I.C.C. Committee on Tumour Nomenclature and Statistics, the chairman of which was Dr. Isabella Perry (U.S.A.), met with a committee appointed by the International Congress of Radiology and reached agreement on a general technique for classification, staging, and presentation of results of treatment. Then the Research Commission of the U.I.C.C. appointed a permanent committee for the purpose of classifying, by the T.N.M. system, tumours at various sites, and under the chairmanship of Dr. Denoix (France) the following sites have been so classified at the present time: breast,[4] bladder,[5] buccal cavity (including lip), pharynx and larynx,[6] thyroid gland,[7] lung,[8] oesophagus, stomach, colon, and rectum (excluding anal canal),[9] cervix uteri, corpus uteri, and ovary,[10] and skin (including melanoma of the skin).[11] Eight brochures in English, French, and Spanish have been published by the Geneva Office of the Union covering these sites. The first brochure to be published was on the breast in 1960 and the most recent sites classified were the cervix and corpus uteri, ovary, and skin. These were made available at the Ninth International Cancer Congress at Tokyo last October. The general policy of the Union is that classification of any site should be adopted for a trial period of five years, after which time criticisms of the classification and proposed modifications should be submitted to the committee for discussion.

The principles of the T.N.M. system are straightforward. The initial letters stand for: T the tumour, N the regional lymph nodes, and M distant metastases. Numbers are added to these three letters to indicate a progression in the extent of the malignant process and provide in effect a kind of shorthand notation of the particular tumour to be recorded. For example, a surgeon familiar with the system might describe a patient with cancer of the breast as T3 N2 M0. This would indicate that the tumour was of a certain size (more than 5 and less than 10 cm. diameter) *or* that it was causing ulceration of the skin, *or* that it was adherent to the pectoral fascia; that the axillary nodes were palpable and fixed; and that there was no clinical evidence of distant metastases. An essential rule of the system is that the T.N.M. description of a tumour is applied to cases not previously treated, and the description of the extent of the disease must be determined and recorded on clinical examination only. Clinical examination includes diagnostic radiology of any sort and endoscopy of any type. Operative findings are excluded except in the case of the ovary for the obvious reason that many tumours—for example, breast, lung—are treated without the more definitive information which is provided by exploratory operations. The purpose of T.N.M. is to define categories for all cases, however advanced when first seen, and also to allow subsequent and more detailed information to be added without changing the original description of the tumour.

Twelve years is a short time in medical history. One of the things which was evident at the Ninth International Cancer Congress was the general acceptance among the delegates from so many countries of the T.N.M. system. There are still difficulties to be overcome and it is possible that some of the definitions for various sites may require alteration in years to come. There can be no argument, however, that T.N.M. is here to stay and that the system deserves the attention of all specialists in the cancer field.

[1] *Bull. Inst. nat. Hyg. (Paris)*, 1946, **1**, 70.
[2] Ibid., 1950, **5**, 81.
[3] —— 1952, **7**, 743.
[4] International Union Against Cancer. Research Commission. Committee on Clinical Stage Classification and Applied Statistics, *Malignant Tumours of the Breast*, 1959. Union Internationale Contre le Cancer, Geneva.
[5] —— *Malignant Tumours of the Urinary Bladder*, 1963. Union Internationale Contre le Cancer, Geneva.
[6] —— *Malignant Tumours of the Oral Cavity (Including the Lip), the Pharynx, and the Larynx*, 1963. Union Internationale Contre le Cancer, Geneva.
[7] —— *Malignant Tumours of the Thyroid Gland*, 1966. Union Internationale Contre le Cancer, Geneva.
[8] —— *Malignant Tumours of the Lung*, 1966. Union Internationale Contre le Cancer, Geneva.
[9] —— *Malignant Tumours of the Oesophagus, Stomach, Colon, and Rectum*, 1966. Union Internationale Contre le Cancer, Geneva.
[10] —— *Malignant Tumours of the Cervix Uteri, Corpus Uteri, and Ovary*, 1966. Union Internationale Contre le Cancer, Geneva.
[11] —— *Malignant Tumours of the Skin, including Melanoma*, 1966. Union Internationale Contre le Cancer, Geneva.

Closer Links

In a painstaking assessment of future needs in the mental health services the Western Regional Hospital Board for Scotland[1] has advocated a much stronger link between mental hospitals and general hospitals. But a memorandum[2] prepared by the Royal Medico-Psychological Association points to fears among a majority of British psychiatrists that the amalgamation of psychiatric with general hospital groups would carry disadvantages sufficiently serious to justify postponement of further action at present. This apparent conflict of views reflects a dilemma that mental-health planners are now facing.

There is wide agreement that closer links between psychiatric and general hospitals bring improvements in services, status, and relationships for both staff and patients. Psychiatric patients are entitled to high standards of specialized surgical and medical care, just as patients in medical and surgical units should have the advantages of skilled psychiatric care and consultation within the general hospital. District general hospitals ought to have facilities for treating patients suffering from acute mental disturbances. Delirious states, attempted suicide, and somatically presenting psychiatric disorder are part of the daily life of any hospital, and many acute psychiatric disorders presenting as such can conveniently be investigated and treated in the setting of a general hospital.

The case for larger psychiatric units in general hospitals, aiming at the provision of comprehensive local services, is less well established. Where they are truly integrated with the rest of the hospital such units provide stimulating and congenial working conditions for medical and nursing staff and offer their patients freedom from the stigma still associated in some people's minds with mental hospitals. The danger is that the unit may become an isolated bastion within, but not of, the general hospital. The absence of long-stay facilities poses additional problems for integration of services and creates a stigmatized group of patients not fitting into the general hospital pattern. Psychiatrists fear that financial support for psychiatric developments may become subject to direct competition with the needs of medicine and surgery within the hospital or group. They also suspect that committees accustomed to the problems of a hospital with a high rate of bed occupancy and to dealing with patients who

[1] *Hospital Survey and Draft Proposals for Mental Health Services*, 1966 (released 1967). Western Regional Hospital Board.
[2] Memorandum on Amalgamation of Psychiatric with General Hospital Groups, *Brit. J. Psychiat.*, 1967, **113**, 235.
[3] *Brit. med. J.*, 1966, **2**, 655.