only 0·4% of patients required amputation of the terminal phalanges, there were no deaths, and disability was slight. Raynaud's phenomenon may precede overt systemic disease, and this should be remembered in assessing apparently primary cases.

The prognosis of secondary Raynaud's disease depends on the cause. When that is remediable—for example, cervical rib—a cure is possible, but conversely when a severe general disease is present the outlook will be that of the causative condition. Since scleroderma, or progressive systemic sclerosis, is an important secondary cause, the prognosis in this condition has received considerable attention. It is a serious disease, and in one series of over 700 cases 30% died within five years.[5] Other authors have quoted five-year survival figures as low as 50%.[6] But in the "C.R.S.T. syndrome" (calcinosis, Raynaud's disease, sclerodactyly, and telangiectasia) the prognosis is good even if the patient has oesophageal aperistalsis.[7 8] This has recently been confirmed.[2] It has also been recently shown[2] that sclerodactyly alone is sometimes associated with oesophageal aperistalsis, and that the prognosis in these patients is also good.

The treatment of primary Raynaud's phenomenon is apt to be unsatisfactory. In mild cases the patient should be advised to wear loose, warm clothing on the extremities and avoid so far as possible exposure to cold. As many patients are thin, a high-calorie diet may help, and allaying mental stress is sometimes of value. Smoking should be prohibited. Rauwolfia derivatives in small oral doses on a continual basis are sometimes beneficial. In more severe cases lumbar or cervical sympathectomy has been advocated and gives some relief, but it is justified only when symptoms are disabling or digital gangrene is present. Surgical amputation of the terminal phalanges is occasionally required. When serious disease has been excluded a simple explanation and reassurance is appropriate and often in itself helpful to the women suffering from this condition, as the prognosis in primary Raynaud's is generally excellent. These general measures are also of value to patients with secondary Raynaud's disease, but when possible treatment of these patients should be directed at the underlying disease process.

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Acute Myocarditis and its Sequelae

Acute infective myocarditis probably occurs frequently but is less often recognized. Congestive cardiomyopathy is the name given to left ventricular pump failure after exclusion of structural heart disease, hypertension, and known causes of heart muscle disorder. This form of cardiomyopathy is heart failure of unknown origin,[1] but a neat and reasonable explanation of it would be that it is caused by myocardial damage resulting from previous infective myocarditis. Careful follow-up studies on patients with infective myocarditis are therefore of great interest, and P. Gerzén and colleagues from Danderyd, in Sweden, have recently described their observation on 45 cases.[2] These patients had been admitted to an infectious diseases hospital with various acute infections. In 12 cases the infection was of bacterial origin, in 3 due to mycoplasma or psittacosis, in 7 of proved viral origin. In the other 23 patients the cause was not identified.

Symptoms related to the myocarditis were mild or absent in the majority of patients, and recognition of the myocardial complication was generally based on the development of transient and usually localized T wave inversion in the electrocardiogram. Only one patient developed evidence of acute heart failure, and this was in association with a pericardial effusion. Pericardial friction rubs were heard in 11 other patients, who may have had what is usually termed "acute benign pericarditis." Only one patient developed tachycardia and dyspnoea. It seems, therefore, that these patients had relatively mild disease of the myocardium. All of them recovered, and all except three had lost the E.C.G. abnormality within a year of the illness. One of these patients showed occasional supraventricular ectopic beats and two had localized flat and biphasic T waves.

Tests of physical working capacity carried out on a bicycle ergometer showed no abnormality in any of these patients, and the authors came to the conclusion that the prognosis of myocarditis seems to be very good. But they point out the possibility of relapse and also remind us that the most severe and fulminating cases are likely to be admitted to the acute medical wards of a general hospital or cause sudden death.

Acute myocarditis and pericarditis of viral origin is now well substantiated. All the coxsackie B viruses can cause it, as can Echo 6, Echo 9, Echo 30, and influenza A_2 viruses.[3 4] Myocarditis during the course of infectious mononucleosis, now attributed to infection with Epstein-Barr virus, is also well recognized. As a complication of the acute childhood exanthemata myocarditis is rare, and in acute bacterial infections it is usually not a clinical problem, though transient E.C.G. changes are frequent, particularly in pneumonia. Early in the illness there is often evidence of viraemia, with symptoms from more than one system, and pneumonia, encephalitis, or meningitis as well as myocarditis. Widespread myalgia may provide a clue to the presence of myocarditis in a patient with a virus illness.[5] Clinical suspicion of the complication of myocarditis should be awakened when considering any severe virus illness, but it is especially likely if tachycardia rises out of proportion to the height of the fever and certainly if it is accompanied by a prominent gallop rhythm in an adult. A pericardial friction rub, indicating pericarditis, also leads to suspicion of myocarditis, but when the disease is mainly in the myocardium the rub does not develop. Intracardiac murmurs are rare, though a transient apical systolic bruit attributable to functional mitral regurgitation may be heard in the most severe cases.

The electrocardiogram is the most sensitive indicator of myocardial disorder and shows diffuse or focal repolarization changes, sometimes with transient conduction defects. Ectopic beats and atrial or ventricular dysrythmias may occur. In severe cases sinus tachycardia and low-voltage QRS complexes are striking.

Slight cardiac enlargement may be missed on the chest radiograph because of orthostatic blood pooling in the upright position in the sick patient, and in any case heart size cannot well be judged from a portable film. Great increase in heart size is unusual in acute myocarditis and when present suggests pericardial effusion. Suspicion is

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strengthened if, despite the cardiomegaly, gallop sounds are not heard. The existence of an effusion can be confirmed atraumatically by ultrasonics. Acute "benign" pericarditis may not be accompanied by clinical evidence of accompanying myocarditis, or the signs may be overshadowed. And, though the disorder is usually well named, a few patients progress rather quickly to cardiac constriction. A few others develop a relapsing illness with many recrudescences of fever, chest pain, pericardial friction, and effusion.

There is no specific treatment. Drugs are indicated only if there is evidence of myocardial failure, in which case digitalis and diuretics should be given. Aspirin is helpful for patients with pericarditis, particularly when they have precordial pain, but corticosteroids should be avoided because of the risk of propagating an underlying virus. Pericardial aspiration may be carried out for diagnostic purposes or may be needed to relieve tamponade. It is usual to prescribe rest and careful convalescence for patients with acute myocarditis, and during the acute stage rest will minimize cardiac volume, cardiac work, and metabolic need. The risk of venous thromboembolism must be recognized in such patients, and passive foot exercises should be instituted. Convalescence ought to be delayed until all abnormal physical signs have disappeared but need not wait upon the resolution of T wave changes on the E.C.G. The patient should undertake carefully graded increases in physical exertion during the convalescent period until he is fully fit.

In mild cases, when the presence of myocarditis is signified only by slight or focal E.C.G. changes, the case for prolonged rest is far less good. Advocates of it cite the occasional sudden death in patients convalescent from acute and apparently uncomplicated influenza as well as the evidence from animal experiments that physical activity may be deleterious in the active stage of a myocardial infection.[6] Their antagonists emphasize the benefits of early mobilization and active physical rehabilitation for the restitution of physical fitness and to minimize the chance of the development of a cardiac neurosis.[2] It is certainly true that there is no evidence of a need for prolonged inactivity in these patients. The high rate of complete recovery of the Swedish patients in Gerzén's series, who were encouraged to return to normal physical activity as early as possible, encourages this view.

The persistence of a cardiac abnormality after virologically proved myocarditis has been well documented.[3 7-10] But it remains uncertain in what proportion of patients with congestive cardiomyopathy a previous virus infection may have been responsible. Sometimes these patients give a history suggesting that the cardiac disability started abruptly with a brisk illness of influenzal type, after which heart failure was first recognized. But left ventricular failure can be mistaken for bronchitis or "virus pneumonia," and this introductory illness may simply draw attention to a chronic myocardial disease which is likely to remain asymptomatic until pulmonary congestion or oedema occurs.

It seems, therefore, that though death may result from myocardial failure or sudden dysrhythmia during the acute phase of myocarditis[10 11] complete recovery is otherwise to be expected in most patients. The results of the follow-up studies and the fact that no trace of such previous infection is to be found in the myocardium of patients with congestive cardiomyopathy, either in biopsy specimens or after death, make it unlikely that many cases are postinfective.

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Ivory Tower Economics

One of the features of modern scientific research is the high cost of much of the equipment used, and this together with the proliferation of research institutes and new universities has made research a big business in financial terms. As a result research workers can no longer afford to maintain their traditional isolation from the practical day-to-day world. They have to find a source of income for their projects and make sure that the source will not dry up. Recent events have shown the hazards: first there were cuts in university expenditure and these were followed by the Government's plans[1] for diverting resources from the research councils to its major departments. Clearly when times are hard the universities and the health services must expect to be included in general economies, but such events make long-term research planning very difficult.

Another way in which economic events can impinge on research is shown in the latest annual report[2] of the Nuffield Foundation. Much of its income comes from shares in the British Leyland Corporation, and when the motor industry has a lean time this income falls precipitously. From over £1 million in 1970 the return from investments fell to £255,608 in 1971. Fortunately unallocated income brought forward from the previous year meant that the trustees had no difficulty in making the grants they thought necessary.

Among medical projects currently supported by the Nuffield Foundation are studies of the biochemical effects of high altitude, further investigation of Rhesus haemolytic disease, and follow-up studies of babies surviving immaturity or asphyxia at birth. Much of its support continues to be given to research in the medical sciences—in particular in neuropharmacology and kidney physiology. Since its creation 28 years ago the Nuffield Foundation has paid out over £30 million in grants, more than £5 million of which has been given to medical research projects. Such sums may, as the report says, be small compared with Government expenditure, but in terms of results they seem to have been remarkably well spent.

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