murs not due to mitral stenosis but simulating it (the Austin Flint murmur), and the U.C.G. permits differentiation. In case of severe aortic regurgitation of acute onset the rapid overfilling of the left ventricle due to aortic reflux can produce an early rise in left ventricular diastolic pressure, which causes the mitral valve to close in diastole well before the left ventricle starts to contract. This premature closure of the mitral valve curtails diastolic inflow from the left atrium, reduces cardiac output, and indicates an urgent need for aortic valve replacement.[5 13]

The U.C.G. provides an accurate but not particularly sensitive method of detecting pericardial effusion. Dr. Ramsey Benham described how fluid may be sought either anteriorly or posteriorly to the heart. Its detection depends on finding an echo-free space external to the free wall of the heart. Dr. Benham recommends looking in front of the heart for fluid. When a pericardial effusion is present the immobile anterior chest wall is separated from the moving surface of the right ventricle by a compressible, fluid-filled space. This echo-free gap varies in width with the cardiac cycle.[14]

Study of the cavity and walls of the left ventricle was described by Dr. D. G. Gibson. He found that the distance between the endocardium of the ventricular septum and the endocardial surface of the posterior wall of the left ventricle measured by U.C.G. bears a predictable but empirical relationship to the volume of the left ventricle measured angiographically. The cube of the U.C.G. dimension approximates to the angiographic volume both at the end of systole and at the end of diastole.[9] U.C.G. can also be used in the study of localized abnormalities of wall movement caused by conduction defects or local disease.[10]

The modern uses of U.C.G. have been extolled in these columns before.[15] As its technology improves its applications multiply at an astonishing rate, and it can be compared with electrocardiography 30 years ago. In only a few years it has become indispensable to many cardiologists in permitting the clinic investigation of patients who would have otherwise required admission for more arduous or relatively hazardous invasive investigations.

It is of special value in hospitals with a cardiologist but without facilities for cardiac surgery as a screening method for patients who are being considered for further examination in a specialist unit or for operative treatment. In this way it should speed diagnosis, save unnecessary referrals to other hospitals, reduce time spent in hospital, and limit the more hazardous, uncomfortable, and expensive invasive diagnostic procedures.

At the symposium it was possible only to deal with the better established uses of U.C.G. and some of the most exciting new developments could not be covered. Congenital heart disease was omitted from discussion, but U.C.G. is now being used in the initial screening of newborn babies as well as in the recognition of many congenital cardiac abnormalities.[6-8] In the newborn it permits recognition of the two most common conditions which present in the first week of life. They are transposition of the great arteries (these babies require to be taken straight to the catheterization laboratory for therapeutic balloon septostomy) and hypoplastic left heart (uncorrectable and soon fatal). In the diagnosis of single ventricle U.C.G. is probably more accurate than angiocardiography. In the young child the number and disposition of the cardiac chambers and of atrioventricular and semilunar valves are fundamental to the diagnosis and can be accurately perceived by U.C.G.

This meeting was the first teaching symposium to be held by the British Cardiac Society, and Dr. Arthur Hollman is to be congratulated on its organization. Others should surely follow and may be attended, it will be hoped, with the same success.

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Vaccines against Influenza

While polio vaccines have largely eliminated poliomyelitis, influenza vaccines have certainly not eliminated influenza, and some people think they are of little use. This view can arise from a misunderstanding in that cases of clinical influenza which occur outside influenza epidemics are not usually due to the influenza A or B viruses contained in the vaccine, and therefore cannot be prevented by its use. Nevertheless, the deaths and severe illnesses which occur during epidemics run into thousands and it should be possible to reduce these by the judicious use of vaccine.

In some ways influenza vaccines have improved considerably in recent years. At one time production was delayed by the time taken to adapt new strains to growth in the chick embryo. Now hybrids between the new strains of influenza A and laboratory strains are prepared, and these grow to high concentration in eggs.[1] This means that production can be started earlier. The virus contained in the fluids produced is better purified than in the past because of the introduction of zonal centrifugation.[2] The antigenic composition has to be constantly updated so that the antigens included in each dose correspond with the viruses found in epidemics. The present vaccines contain the A/Eng/42/72 strain, which has replaced the variant of Hong Kong serotype throughout the world, and also a new B/Hong Kong/5/73 strain,[3] which might cause the next influenza B epidemic. If given at an appropriate time—a few weeks to a few months before the epidemic—these vaccines would give substantial but not complete protection, provided there is no unexpected antigenic change in the viruses circulating in the community. Since influenza epidemics, if they occur, usually do so between January and April, it would be appropriate to give vaccine about now. It should be given to people at risk of taking the disease badly, particularly the elderly, and those with chronic chest or other diseases such as diabetes. The virus strains causing recent cases of influenza A in Britain and those which caused outbreaks in Australasia are antigenically different from the A/Eng/42/72 type. However, the present vaccine is likely to give protection against this virus.

The present vaccines still have disadvantages and research is trying to overcome them. For example, intact virus particles have toxic effects, so vaccines made of virus split by detergents are available. The advantage conferred is not very noticeable. They still contain components of the host and the internal parts, which at best do no good, and the present objective is to produce a vaccine containing only the two surface antigens, the haemagglutinin and the neuraminidase, which are important in protection. Such virus peptides may not be stable or very antigenic, and a vaccine made in this way is still only a hope, though probably all the techniques needed to develop it are now available.

Many people will not take influenza vaccine because it requires an injection, and this is a point in favour of the intranasal vaccines now on the market. They consist of the same components as a saline vaccine but freeze-dried and put up in an aerosol container. The idea is an old one, brought forward again recently, that the antigen deposited in the area attacked by the infection gives rise to a local immunity. In the case of influenza it is clear that there are local antibodies to influenza viruses and that these contribute to protection, though probably less than circulating antibody.[4] However, on the whole we get less antibody response, both local and circulatory, from antigen given locally than from the same amount given by injection, and the evidence[5] that this form of vaccination is protective when used in the field is not as good as that for injected vaccine.

It would be valuable if an adjuvant were available which would improve the immunity given by the vaccine and increase its duration. Mineral oil emulsion seemed to be such a material, but though it was trouble-free at first it fell into disfavour owing to unpleasant local reactions. A similar emulsion made with peanut oil was developed in the U.S.A. It causes less local reaction in animals, and after observation on thousands of people has caused no local reactions.[6] It probably is a less good adjuvant than mineral oil, as judged by its effect in increasing titres of antibody, but it certainly seems to be better than saline. It may soon be available in Great Britain. At the moment there are no field evaluations of how effective it will be in the face of natural infection, but it is likely to be at least as good as saline vaccine. It remains to be seen whether extensive use, including administration under conditions other than those of a research programme, will prove it to be free of unacceptable local effects.

Steady progress is being made in the development of living vaccines. These may be easy to give by the nasal route, acceptable, economical, and also protect well. But they are not yet available for use in Britain.

It would be much easier to decide how to use vaccines if we had a good long-range forecasting system for the future antigenic epidemic behaviour of the virus. Attempts to anticipate the behaviour of the virus by exposing it to antibody in the laboratory were partly successful with the haemagglutinin[7], but unsuccessful with neuraminidase, and there is little hope for the future there. In the U.S. army[8] and in schools which have adopted a regular programme of influenza vaccination the impact of epidemic influenza has certainly been reduced. The results of an extensive study in students by the Public Health Laboratory Service may give us a firmer idea of what we can expect of standard saline vaccine and how to use it.

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Seat Belt Injuries to the Colon

It is generally agreed that the introduction of seat belts into cars has saved lives and reduced the incidence and severity of injuries to the occupants. The reduction has been estimated in an American study to be by 35%[1] and in a British investigation by 51%.[2] Another estimate puts the saving of lives in this country as a potential 1,000 a year, with a reduction of serious injuries by 14,000 if the wearing of seat belts was made compulsory as is already the practice in France, Australia, New Zealand, and Czechoslovakia.[3]

Yet in the past ten years increasing numbers of examples of injuries due to the wearing of seat belts have been reported, and the term "seat belt syndrome" was introduced to describe them.[1] Of 3,325 car occupants wearing seat belts and involved in accidents that were studied 30% sustained some damage, but only 26 (0·75%) had severe injuries. These injuries appeared to be secondary to the restraint provided by the seat belt, as the victim of the accident is rapidly decelerated while inertia forces him forward against the straps holding him to the car frame.

Many accidents appear to be due to faulty wearing of seat belts. A recent study by *Drive*,[3] the magazine of the Automobile Association, found that 19 out of 20 motorists wear their seat belt in a faulty and potentially dangerous manner, that instructions issued with seat belts are often vague, that rear seat belts are rarely fitted or requested, that inertia-reel automatic seat belts, which are becoming more and more popular, may not give as much protection as static belts, and that in some cases it is impossible to adjust the belt correctly. Where a combined lap-strap and diagonal belt is used the buckle or the point where the lap and diagonal belts intersect must be at the side of the hip and not the front, the lap section must always lie on or below both iliac crests and not be allowed to creep up over the abdomen, the belt must be worn as tightly as comfort allows, and it must not be allowed to be either twisted or snagged on the seat. This review concludes that unnecessary injuries from seat belts result from people not being told how to wear them properly or because the belts are not well enough designed in the first place.

The "seat belt syndrome" in general comprises three distinct groups[4]: abdominal injury, injury to the spinal column or pelvic girdle, and thoracic injury. The lap-strap belt is associated with soft-tissue injuries of the abdominal wall. Intra-abdominal trauma predominantly involves the hollow viscera and the mesenteries and is associated with injuries to the lower spinal column and pelvic girdle. Diagonal belts may produce soft-tissue injuries to the chest wall, fractures of the thoracic cage and upper vertebral column, and intra-abdominal injuries, particularly to the solid viscera in the upper abdomen. The combined lap-strap and diagonal system, which is now common in Btitain, is associated with injuries to the trunk, the abdominal viscera, the cervical and upper thoracic spine, and fractures of the thoracic cage. The small intestine and its mesentery are the commonest abdominal viscera to be injured, but there are reports of trauma to the bladder, kidneys, common bile duct, stomach, duodenum, pancreas, spleen, the gravid uterus, and the colon.

Isolated seat belt injuries of the colon are occasionally seen. J. B. Towne and J. D. Coe[5] described four cases. They considered the injury was likely to be the result of shearing of the bowel between the vertebral bodies on the one hand and the anterior abdominal wall with the seat belt on the other. The risk