day. Data processing by a computer-based reporting and record store is essential if such a system is to work. The possible effects of such centralization are disturbing; impersonal service, complex administration, rethinking on technician and graduate training, effect on staff morale, and the role of satellite laboratories are all problems to be faced. Patient care will require concentration of those requiring special investigation in the hospital containing the central laboratory and the laboratory itself should be sited centrally in the parent hospital. Clinical fashions and administrative barriers will have to be broken.

The effect of such centralization and automation will tend to cause a profound revolution in our pattern of working, but should release the medically qualified personnel from much that is mundane and routine and allow them to carry out the task they are best qualified to do, namely, research and development, and to play a greater role either directly or indirectly in patient care.

**The Effect of Centralization on Laboratory Procedure in Histopathology**

H. K. WEINBREN (University of Nottingham)

With the development of newer techniques, reorganization of hospital groupings and the possibly reduced numbers of histopathology technicians qualifying from training schools, new methods have to be devised for increasing the service load and at the same time relieving technicians of the chore of routine cutting and staining.

Of the possible modifications to existing systems, the main changes envisaged in some new developments involve automatic linkage stations between existing mechanical procedures. Selection of blocks is to be made after macroscopic details are recorded with the help of a suitably programmed two-way computer, the data are stored, and individual print-out notes accompany each specimen.

Tissue processing and vacuum embedding is effected by means of a linear system involving features found in commercially available apparatus and an electronically controlled linkage being developed between paraffin block production and orientation in a mechanical microtome, in which some knife renewal system is incorporated.

The linkage between section cutting and mounting is provided by temperature-controlled water flow for floating sections and a vertical belt carrying slides to which the sections adhere. Mounted slides are delivered to a staining machine and cover slips may be replaced by a mechanized transparent spray.

**Effects of Centralization on Laboratory Services**

M. T. PARKER (Central Public Health Laboratory, Colindale)

The main activity in clinical microbiology is identifying medically important microorganisms in specimens from patients. Centralization would create problems if it removed this work from the point at which clinical and epidemiological decisions have to be taken. Fortunately, present techniques in diagnostic bacteriology are so primitive and so dependent on personal judgment that there is little to be gained from centralizing them further than to the area served by a group laboratory.

The other activities in clinical bacteriology are secondary identification processes, e.g. typing and the identification of rare or 'difficult' organisms, and the detection of antibodies in patients' sera. Here, centralization is sometimes inevitable, but must be justified in each case and usually by one of the following considerations. (a) In a few specialized fields it may be necessary to centralize 'on a person', i.e. the national expert. (b) When a technique is difficult to perform a special laboratory may have to be set up to carry it out. But most examples of centralization 'on a technique' are in fact examples of centralization 'on a reagent'. Here, the main obstruction to decentralization is the reluctance of the special laboratory to become merely a producer of reagents. This can usually be overcome by cautious devotion to selected regional centres. (c) Centralization to achieve an optimal workload often leads to increased efficiency and may often give a quicker service. Virology is a special case, because a credible virological service can seldom be provided except in a relatively large laboratory unit.

**The Effect of Centralization on Laboratory Services in Chemical Pathology**

I. J. L. GOLDBERG (St. Mary's Hospital, London)

It is not realistic to think in terms of geographical centralization until new district general hospitals are built. Administrative centralization, however, is possible at an earlier stage and this could take the form of cooperation in the provision of biochemical services for about three adjacent groups or areas serving a population of between a half and three-quarters of a million. This development is made possible by the recognition of eight or more subspecialties of clinical biochemistry. These could be distributed among the contributing hospitals thereby retaining a significant biochemical 'presence' on the spot at each acute hospital.

The effects will be beneficial in providing an improved analytical and consultative service and the problems created in staff training, data communication, patient identification, and specimen transport and are not impossible to solve.

**The Grouping of Staphylococci and Micrococci**

A. C. BAIRD-PARKER (Unilever Research Laboratory, Colworth/Welwyn, Colworth House, Sharnbrook, Bedford, England)

The Gram- and catalase-positive, clumping forming cocci belonging to the genera Staphylococcus and Micrococcus can be separated by the ability of numbers of the former genus to grow in the absence of glucose and under these conditions to ferment glucose. Staphylococci can be grouped into two quite distinct species, Staphylococcus aureus (the type species) and S. epidermidis: the latter organism is produced frequently, although incorrectly, referred to as S. albus in the medical literature. They are distinguished in the laboratory by such characteristics as cell wall structure, growth requirements, and metabolic activities such as the production of enzymes, clotting animal plasmas (coagulases) by S. aureus. Staphylococcus aureus can be subdivided into several ecotypes based on differences in biochemical properties, serology and phage sensitivity of strains isolated from human and animal sources. Staphylococcus epidermidis can be divided into a number of biotypes corresponding to Baird-Parker's Staphylococcus subgroups II, III, IV, and VI, i.e. (subgroup V) was subsequently shown to be indistinguishable from II) and into a number of phage types. There is some correlation between phage type and biotype, but this is far from clear cut. Five species are at present recognized in the genus Micrococcus. These are: Micrococcus luteus (the type species), M. lactis, M. morrhuae, M. saprophyticus and M. roseus. It...
The Association of Clinical Pathologists: 87th general meeting

The Cultural, biochemical, and physiological properties of Micrococcus subgroup 3 are described and compared with those of Staphylococcus aureus. Strains isolated from patients are moderately resistant to penicillin, highly resistant to novobiocin, and variably resistant to some antibiotics such as fusidic acid. Preliminary ecological studies have been carried out utilizing a selective and indicator plate which contains novobiocin, mannitol, and bromccresol purple.

The Opportunist Pathogenicity of Coagulase-negative Staphylococci

For nearly a century golden pigmented Staphylococcus aureus strains have been regarded as the only pathogens in the genera Staphylococcus and Micrococcus, and acceptance into routine practice of the coagulase test some 30 years ago appeared to confirm the general view that coagulase-negative strains with whitish pigment could safely be disregarded. When these organisms were cultured from blood, cerebrospinal fluid, or urine many workers ignored them as contaminants, despite some 90 isolated references since 1900 to bacteraemia caused by coagulase-negative staphylococci, frequently associated with pre-existent cardiac damage (Smith, Benes, Kingsbury, and Hasenclever, 1958). Now, however, in addition to this role, they are widely recognized as colonizers or invaders of internal artificial prostheses, usually with a concurrent bacteraemia, and the work of Gallagher, Montgomery, and North (1965) and of Mitchell (1968) has established them as primary pathogens of the urinary tract.

Investigations into the colonization of ventriculoc-atrial shunts revealed that in almost all the cocci responsible for this troublesome complication belonged to Baird-Parker's subgroup Staphylococcus aureus II which was found commonly, but by no means exclusively, on the skin of patients and staff in hospital and of subjects of all ages in normal environments (Holt, 1969).

Since these opportunistic potential pathogens were all coagulase-negative, their lysozyme and deoxyribonuclease activities were investigated as additional possible criteria. Almost all strains from colonized prostheses failed to produce either enzyme, whereas over 50% of strains from the urinary tract were lysozyme positive and 27% were DNase positive. It is suggested that the slow, indolent colonizing strains are more successful invaders because they provoke a very little somatic response.

References


In an effort to identify the site of blood stream invasion, a staphylococcal survey of various sites in the affected babies was undertaken. The sites were conjunctival sacs, nostrils, pharynx, skin of the antecubital fossa from which the blood for culture was taken, umbilicus, urine, stools, and perineum.

An attempt to group the isolates was made by pigment production, antibiotic resistance, agglutination by random sera, agglutination by serum from the baby affected, and by the methods of Baird-Parker.

With each of these methods, a classification was possible. However, none of the classifications corresponded.

There were some similarities in the behaviour of isolates from the nasopharynx and blood stream. There were fewer similarities between blood stream isolates, and more superficial sites such as antecubital skin.

The Distribution of Coagulase-negative Staphylococci from Newborns

Coagulase-negative staphylococci have been isolated from the blood stream of 32 symptomatic newborns.

In an effort to identify the site of blood stream invasion, a staphylococcal survey of various sites in the affected babies was undertaken. The sites were conjunctival sacs, nostrils, pharynx, skin of the antecubital fossa from which the blood for culture was taken, umbilicus, urine, stools, and perineum.

An attempt to group the isolates was made by pigment production, antibiotic resistance, agglutination by random sera, agglutination by serum from the baby affected, and by the methods of Baird-Parker.

With each of these methods, a classification was possible. However, none of the classifications corresponded.

There were some similarities in the behaviour of isolates from the nasopharynx and blood stream. There were fewer similarities between blood stream isolates, and more superficial sites such as antecubital skin.