cated for the patient on digoxin.\(^1\) When the ventricular rate rises in atrial fibrillation, or when congestive failure increases, there is a temptation to increase the dose of digoxin, though excess of the drug may actually cause either situation. Conversely, the physician is apt to stop digoxin in a patient with ventricular ectopic beats, which may not in fact be due to the drug. In such circumstances, especially when information is lacking or when the patient cannot identify his drugs or their dosage, measurement of the serum digoxin level, which can be obtained in under an hour, may prove helpful. The procedure will also make it possible to determine the half-life of digoxin in any patient, and by a simple calculation a dosage may be chosen that will maintain a selected serum level.\(^2\)

The general introduction of a simple, rapid, and sensitive measure of serum digoxin would undoubtedly be helpful. But, useful as such a test may be, it remains only a guide to the clinical situation. Toxic effects on the heart may precede symptoms of toxicity. Because of this it is not enough simply to instruct the patient on the dosage and adverse effects of the drug. The dosage must also be reviewed at appropriate intervals on the basis of clinical examination.

### Gamma Minus

The University Grants Committee deserves gamma minus for its current exercise on medical teachers’ pay. For a body so intimately involved with academic life it seems obstinately slow in learning its lessons. There is a shortage of doctors in Britain, more doctors must be trained, therefore more medical teachers will be needed. Already there is a shortage of teachers—and a very serious shortage of preclinical teachers\(^3\)—which the U.G.C.’s delay in implementing a just pay increase is likely to aggravate.

Hard work by the B.M.A. has resulted in the pay of senior clinical teachers being roughly equated with that of their colleagues in the hospital service, with Review Body increases being applied also to the teachers’ salaries.\(^4\) The B.M.A. and the B.D.A., in a recent joint memorandum\(^5\) to the National Board for Prices and Incomes, had urged that there should be no delay in effecting such increases, saying “On previous occasions procrastination by the U.G.C., in this matter [the implementation of pay increases for teachers] had led to widespread and entirely unnecessary concern among clinical academic staff.” But the lesson seems to have been lost on the U.G.C. Having first suggested, after the Government’s decision on the Review Body’s 12th Report, an immediate interim payment to clinical teachers in line with that proposed for N.H.S. hospital doctors (30% and 15%), the U.G.C. changed its mind—in spite of the B.M.A.’s agreement to its proposal—after consulting other interested bodies—notably the Committee of Vice-Chancellors and Principals, and the Association of University Teachers.\(^6\) Now, after Sir Keith Joseph’s letter\(^7\) giving the fate of the 15% outstanding for hospital senior doctors, the U.G.C. has told universities that it intends to pay 30% to clinical teachers earning £2,760 or below, but only 15% to those earning more. The payments will be retrospective to 1 April 1970, and in its letter to universities the U.G.C. also states that “for the present the increases are to be regarded as ad hoc and scale revisions will be held in abeyance until the matter can be reviewed again when final Government decisions are taken on the N.H.S. salaries.” The U.G.C.’s letter immediately prompts two observations. Firstly, it does not promise specifically that the final settlement for teachers will be of the same magnitude as that given to N.H.S. doctors. Secondly, with the Government issuing warnings about another economic crisis teachers could be forgiven for experiencing a déjá vu sensation. 1966, the year of the pay freeze, was one that most doctors have cause to remember with bitterness—and teachers were no exception.

The University Grants Committee gives as a reason for delaying a final settlement the supposition that it may well be some time before the full N.H.S. award is clarified. In fact the Department of Health, acting with commendable promptness, has already forwarded proposals to the B.M.A. for resolving the pay anomalies which occur at the senior registrar/consultant boundary as a result of the previous Government’s modification of the Review Body’s recommendations. The U.G.C. should quickly acquaint itself with the Department’s proposals and make arrangements for prompt retrospective payment of all that is due to teachers. One point that will not escape academic clinical staff is that the anomalies which will arise as a result of the application of the 30%-15% formula to their pay scales are likely to be greater than those arising in the N.H.S. It could reasonably be argued therefore that the U.G.C. has particular cause for immediately applying the additional 5% (20% overall) across-the-board increase just awarded to senior N.H.S. doctors to those teachers earning more than £2,760 as this would go some way to reducing the anomalies. Unless the committee is prepared to stop giving the impression of procrastination over pay awards it should not be surprised if finding doctors to staff university medical departments becomes even more difficult.

### Profile Analysis

Patients are being misdiagnosed at general practitioner clinics for want of relatively simple laboratory screening procedures, according to Professor T. P. Whitehead. As an enthusiastic advocate of “profile analysis” he believes its benefits should be brought into general practice, for it would offer better diagnosis to the patient and greater interest in his work to the general practitioner.

According to the inaugural lecture\(^8\) he gave by virtue of his appointment to the new chair of clinical chemistry at Birmingham some people are critical of the university’s clinical chemists for their insistence on precision and the use of computers. But Whitehead has a disarming style of address, sees his position as a bridge between medicine and the sciences, declares that quality-control analyses from over 200 laboratories throughout the country point to a situation “which may fairly be described as scandalous,” and modestly claims that “clinical chemistry is not medicine, it is a service to medicine.”

By profile analysis he means the carrying out of a dozen or more predetermined biochemical tests on every patient what-

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1. \(^{1}\) British Medical Journal Supplement, 1970, 1, 48.
5. \(^{5}\) Whitehead, T. P., A View from the Bridge. Birmingham, 1970 (The Registry, P.O. Box 363, University of Birmingham, Birmingham 15).
ever the patient's history, signs, or symptoms. The Auto-
Analyzer, invented by a chemical chemist, Dr. L. Skeggs, of
Cleveland, Ohio ("probably the most significant event which
ever occurred in clinical chemistry"), has now been joined
by the computer to mark the next era of clinical chemistry,
on whose threshold we stand, according to Whitehead. That
is the profile era. Experience with profile analysis at Birming-
ham quickly showed up the defects of so-called normal values
with which to compare the data derived from patients. Half
the patients in the Queen Elizabeth Hospital are aged over
55, whereas probing into the sources of normal values showed
that they had often been obtained from young people such as
medical students. Incidentally, they rarely included deter-
minations on females.

It is a commonplace of clinical practice that an elaborate
terms of a good deal less than a careful rectal
examination. But that is not to condemn them as such, only
their misuse. If they can indeed be made quickly and
economically available for general practitioners, should not a
nation-wide scheme for their application be thoroughly
studied now? Whitehead refers, for instance, to a machine
which can do 20,000 blood ureas comfortably in an afternoon.
And he and his colleagues at Birmingham have recently
reported that profile analysis carried out on patients in general
practice led to a new diagnosis in 16.9% of patients, many
of whom required an alteration in treatment. Few readers
can doubt his conclusion that the role of clinical chemistry in
the care of patients will continue to increase.

The Surgical Scrub

Lister included disinfection of the surgeon's hands with a
solution of phenol among the details of the antiseptic method.
But with the development of asepsis and the use of rubber
gloves this practice was dropped, and until fairly recent times
the only step taken by surgeons to reduce the numbers of
bacteria on their hands and forearms before operation has
usually been a scrub with bar soap under running water.

Wearing rubber gloves obviously reduces the risk of con-
taminating operation wounds, but the discovery by E. A.
Devenish and A. A. Miles1 of minute holes through which
bacteria could escape in over 20% of the gloves worn by
surgeons showed they were not an entirely reliable barrier
against contamination of wounds. Moreover, the skin occluded
by a rubber glove becomes moist, and moisture of the skin
is associated with an increase in the numbers of its bacteria.2
A six-minute scrub with ordinary soap and water has been shown
to cause a reduction of only about 50%, in the estimated natural
bacterial flora of the skin.3 It came to be accepted that at least
five minutes' scrubbing with soap and water was desirable,
and even such a thorough preparation could not be guaranteed
to prevent contamination of the operation wound by the
surgeon's hands. For other reasons, however, prolonged
scrubbing was undesirable; not only did it add an appreciable
time to the operating-list, but it could cause small excoriations
of the skin, which became infected, thus increasing the
hazard which it was meant to reduce.

The introduction of effective antiseptics, and especially of
liquid soaps and detergent preparations containing hexa-
chlorophane+ or iodophors,7 changed the position radically.
But though repeated two-minute hand washings with such preparations
were shown to reduce the estimated numbers of bacteria on the skin progressively to as little as 1% of the
initial counts, or even less, the tradition of five to ten minutes' scrub has apparently died hard even when hexachlorophane or iodophor preparations have been used. It might be supposed that more prolonged washing or scrubbing with the antiseptic
preparations will increase their effectiveness, but the evidence
does not support this view. P. Dineen8 has recently shown, in
studies on 50 subjects, that ten minutes' scrub with a hexa-
chlorophane detergent cream or with an iodophor (povidone
iodine surgical scrub) did not cause a greater reduction in the estimated numbers of bacteria on the hands than was obtained
by five minutes' scrub with these agents. E. J. L. Lowbury,
H. A. Lilly, and J. P. Bull10 found mean reductions of 99%,
95%, and 85% in bacterial counts of hand washing taken
respectively after rinsing for two minutes, one minute,
and half a minute with 0.5% chlorhexidine in 70% ethyl alcohol.
These workers also found that two minutes' rinsing of the
hands of six persons with 70% ethyl alcohol caused a mean
reduction of 64% in bacterial counts; after two further two-
minute rinses in rapid succession with 70% ethyl alcohol the
mean reductions in bacterial counts, compared with the
counts obtained before the first rinse, were 83% and 85% respectively. It was concluded that most of the disinfection
occurred in the first two minutes and little further disinfection
occurred after four minutes, probably because the bacteria
still present on the skin after that time were beyond reach of the
antiseptic. On the other hand disinfectant rinses or ablations repeated at intervals of several hours led to a pro-
gressive reduction in bacterial counts to very low equilibrium
levels.6

The hazard of infection from the hands at operation is sporadic, depending on contamination of a susceptible wound
when a surgeon who happens to carry virulent staphylococci
wears gloves that happen to become perforated during use.
Since this contingency cannot be foreseen, the rational way
for the surgeon to meet it is by washing or scrubbing the hands
and forearms with an effective antiseptic soap or detergent
preparation before every operation. A liquid soap or detergent
preparation should be used, because antiseptic bar soaps are
less effective.6 Since a two-minutes wash with such prepara-
tions gives satisfactory disinfection, there is no longer any
need for the prolonged ablation which was rational at a
time when no antiseptic was used for preoperative cleansing of the
hands. Still shorter periods of ablation are likely to be in-
adequate, because some areas of the skin may then escape the
thorough and systematic application of the antiseptic. Though
a brush helps to detach dirt and dead epithelial cells, it seems
unnecessary to use one for all preoperative ablations. Two or
three minutes' scrubbing (with careful attention to the finger
nails) before the first operation and two or three minutes' washing without a brush before the remaining operations of a
list should be a reasonable routine for the surgeon.

2. Blank, I. H., in Skin Bacteria and their Role in Infection, ed. H. I. Maibach,
4. Traub, E. F., Newhall, C. A., and Fuller, J. R., Surgery, Gynecology,
and Obstetrics, 1944, 78, 205.
753.
1963, I, 1251.
1964, 2, 531.
1960, 2, 1039.