ever the patient’s history, signs, or symptoms. The Auto-
Analyzer, invented by a clinical chemist, Dr. L. Skegg, 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
battery of tests may show 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

\[\text{effectively available for general practitioners, should not}\]

be a national-wide scheme for their application be thoroughly
studied now? Whitehead, for instance, to a machine
which can do 20,000 blood ureas comfortably in an afternoon.
And he and his colleagues\(^8\) 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 antisepic 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. Miles\(^1\) 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 antisepsics, and especially of
liquid soaps and detergent preparations containing hexa-
chlorophene\(^4\) or iodophors,\(^7\)\(^8\) 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 hexachlorophene
or iodophor preparations have been used. It might be supposed
that more prolonged washing or scrubbing with the antisepic
preparations will increase their effectiveness, but the evidence
does not support this view. P. Dineen\(^9\) has recently shown, in
studies on 50 subjects, that ten minutes’ scrub with a hexa-
chlorophene 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. Bull\(^10\) found mean reductions of 99.9\%,
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 antisepic. On the other hand disinfectant rinses or
ablutions 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
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\[\text{Since this contingency cannot be foreseen, the rational way}\]

for the surgeon to meet it is by washing or scrubbing the hands
and forearms with an effective antisepic soap or detergent
preparation before every operation. A liquid soap or detergent
preparation should be used, because antisepic 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 antisepic 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 antisepic. 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.

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2. Blank, I., H., in *Skin Bacteria and their Role in Infection*, ed. H. I. Maibach,
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