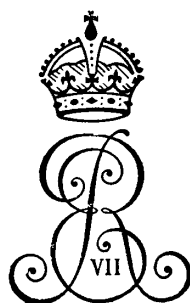


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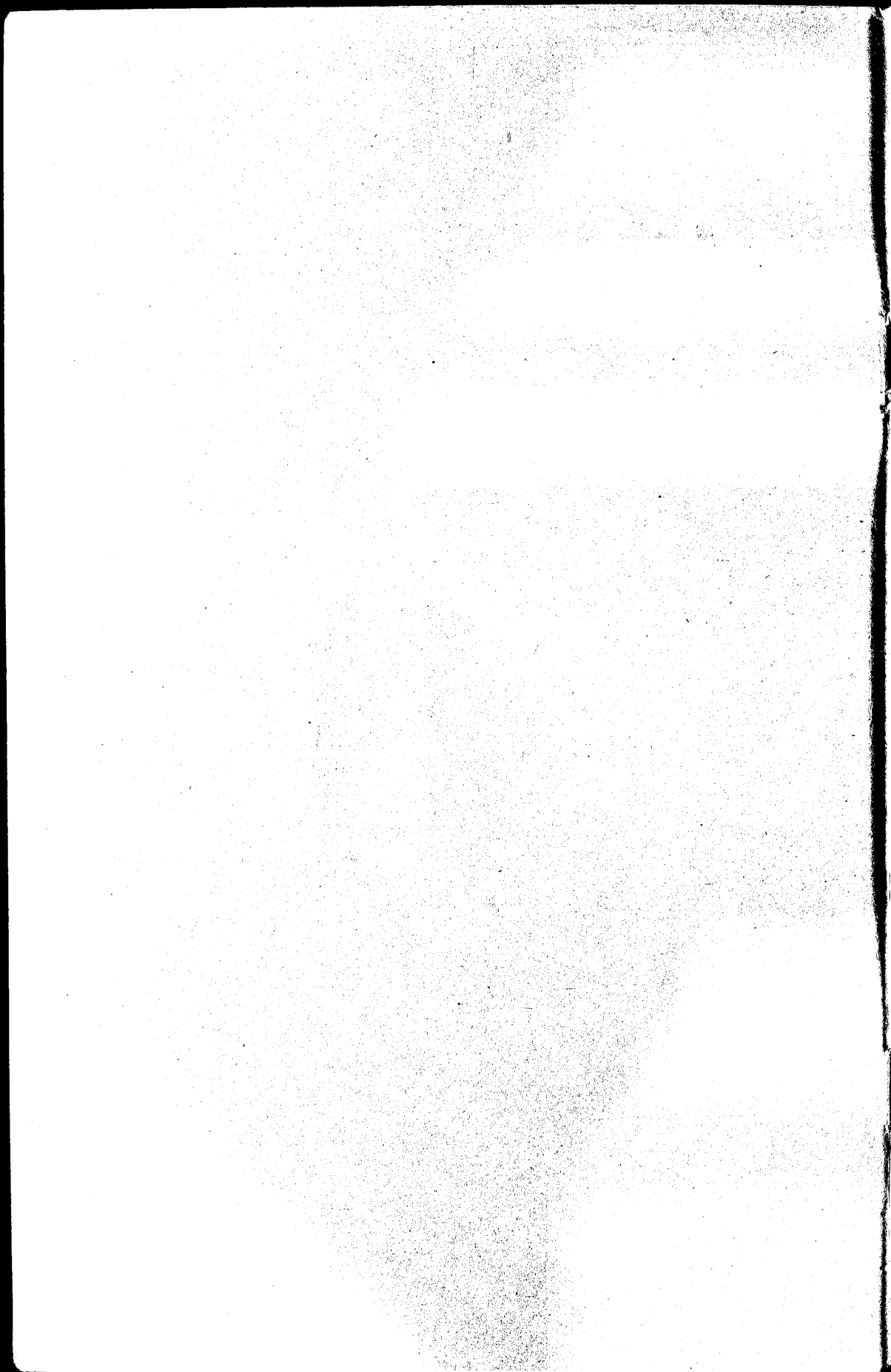
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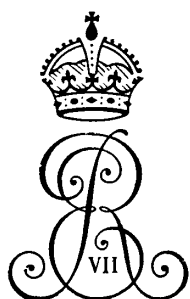
DECEMBER,
1960

34 KING STREET,
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Report of a follow-up enquiry

DECEMBER,
1960

34 KING STREET,
LONDON E.C.2

THE UNIVERSITY OF CHICAGO

PHYSICS DEPARTMENT

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NOISE CONTROL IN HOSPITALS

"Unnecessary noise is the most cruel absence of care
which can be inflicted on either sick or well"

(Florence Nightingale).

1. Introduction

In 1957/58, the Fund conducted an enquiry into the problem of noise control in hospitals, and the results of this enquiry were published in a report in November, 1958.

Fifteen hospitals participated in this original enquiry, and in 1960 it was felt that some useful information might be obtained by inviting the same hospitals to take part in a follow-up enquiry to find out what improvements or changes had taken place during this period. The hospital authorities concerned readily agreed to take part, and in a number of cases asked for additional hospitals to be included in the survey. As a result, 19 hospitals took part in the 1960 enquiry; 9 of these were London teaching hospitals, 6 were non-teaching hospitals in London, and 4 were non-teaching hospitals in country towns.

In order that the results of the two enquiries should be broadly comparable, the same procedure was adopted in 1960 as in 1957. Thus it was arranged for the ward sisters to hand to all patients who were well enough a letter explaining that it was hoped to reduce the noise in hospitals, and that it would be appreciated if patients would be good enough to comment on the noises they heard, in the appropriate section of the questionnaire provided. The questionnaires were then sealed up by the patients in reply-paid envelopes and returned to the Fund. A copy of the letter and questionnaire is shown in the Appendix at the end of this report.

In addition, the hospitals concerned were invited to summarise the improvements they had been able to effect since 1957, so far as noise-control was concerned.

Throughout this report, extensive use has been made of direct quotations from the patients' questionnaires and from the comments made by the hospitals participating in the enquiry. These quotations have all been printed in rather smaller type, and inset slightly.

2. Results of the enquiry

This is my first visit to any hospital, and I am so grateful for all the wonderful attention I receive from nurses and domestic staff; really I cannot say I have noticed any undue noise.

This ward is most restful and beautifully run. I have had four severe operations and for two of them was in this ward. Full marks and no criticism.

In 1960, as in 1957, rather over 2,000 questionnaires were distributed to patients. Not all of these were returned to the Fund, and of those that were returned, quite a high proportion were either blank or complaint-free. A number of patients in fact used the questionnaires as a means of expressing their gratitude to the hospital, and the verbatim extracts quoted above were typical of many that were received.

In this respect, the 1960 enquiry confirmed the findings made previously, and indicated that about 50% of the patients were not unduly bothered by noise. On the other hand, it is probably true to say that gratitude prevented some patients from expressing their real feelings about the noise in hospital, and that they refrained from making any critical comments at all lest these should be taken as a reflection upon the kindness and devotion of the nursing and other staff.

It is also obvious that some people are much more sensitive to noise than others. Although statistically the importance of some of the noises mentioned in these pages may appear insignificant or trivial, it is clear that to a minority they are a very real source of irritation. Noise breeds noise, and to the outside observer, as well as to the patient, it is clear that some hospitals have a much noisier and more restless atmosphere than others, irrespective of their location. Conversely, some hospitals have an air of quiet efficiency that encourages patients, staff and visitors alike to keep unnecessary noise down to the minimum. If the noises can reasonably be reduced or eliminated without detriment to the care and treatment of the patients, it seems only right that this should be done.

In Table I, following the Appendix, there is shown an analysis of the principal sources of noise mentioned in the 1960 enquiry, together with references to the corresponding sections of this report,

in which are described some of the practical measures taken to reduce or eliminate the various noises. One reason for presenting the analysis in this way is that it may perhaps serve to provide an index or check-list for hospital authorities wishing to carry out their own investigations.

3. Comparisons between 1957-60.

In the case of 14 hospitals, the results in 1960 were broadly comparable with those in 1957, and in Table II there is shown an analysis of the principal changes in the incidence of different types of noise during that period.

It will be seen that under a number of headings there has been a very welcome reduction in the number of complaints, and this can be attributed almost entirely to the efforts made by the individual hospitals since the original enquiry. Details of many of the successful measures taken are quoted in the following pages and it is clear that the improvements are due very largely to greater co-operation from the staff, and also to higher standards of maintenance and the purchase of new and more suitable equipment.

Greater improvements would undoubtedly be made more quickly if more funds were available, but noise is obviously only one of many factors that have to be assessed in determining priorities for the purchase of hospital equipment, etc. This is a field in which there might well be scope for help from Leagues of Friends or similar voluntary organisations, and some Leagues have in fact already given such help.

Despite the improvements that have been achieved, it is clear that some of the sources of noise, and trolleys and doors in particular, continue to be disturbing to some patients, and constant vigilance is evidently necessary if noise is to be kept down to a reasonable level.

All the hospitals participating in the survey are known to have made considerable efforts in the past two or three years to control noise, and it may seem somewhat disheartening that there should nevertheless appear to be an increase in the disturbance from a few sources. Part of this apparent increase may be due to the possibility that as some of the hospital noises have been reduced, so the remaining

noises have become more noticeable. Some of the other possible contributory factors are considered later in this report, under the appropriate subject-headings.

4.

SOURCES OF NOISE

No noise worries me: have 7 children at home.
I find the general sounds of life re-assuring.

Whilst some patients used the questionnaires to show their appreciation, others indicated that there were no noises that really bothered them. A certain amount of noise is inevitable in busy wards, and this is accepted quite cheerfully by most patients. It is excessive or unnecessary noise that causes complaint.

Table I lists most of the sources of noise mentioned by the patients of the hospitals participating in the 1960 enquiry. For the sake of convenience, the sources of noise have been divided into two main categories:

- (a) Noises caused primarily by people and by outside traffic, etc.
- (b) Noises caused primarily by equipment, etc.

The commentary in the following pages consists largely of verbatim extracts from the questionnaires sent in by the patients, together with descriptions of the action taken or of the views held by the hospitals concerned. It will be seen that the control of noise in hospitals is not a simple matter, and that with some activities necessary for the running of the hospital and the care of the patients, there is bound to be some noise. On the other hand, it is also clear that there are quite a large number of noises that can be reduced, and that indeed have in many cases been reduced or eliminated.

NOISES CAUSED PRIMARILY BY PEOPLE AND BY OUTSIDE TRAFFIC

5. Road traffic

The biggest single cause of complaint from any source proved to be the noise of road traffic, and there was a considerable increase in the proportion of complaints under this heading between 1957 and 1960. Over the country as a whole, the volume of road traffic has

increased greatly in the past few years, so it is hardly surprising that the complaints of noise from this source should have increased. It is noticeable that the noise of motor-cycles is referred to very frequently, and the number of comments about banging car-doors and engines starting-up in car-parks seems to indicate that more cars than previously are being parked in fairly close proximity to the wards.

In many cases the site and lay-out of the hospitals are such that these outside noises are as inescapable as they are disturbing. Several of the hospitals participating were built before the advent of the motor-car and aeroplane, and in locations that were at that time relatively open and peaceful. Urban development and the mechanisation of transport have completely altered this situation, so that these same hospitals now find themselves in a very noisy and restless environment, as the following patients' comments show:

Traffic all night. Cannot get a wink of sleep all night.

Road traffic noises in X road, at all hours, reaching a crescendo at weekends. A full night's sleep is impossible.

Traffic noise which persists throughout the night; as far as I know a diversion would be difficult and annoying to the driver, but surely it would not cost much to erect a sign. This is about the only hospital I know without any signs.

Continual coming of cars and motor-bikes with headlights disturbing the ward at night.

Cars travelling at excessive speed past the hospital after 10 p.m. Apparently X Street is used to avoid traffic lights.

Very heavy traffic coming up the hill at night especially changing gear.

A 3-wheeler car or something parks just outside the building and 4 times a day it annoys me with its noise.

Motor cycles revving up engines.

In such circumstances, adequate noise-control may prove prohibitively expensive, if not altogether impracticable. In some cases, local authorities and the police may be able to assist by diverting or controlling traffic, whilst the display of suitably-worded notice-boards may help to reduce some unnecessary noises. Within the hospital itself, the installation of double-glazed windows can be effective, though costly, and acoustic ceilings can be helpful, too. The following are some of the steps taken by different hospitals:

Police co-operated to control parking near the hospital and to control undue noise during the evening.

Provision of car-parking facilities is high on the list of the Board's future amenity projects.

A two-sided painted notice-board reading "Hospital—Quiet Please" was erected on corner of X Road and Y Street, illuminated at night.

The only practical solution to this problem is to double-glaze all windows on that side of the hospital, which would be very expensive.

In spite of all efforts, however, street noise such as banging of car-doors and revving of engines, particularly at week-ends, is still an unsolved problem, although this also has lessened.

Double windows and sound-reducing ceilings in the single and double rooms facing X Road. Double windows, sound-reducing ceilings and extract fans in the two clinic rooms of the out-patient department.

Ambulance staff asked to be quiet at night or early morning and turn off engines.

Measures such as these can improve the situation to a certain extent, but it seems clear that the noise of road traffic will unfortunately continue to be a major source of annoyance to patients in many hospitals on existing sites. The experience of these hospitals may provide some useful object-lessons for those concerned with the planning of new hospitals or extensions: the siting of wards in relation to road traffic is obviously of importance.

6. Rail, river and air traffic

Other forms of traffic caused far less annoyance, but these patients' comments are perhaps worth mentioning:

By far the worst noise is that of trains outside the building, especially at night. They keep many patients awake.

Continuous railway shunting.

Moored all-metal barges banging together—made a noise as penetrating as cannon fire!

Some tugs or pleasure-boats that give violent blast on siren.

Aircraft flying over at night.

The noise of helicopters back and forth.

As is the case with road traffic, it is difficult to remedy noise from these sources in existing hospitals. In the siting of new hospitals, however, it is to be hoped that due consideration will be given to likely future developments in transport, and in particular to the position of hospitals in relation to airports and helicopter routes and terminals.

7. Other patients

It is difficult to determine just why there should be an apparent increase in the number of complaints by patients about other patients. As in 1957, the comments under this heading can be divided into two main categories:

(a) Comments about convalescent patients being excessively noisy in talking and laughing, or in the use of radio and television, whilst more seriously ill patients in the same ward want peace and quiet.

(b) Comments about the distressing noises from patients who are very ill or recovering from anaesthetics, and about the noise and disturbance caused by senile or confused patients.

The comments under the second heading were of course generally expressed in terms of sympathy rather than of anger, but they are evidently an increasing source of concern.

Some patients, particularly when well on the road to recovery, are sometimes rather thoughtless about those who may be feeling less fit, as the following patients' comments indicate:

Talking and noises made by other patients, usually those in convalescent state showing no or little regard for others in less fortunate state.

This is a very quiet ward. There is nothing to complain about. I have noticed one person, who has stated that the only noise she has to complain about is made by the other patients, makes the most noise herself.

Fitter patients getting well, talking and laughing while newly operated patients need absolute rest and quiet.

Inconsiderate patients who are most responsible for noise by playing of the radio and television louder than necessary. Grumblers who are never satisfied with what is done for them.

Other patients who bang their locker doors and drawers, and others who never stop talking.

The things that annoy me most are when you get a patient who knows every other patient's business.

The majority of comments under this heading, however, concern the disturbing noises made by patients who are very ill or recovering from anaesthetics, or who are senile or confused. The distress—and sympathy—aroused by these patients are well illustrated below:

Some patients are noisy because of their complaints but I think something could be arranged to help them to sleep quietly at night as other patients are very much disturbed.

Noises made at night by other patients receiving treatment or in pain (these noises are not necessarily annoying but in some cases harrowing).

Patients who talk in their sleep telling someone fetch her clothes, close the door, put the cat out, should be put in a room of their own.

Another patient that I cannot see behind screens being very noisily and repeatedly sick (or similar sound) distresses me because I am sympathetic.

Other patients. Chronic patients in same ward as acute, especially the aged who tend to sleep all day and shout all night.

New patients when admitted prior to an operation tend to be most noisy—probably because they are rather frightened and unsure.

Elderly patients sometimes are very noisy, when their minds wander and talk very loudly during the night.

Special cases needing much attention after operation should be put in a room outside ward.

A tactful word from the nursing staff can usually make a thoughtless patient more considerate, but the disturbance caused by very ill or confused patients raises much more difficult problems. Medical and nursing requirements must obviously determine to what extent it is desirable or necessary for chronic or elderly patients to be nursed in the same wards as acute patients, and for the convalescent to be in the same ward as the new or very ill patient. On grounds of noisiness, of course, there is much to be said in favour of sub-dividing the ward or of providing separate single cubicles for certain categories of patient. The following are comments from various hospitals on this subject:

Special sound-proof cubicles have been constructed in three of the wards, and these can be used to separate noisy patients from the rest of the ward or alternatively, to provide a quiet room for very ill patients.

Noisy and disturbed patients are placed in side wards.

The design of the ward in the new hospital allows central access of services to the ward, and employs glazed partitions to divide the ward into a number of 4-bed bays. Such a design offers the best chance of keeping noise to a minimum.

One ward has been upgraded to provide single-bed wards for noisy patients and a post-operative 'quiet' ward. In this ward the television set has been removed to a new day-room.

All wards now have single-bed wards for noisy patients.

We are considering putting a paragraph, dealing generally with the problem of noise, into the handbook supplied to patients.

8. Domestic Staff

As for staff, nurses and domestic, I find them most kind and helpful in every way.

This comment is typical of many that were received, and the number of complaints under this heading is relatively small, particularly in view of the fact that a certain amount of noise is inevitable with much of the work that the domestic staff have to undertake. It is nevertheless apparent that some of the noise and disturbance is unnecessary, and that some domestic staff are more careless or thoughtless than they need be, as these patients indicated:

I am in a side ward and the noise which worries me most is during the day when the crockery is being washed, it's frightful, but the supper dishes are washed by another washer-up and she is very much quieter which shows the noise depends on who is doing this duty. Domestic washer-ups leave the kitchen door open and laugh and squabble which drives one mad.

The domestic staff—these people are most jolly and cheering, but the people who use the vacuum-cleaners should be made to be more careful, they knock the beds and cause unnecessary pain to the patients.

Domestic staff vary greatly in consideration. Some persistently bang the ward door, knock the lockers and the bed, and then dust with more ostentation than efficiency. Others clean equally well in an unobtrusive manner.

My greatest annoyance was the ward cleaners banging every bed and other furniture with brushes and mops when patients are resting or are very ill. The shock is worse than any operation.

Cleaners knocking the beds with vacuum-cleaners, and knowing two lines of a song, sing them over and over again.

The ward maids when shouting at you what you want to drink and this repeatedly for 29 beds.

9. Nurses walking and talking

Nurses could not be quieter than they are.

No complaints whatever, perfect service.

As mentioned earlier, many patients used the questionnaires as a means whereby to express their gratitude and appreciation for the care received in hospital, and comments such as those quoted above were frequent. Such complaints as patients did make about nursing staff referred mainly to their footwear or speed of movement, or to rather thoughtlessly loud talking, particularly at night:

Nurses should wear soft or rubber shoes at night and talk quietly.

The night staff are sometimes noisy, walking heavily or talking and laughing too loudly.

Vibration of floor as nurses and staff hurry to attend to their duties. Particularly at night to a light sleeper.

Some nurses are heavy footed which is particularly noticeable when they hurry the length of the ward.

Some night nurses inclined to run too often. Bursting through ward doors causing feeling of alarm.

Nurses at night outside the ward probably not realising how much noise they make for an hour after lights out, probably because the corridors echo.

Some rather thoughtless night nurses who leave the door to the equipment room open and carry on noisy conversations.

Far too many people pass the end of my bed—shaking it each time, everyone needs to be reminded to move and speak quietly as they enter the ward.

The provision of suitable footwear for nurses and other ward staff is a matter to which many hospitals have attended:

Matron has requested all staff to wear suitable footwear.

A close watch is kept on the type of footwear worn by nursing and domestic staff on the wards.

Nurses have been encouraged to use rubber soles and heels on their shoes.

Nurses who hurry and bustle about their work generally do so because of shortage of staff and time, but there is no denying that such bustling can disturb or unsettle many patients. Feelings on this point can perhaps best be summarised by quoting the words of one patient, who wrote: "This week a sister with a calm and gracious manner gave a different atmosphere to the whole ward: nurses and patients all became much more co-operative."

As was the case in the 1957 enquiry, it is apparent that the ward staff often do not notice the noise going on around them because they are there all the time and become accustomed to it. Furthermore, with frequent changes of staff it may well be very difficult for ward sisters and others to develop and maintain in their staff a constant awareness of the importance of noise-control. As one hospital put it "our student nursing staff are supplied by X hospital, and there is a complete change-over of student nurses every three months. Therefore they do not get a sense of belonging to the hospital, if you understand what I mean."

Continuing noise-consciousness can only be achieved by constant reminders, and permanent improvement must be largely maintained

by the efforts of the senior nursing and other staff, as shown by the following comments:

Since 1957 an intensive effort has been made by the officers, Matron and Ward Sisters to inculcate noise consciousness into the staff working in the wards and hospital precincts. This practice continues and has produced results. It is important that this practice **should** continue, for without it, other attempts at noise control would be of little avail.

Perhaps the most valuable result of the enquiry was the very fact of directing the attention of all hospital staff to habitual noises which go on throughout the 24 hours and are unnoticed. There is no doubt that "the patient's point of view" is a tremendous asset in running hospitals.

10. Visitors

Thoughtlessly noisy visitors can cause much unnecessary noise:

Visitors—especially young ones. Young women with stiletto heels tap-tapping along the wooden floor.

The visitors make the most noise whilst waiting outside the ward.

Visitors who seem to think they are on show and talk and shout not only to those whom they visit but to others who wish to be quiet.

More co-operation needed between nurses, patients and visitors regarding crying babies in ward during visiting hours.

Apart from the noise they make, stiletto-heeled shoes have caused damage to floors in countless places, and most hospitals probably wish that the fashion for such shoes could die a swift and sudden death.

Visiting hours in most hospitals have been considerably extended in recent years, and it becomes more than ever important that visitors should behave quietly and considerately. This is a point that might perhaps be mentioned more often in the leaflets or visitors' cards often given to patients (or their relatives) before admission.

11. Collection and delivery of stores, fuel, milk, oxygen and gas cylinders, etc.

Collection and delivery of hospital goods and equipment can be very disturbing at times to the patients:

The milkman makes a lot of noise at about five o'clock in the morning.

Milk van arriving very early each morning.

Milk bottles in crate (metal) on trolleys.

Unloading and loading of oxygen cylinders.

Unloading of fuel at boiler house by bulk transport lorries, motor that operates lorry in emptying process.

Coal deliveries 20 yards away at odd times.

A stoker stoked the boilers every night at 4 a.m. directly under my bed which woke me every night and I was unable to sleep again.

The layout of existing hospitals often makes it difficult for the collection and delivery of goods to be completed without some disturbance. In some cases, however, hospitals have been able without loss of efficiency to re-route goods traffic in the hospital grounds, or to alter the siting and lay-out of their service areas, so that less noise and disturbance is caused near the wards. These factors must of course also be of importance in the planning of new hospitals or extensions.

Oxygen and other gas cylinders have long been a source of complaint, and the company chiefly concerned has given considerable thought to the problem, but without success. Large hospitals, with bulk storage of liquid oxygen and piped supply-lines, have little trouble but the majority of hospitals still use cylinders. In many cases the noise has been lessened by the use of dumping mats for unloading cylinders and of rubber pads on the cylinder-trolleys.

In a few places, the noisiness of milk crates and bottles has been largely eliminated by the supply of milk in treated-paper containers, and this practice may well develop more extensively.

12. A variety of other noises annoyed various patients, as shown in the following selection of comments:

Workmen hammering in areas.

Things dropped would be the worst.

As a patient in hospitals in the East, I noticed that the more leisurely pace (no doubt due to the heat) resulted in a generally quieter atmosphere. Also there was not so much accidental dropping of things.

Metal articles dropped or thrown into place in sterilising rooms, store rooms, etc.

By workman drilling at 9.30 at night.

Students running up and down stairs to the maternity ward could be much quieter.

Some doctors (students?) who enter the wards late at night are inclined to tread heavily thus aggravating the noise already rising from the floor-boards.

Consultant doctors and surgeons—their hard shoes and heavy footfalls.

Houses opposite, hectic parties, people departing 2-3-5 a.m. banging car doors.

Singing and shouting in street near hospital after 10 p.m. mainly at week-ends.

During the afternoon when directed to rest for 1 or 2 hours when a lawn mower or similar machine is being used considerably close to the ward.

Noises from the fun-fair which go on till midnight.

Window cleaners calling to one another.

Nurse rattling keys, especially at night.

Big Ben strikes every 15 minutes. I think it would be a good idea if it stopped striking from Midnight to 6 a.m.; this is done at Hastings Memorial Clock for the benefit of the visitors.

Taken individually, these sources of noise (apart from the last one) do not worry many patients, but if they unnecessarily annoy anybody at all that is sufficient reason for trying to eliminate them.

NOISES MADE PRIMARILY BY EQUIPMENT, ETC.

13. A wide range of noises was mentioned under this heading. In a number of instances, the comments were relatively fewer than in 1957, but still sufficiently numerous to be a cause of concern. In practically every case it seems clear that careful forethought in planning and purchasing, combined with subsequent regular maintenance, can do much to reduce or eliminate unnecessary noise.

Many of the hospitals taking part in the enquiry emphasised particularly the importance of maintenance, and the consensus of opinion on this subject can perhaps fairly be summarised by quoting the comments from two hospitals:

I think the report might emphasise how much can be achieved under the heading of "Maintenance" and that the noise aspect should be considered when new equipment is being ordered. In this connection I rather like the term I came across in the States, namely "Preventive Maintenance". This means that anything that moves or is movable receives routine inspection. This is no new idea, I know, and is difficult to implement in its entirety in our hospitals owing to lack of staff, but nevertheless I think this is a phrase to bear in mind.

For better or worse, and in this particular instance we think it is for better, we have given an oil can to each ward sister. This does mean that many squeaks can be silenced before they could be tackled by a somewhat meagre maintenance staff.

14. Trolleys

As indicated in Table II, complaints about trolleys were proportionately less numerous in 1960 than in 1957, thanks to the efforts of

the hospitals concerned to deal with the problem. Despite this improvement, they still constitute easily the largest source of annoyance under the general heading of equipment, and the following comments are typical of many that were received from different patients:

Being a fairly restful patient I have had to listen fairly intently for any disturbance, but there is no doubt at all that the noisiest equipment is the trolley. All other noises are as nothing compared with it.

Trolleys that are not properly oiled squeak and rattle and the vibrations go right through you, by day.

Trolleys going to and from the door entrance to the ward. That part of the flooring wants levelling.

Plate glass topped trolleys, metal trolleys with metal dressing trays day and night.

Trolleys from kitchen with iron wheels instead of rubber.

Unthinking staff who put down objects on lockers and trolleys with undue force.

Milk bottles in crate (metal) on trolleys.

Trolley for bathe-down at 5.30 a.m. rattles.

Trolleys that squeak day and night, noisy stone corridors and banging from the kitchen at night.

Trolleys, which seem difficult to guide and whose wheels are very noisy, also the banging of crockery onto trays and trolleys—during the day.

In the older hospitals in particular, these noises are exacerbated by the unevenness of the floors, and the problem cannot be completely overcome without provision of a smooth floor surface. Apart from that, much can be done to minimise the noise from trolleys by adopting measures such as the following:

More regular and effective attention is now given to trolley wheels.

Four trolleys have been re-wheeled with larger and more silent castors, and rubber buffer bands have been fitted between the framework and shelves. These measures have been a success, but lack of funds has prevented our going further with this conversion.

All trolley wheels are being checked and replaced where necessary.

The use of pieces of rubber tubing to obviate the rattling of glass shelves on dressing trolleys.

It is extremely satisfactory to note the reduction in the number of complaints about noise from trolleys. We have fitted a good many new wheels in the past few years and have laid new floor coverings, particularly at X Hospital.

Several noisy trolleys have been replaced.

15. Crockery and kitchen noises

After trolleys, crockery and kitchen noises were one of the chief sources of complaint, and the situation was apparently worse in 1960 than it was in 1957. The likeliest explanation for the increase in noise under this heading is that ward kitchens or pantries in many hospitals have been upgraded in recent years. This has usually meant the installation of stainless steel sinks and draining boards, which are more hygienic, but considerably noisier than the old wooden draining-boards. Patients' feelings on this subject are indicated by these comments:

4.45 a.m. The daily routine of setting tea trolleys for 5 a.m. means that light sleepers are awakened to the clatter of cups and saucers outside our ward door.

Crockery in kitchen very early morning. Nurses preparing breakfast and washing crockery about 5 a.m. Kitchen door if kept closed would stop a lot of the noise.

Crockery being laid out at mealtimes—dealt out like a pack of cards at great speed.

The clatter of trays and crockery while washing up during the day.

Daytime. Orderlies crashing crockery about unnecessarily (**not** all the orderlies).

Noise of nurses doing dressing trolleys in clinic rooms, and from domestic staff washing crockery.

Provision of suitable doors has in some cases helped to cut off noise from the ward, and the following indicate some of the other measures taken by different hospitals:

Plastic sink bowls, washing bowls, beakers and jugs have been and are being provided in the wards.

Rubber sink-mats have been provided.

In an attempt to deaden the noise when using metal sinks and draining-boards, several coats of a rubber solution have been applied underneath the sinks and draining area. This has the effect of adding a layer of rubber to the metal, which does to some extent reduce noise.

Staff are being asked to exercise care when handling crockery to cut down noise to a minimum.

Where possible plastic equipment has replaced metal.

Rubber and polythene bins have been introduced.

Further progress has been made in replacing metal containers, washing-up bowls and kitchen utensils with plastic or polythene articles and future replacements will be of the latter type.

Glass fibre is a material that is being developed with some success for containers and equipment of various types, and the use of plastic ware is increasing, although it is not without its drawbacks as regards heat resistance, staining and electrostatic properties. Equipment made of melamine formaldehyde can be boiled, but should not generally be autoclaved, and it does tend to show stains or scratches if not looked after carefully. Nylon can be boiled and autoclaved at high temperatures, but has a tendency to show stains, etc., because of its relatively high absorbency. High-density polythene is more resistant to staining and can be boiled; it can also be autoclaved within narrow limits, and is being used for quite a wide range of equipment in hospitals. Polypropylene is a more recently developed plastic material that would seem to have advantages from the hospital point of view as it is very resistant to staining and can withstand boiling and autoclaving at high temperatures. The use of suitable plastic equipment has enabled some hospitals to get rid of some types of noisy metal-ware, but it is evident that it is the staff, rather than equipment, that can make the biggest contribution to noise-reduction in this field.

16. Electric cleaning machines

Complaints about vacuum-cleaners and polishing-machines increased noticeably between 1957 and 1960. In recent years growing concern about cross-infection has led to more intensive cleaning procedures being introduced in many hospitals. One consequence of this has been the greater use of vacuum-cleaners, etc., in wards, and it is evident that the noise caused by the use of these machines (some more so than others) is very disturbing to quite a number of patients:

Electric vacuum-cleaner made me feel like screaming.

Vacuum-cleaning machines have been introduced to do away with sweeping as this scatters the dust; but the noise which these cleaners make is very penetrating. I am a member of the nursing staff and the cleaner was used in my ward for the first time yesterday, and I found it extremely irritating. I may in time get used to it, but I think that patients coming into the ward feeling very unwell are going to find it very annoying particularly as it is used three times a day—early morning—(a hospital day starts early as everyone knows but I don't think it should be made worse by the use of electric sweepers at 6.30 a.m.) midday and 5 p.m.

The most annoying noise is that of the electric floor cleaners and polishers. As this is a necessary service, such cleaners must be silenced.

A particularly noisy vacuum-cleaner for about 2 hours every morning and $\frac{1}{2}$ -hour in the afternoon. The morning cleaner knocks her vacuum-cleaner against patients' footstools and elevated beds and traction, consistently!

I have not been sufficiently ill to be worried by noise to any proper extent. However, in years past I have been ill and there the most tiresome noise is one that goes on for long periods—e.g. electric cleaners or polishers.

The more frequent use of vacuum-cleaning and other machines has been required as part of the battle against cross-infection, and an increased amount of noise is therefore inevitable. Some floor-maintenance routines require less use of polish and polishing machines than others, and this is a trend that should be encouraged, so far as noise is concerned. Many hospitals attach considerable importance to the noise factor when deciding upon the purchase of cleaning equipment, and the manufacturers are being encouraged to devote greater attention to reducing the noisiness of their equipment:

Vacuum-cleaners and electric polishers have received our attention and the manufacturers are always very stimulated when called in to experiment on noise reduction. In one case we had an amazing improvement effected as a result of the manufacturer's representative being called into the ward and getting first-hand comments from the patients on this problem.

17. Doors

Between 1957 and 1960 there was a very noticeable drop in the number of comments about banging doors, etc., which reflected the success of the efforts made by the hospitals to overcome this problem. Doors are nevertheless still relatively high on the list of complaints, and the following are some of the comments made by patients:

Doors banging at all hours; swing doors that keep swinging after a person has passed.

Doors with ill-fitting catches which keep banging day and night.

Bath and toilet doors slamming during rough weather.

Slamming of (apparently) heavy doors a short distance away which makes a shattering noise by day and night, but naturally more disturbing at night.

Metal doors of medicine cupboard night and day.

Not enough oiling done to doors and lockers.

The noises that worry me most are those made by trolleys and a door leading to the bathroom.

Having spent years in many hospitals, I find slamming doors the most annoying of all.

The following are some of the measures adopted by different hospitals:

The use of rubber strips has resulted in less noise in the closing of doors.

In the planning of new buildings, adaptations, etc., consider the need for suitable doors and door fixtures, and for double push action doors wherever possible, and under this heading to query the need for any doors at all.

Double swing doors planed down to prevent them flapping against one another.

Investigation has revealed several faulty doors. The carpenter is repairing door furniture, but several doors require automatic door fasteners, to obviate staff, and sometimes the wind, banging them.

In a number of cases hospitals have found that some doors are not necessary at all and have removed them altogether; other doors have been fitted with self-closing devices that stop the doors banging, and often eliminate the need for latches that can click so irritatingly; door-frames have been fitted with rubber pads or strips that deaden the noise as doors are shut; and in practically every case, improved routine maintenance has reduced the noise of squeaking hinges or ill-fitting doors.

Flexible rubber or plastic doors have been successfully used in some hospitals to provide a form of barrier between the patient-area of the ward and the noisier service-area of kitchen, sluice, etc., and also between the ward itself and the main corridor outside. These flexible doors themselves can make a flapping noise as they close if they are not fitted properly, but the manufacturers have largely overcome this difficulty.

18. Bedpans

Bedpans remain a constant source of noise, and seem likely to remain so as long as they are made of metal. Plastic bedpans have hitherto generally been unsatisfactory because they cannot withstand the normal cleansing and sterilizing procedures that are necessary; the development of newer materials such as polypropylene, or glass-fibre, offers hope that a less noisy bedpan may one day become available. Meanwhile, careful handling can reduce the noise from this source, as these patients' comments indicate:

Metal bedpans in metal trolley. Noise made in toilet by dropping of bedpans on stone floor.

I am rather deaf, but am disturbed by the noise of giving out and washing of the metal bedpans.

Rattle of bedpans which are placed on too high a shelf and are apt to fall at the slightest touch; this occurs day and night.

Bedpans being taken from and into the sluice at night by the nurses make quite a noise but it is unavoidable due to the pans being made of aluminium or some such metal.

Metal bedpans being stacked on metal shelves.

19. Lifts

Generally speaking, modern automatic lift apparatus, and its lift-gate mechanism in particular, is reasonably quiet in operation. The old type of lift with expanding metal gate can be very noisy, and a number of hospitals have fitted new gates and catches, which is one of the reasons why the complaints under this heading were proportionately fewer in 1960, but still by no means negligible:

The constant ringing of the lift bell outside the ward when the gates have been left open by the previous passengers.

I find that the noise caused by the opening and shutting of the lift is very annoying in the night especially.

Loud banging on lift doors in ward when lift door is left open on other floors.

Noise from the lift when goods and surgical appliances are being delivered, and gates of lift opening and closing.

Complete replacement of old lifts is of course a very expensive matter, and where this cannot be done, much depends upon the patience and co-operation of the staff in minimising unnecessary noise in the use of the lifts, as is evident from these hospital comments:

Notices were placed in all the lifts, worded "In the interests of patients, please close the gates quietly."

Fitting of new gates and latches to all lift cages and landings.

This noise is caused mainly by staff pounding on the outer lift gate to attract attention of staff on other floors where lift is frequently left with gates not properly shut. This renders the lift unusable from other levels and causes much annoyance and irritation. There is already a large notice inside asking staff to ensure that the gates are securely closed on leaving the lift. Prior to the Fund's investigation, I had already issued a circular letter to all staff asking for their co-operation in this matter.

20. Screens and curtains

The use of cubicle curtains with plastic runners on plastic track has greatly reduced the number of comments under this heading.

Where portable screens are still used, care in handling and regular maintenance (particularly of castors) are clearly necessary:

Clatter of portable screens being pushed up and down the ward when a patient is brought in in the middle of the night always wakes me up. They also bump into the beds, which are close together, and the wheels catch on the bed-legs.

Screens should be replaced by curtains round each bed. The present screens make noise and are inconvenient to nurses.

The noise of metal curtain runners being pulled. Couldn't they be replaced with plastic runners?

All curtain rails and runners, also being metal, are extreme causes and disturb more than anything else at night.

The noisy and squeaky castors on the bed-screens and on the bedside lockers.

The remedies for these noises can be briefly summarised in the following comments from different hospitals:

Bed screens on wheels replaced by curtaining of all beds.

Screens have been replaced by cubicle curtains in one ward and the same should be the case for all the wards in the next two or so years.

All metal runners have been replaced with plastic runners.

We now have X's plastic cubicle curtaining throughout the hospital and have thus been able to dispense with screens. We find this type of runner and track remarkably silent.

21. Plumbing noises

Patients mentioned quite a variety of noises under this heading. Careful attention to maintenance seems to be the answer to most of them:

The drip of the tap, when it is not turned off.

Water falling on to the roof below and dripping all day long; also a loud sound occurring every 10 mins. or so, like radiators being banged with something metal.

Wash basins in ward gurgle, bubble and make dreadful noise day and night.

Steam pipes in the ward kitchen, it starts about 8 p.m. and goes on all night.

The flushing of the W.C. There are silent ones which are much better.

The noise of bedpans in the sluice and the steriliser, and water running at night.

After a rainy day the loud water overflow that comes off the roof and the noise it makes when the rain stops. Many patients find it keeps them from going off to sleep.

22. Radio and television

Radio and television sets have been installed as amenities in most hospitals by now. Excessive use or abuse of these sets can make them more of a nuisance than an amenity, as these patients' comments indicate:

Television and wireless switched on at wrong time and excessively too loud.

Bedside earphones left on when patients go to sleep or are not listening.

Having spent years in many hospitals I find T.V. sets where there is no control over the volume, most annoying of all.

The television (I believe recently installed in this ward) is very frequently tuned so loud that the din created is almost intolerable, making resting almost impossible and being a constant irritation of the nervous system by its raucous blaring. It is worst from 6-10 p.m. daily except during the hour for visitors. I have been in the ward for five weeks and six days.

Radios on all day at loudest pitch when others trying to sleep. Suggest radios be held to the ear and not laid on bed.

One of the patients imported a small loudspeaker. For a few days a T.V. set was installed in the ward. The constant noise from these (when operating) was infuriating. Otherwise no complaints.

Patients' wireless earphones after 10 p.m. still left on are a disturbance.

Most hospitals now aim to provide individual earphone-sets, rather than communal loudspeakers, for patients wishing to listen to the radio. These earphones are much less likely to cause disturbance to other patients, though they can still be a nuisance, if not used properly, as indicated by some of the comments above.

Television sets normally have a built-in loudspeaker, and the noise from this can be very irritating to patients who are unwell or disinclined to watch. This difficulty can be overcome by having the sound from the television set channelled to patients individually through earphones, as for radio, and quite a number of hospitals have found this to be a satisfactory solution to the problem. The following are some of the hospital comments on this subject:

Television and radio in wards—nuisance can be eliminated to some extent by having a firm control of these amenities.

Television and to some extent wireless in the wards are mixed blessings and except on the long-stay and chronic sick wards, television is not provided, and wireless headphones are used throughout, but are turned off at a fixed time by a time switch.

The television has been removed to a new dayroom.

The Friends Association of this hospital are considering paying for the installation of separate sound channels for television.

23. Telephones and call-systems

These noises can be very irritating to patients, as the following comments show:

I am a patient in the private ward and find the only deterrent to an otherwise very peaceful surrounding is the loud ringing of the main ward telephone which is situated in the lobby just outside the door of the ward. During the day it is not very disconcerting but during the night it is very disturbing. Might I suggest the installation of a buzzer system during the night hours?

Telephone bells ringing constantly.

The telephone bell appears to be unnecessarily loud in the middle of the night.

Unanswered telephone and other bells at any time.

Bell buzzing of a night when you can't sleep.

A very loud bell at visiting times.

Telephonic call-system for doctors, whose names are repeated several times in a strident amplification; fairly constant throughout day.

Various hospitals have managed to reduce the irritation caused by such noises in the following ways:

The practice of ringing a visitors' bell has been stopped.

A magnetic induction call system has been installed in place of the loudspeaker system.

Telephones have been fitted with lights wherever possible, to call members of the staff to the instrument at night.

Buzzer call-system disconnected and reliance placed on visible light system. The most efficient system is the personal receiver type, but this is expensive to install.

Pocket call system installed to cut out use of telephone to wards.

We are, at the moment, experimenting in one ward by muting the ringing tone of the telephone in the corridor, and fitting the extension with a flashing indicator on the Sister's desk in the ward itself. The preliminary report shows that this has been most successful and provided that this is confirmed over a slightly longer period, we shall be making similar modifications in all the wards. Besides cutting down noise, it saves considerably on the nursing staff's time in running to and fro.

24. Dustbins

By 1960, the complaints about dustbins had been reduced to very small proportions, and the following few comments summarise the measures taken:

Rubber dustbins replaced iron dustbins.

Rubber and polythene dustbins have been introduced.

A quantity of rubber lids have been provided for dustbins; additional supplies are required.

Use of disposable paper sacks instead of dustbins.

25. Other noises

A variety of other noises disturbed different patients at different times. The following comments are largely self-explanatory, and in most cases the remedies are self-evident too:

A creaking floor in the ward. Noise occurs all day, every time somebody is walking in the ward.

Ward above, usually walking noisily and dropping things. This morning at about 2 a.m. the noise of something being dropped was most disturbing.

Every day between 2 o'clock in the afternoon and 3.30 when we lay down to have a sleep, you would think the ceiling was falling down.

Patients' lockers have iron wheels instead of rubber ones.

The only noise that startles me is when the locker lids drop down. I have been an inpatient of this hospital five times and have found the same thing. At the moment I have a new locker, with a cupboard and a table that pulls out and believe me I am very grateful. I would like to see them all around the ward.

Locker doors fall down and slam; a small piece of rubber fixed on the corner edges would prevent this.

Noise and light from the steriliser being used at night.

Metal trays used for meals.

Metal waste-paper baskets being knocked against desk.

Ancient wheeled chairs that are seldom oiled.

The clatter of washing bowls (enamel) in early morning.

Windows rattling at night (this is a very windy place).

X-ray equipment running on un-tyred wheels are a great annoyance to well patients and menace to ill patients.

The dropping of the sides of cots during the night is very disturbing to patients.

Bed wheels and trolley wheels.

Staff washing up after lights out, and loud talking in kitchen—noisily throwing blinds up in morning and lowering at night.

Rattling of medicine and pill jars in ward cupboard at night.

Table legs and chairs should be fitted with rubber ends as these are continually moved morning and evening for cleaning the floor and are noisy.

The clatter of buckets and pans from the sluices.

Clanking of metal sputum-pot lids at night.

Rubber pads needed for chairs and visitors' benches.
Commodes. Day and night. The castors roar on the floor like a Tube train!

By night the unnecessary loud click of light switches.

The noise made by bed-tables being put out in the morning about 5 a.m.

Changing the regulators etc. as cylinders become empty by the use of a hammer, this should be done with a rubber mallet (day and night).

The general disturbance caused by the coming to life of the ward at 5.30 a.m., but have to agree that the routine must commence at an early hour when patients have to be prepared for morning operations.

26. Conclusion

I don't think there is enough noise. Music would be suitable.

This comment is perhaps worth quoting because it is unique. Of all the patients who responded to the enquiry, this was the only one who positively wanted more noise.

As has been mentioned already, the results of the enquiry indicate that about half the patients were not unduly bothered by noise, and many of these patients took the opportunity to express in the questionnaires their appreciation of the treatment received in hospital. The comments of the other patients referred to noises that could be divided fairly evenly between two categories: those caused primarily by people and by outside traffic etc; and those caused primarily by equipment, etc.

As regards noises caused by people, the patients themselves can contribute to noise-control by behaving quietly and considerately, but the chief responsibility in this field lies with the staff, and the position can be well summarised by repeating the words of one hospital: "Our experience is that the greatest single factor in controlling noise is staff discipline."

As regards noises caused by equipment, etc., noisiness is clearly one of the factors that should be taken into account when purchasing equipment or installing services. No less important is the need to ensure correct handling and proper maintenance of equipment and services once installed. Here again the position can be summarised in the words of another hospital: "Great importance is placed on the maintenance of the wards, and the House Governor or his deputy does a round of the wards each week with the Matron to ensure that maintenance is kept up to date."

To a certain extent the significance of most of the noises in both categories was determined partly by the siting, design and construction of the hospitals. Structural alterations to reduce noise in existing hospitals may well be prohibitively expensive, but the experience of some of the hospitals reported in these pages may well provide useful guidance to those engaged in the design and equipping of the new hospitals that are being planned or built to-day.

The comparative decrease between 1957 and 1960 in the number of complaints under some headings indicates that it is quite practicable to reduce the amount of unnecessary noise in hospitals. The unchanged or increased proportion of complaints under other headings likewise indicates that there is no room for complacency. **Noise-control is not something that can be achieved by an all-out attack over a short period of time; it is rather a matter of constant vigilance all the time.** As one hospital put it: "In the initial surge of enthusiasm quite a lot can be done, but with the pressure of day-to-day running of a hospital it is all too easy for lessons learned soon to be forgotten."

Finally, it must be emphasised that the credit for any value this report may have is due, first of all, to the patients who completed and returned the questionnaires, and secondly to the hospitals that co-operated in the distribution of the questionnaires and in the development of the noise-control measures described in this report. The Fund is deeply appreciative of all the help that has been so readily given by patients and staff alike in the conduct of the enquiry, and hopes that in time all patients will feel as contented as the one whose comment on the questionnaire was:

I should think this a perfect hospital.
No disturbance whatsoever.

Appendix

DIVISION OF HOSPITAL FACILITIES

Dear Patient,

King Edward's Hospital Fund, whose duty it is to assist hospitals with advice and money, wishes to find out all it can about the noises which are a trouble or annoyance to the patients in hospital. Everybody at this Hospital knows all about this enquiry and wants you to join in helping to make it a success.

Would you, therefore, be kind enough to write your ideas on the form overleaf and put it in the envelope addressed to the Fund. By explaining which noises worry you, it may be that future patients will be relieved from those particular worries.

Please understand that whatever you say will come straight to the Fund and will not be seen by anybody at the Hospital: this is done in full agreement with the Hospital.

Yours sincerely,

Director.

Will you please help to reduce noise for the benefit of future patients by giving short answers to the following questions. If you can say when and how often each noise occurs it would be most useful.

The noises that worry me most are:—

- (1) Those made by equipment: trolleys, lifts, doors, crockery, etc. Please state to which piece of equipment you refer, and whether the noise occurs by day or night.
- (2) Those made by people: nurses, domestic staff, visitors, other patients, etc. Please state which people make the noise, at what time and how. *E.g.*, do they talk loudly, walk noisily, drop things?
- (3) Those made outside the ward.
- (4) Those made outside the building.

Ward:

Date:

Hospital:

PLEASE DO NOT SIGN THIS

Table I

PATIENTS' COMMENTS ON NOISE—1960

Altogether, 1,739 questionnaires were returned to the Fund by 19 hospitals in the 1960 enquiry: 528 of these were quite blank or complaint-free, and an analysis of the remaining 1,211 is shown below.

The figures in brackets after each source of noise indicate the section of the report in which reference will be found to the noise concerned.

<i>Noises made by people and by outside traffic etc.</i>			<i>Noises made by equipment, etc.</i>		
<i>Source of noise</i>	<i>Total No. of comments</i>	<i>% of 1,211 question- naires</i>	<i>Source of Noise</i>	<i>Total No of comments</i>	<i>% of 1,211 question- naires</i>
Road traffic (5) ..	352	29%	Trolleys (14) ..	301	25%
Other patients (7) ..	200	17%	Crockery & kitchen noises (15) ..	173	14%
Domestic staff (8) ..	110	9%	Electric cleaning machines (16) ..	158	13%
Nurses walking (9) ..	106	9%	Doors (17) ..	145	12%
Trains (6) ..	86	7%	Bed-pans (18) ..	74	6%
Nurses talking (9) ..	69	6%	Lifts (19) ..	62	5%
People dropping things (12) ..	53	4%	Screens (20) ..	54	4%
Fuel delivery & stoking (11) ..	46	4%	Creaking floor boards (25) ..	50	4%
Visitors (10) ..	44	4%	Plumbing noises (21) ..	38	3%
Builders & workmen (12) ..	32	3%	Radio/TV (22) ..	37	3%
Aircraft (6) ..	31	3%	Curtains (20) ..	37	3%
Big Ben* (12) ..	29	2%	Telephones & call sys- tems (23) ..	36	3%
Doctors & medical stu- dents (12) ..	24	2%	Floor above (25) ..	33	3%
River traffic* (6) ..	19	2%	Lockers (25) ..	33	3%
Collection & delivery of milk (11) ..	19	2%	Sterilizers (21) ..	27	2%
Collection & delivery of oxygen cylinders (11)	15	1% or less	Beds (25) ..	25	2%
People outside (12) ..	13	"	Bells & buzzers (23) ..	23	2% 1% or less
Funfair† (12) ..	10	"	Trays (25) ..	18	"
Lawn-mowing (12) ..	8	"	Dustbins (24) ..	17	"
People rattling keys (12)	7	"	Wheels (25) ..	12	"
			Windows (25) ..	10	"
			Washbowls (25) ..	9	"
			Portable X-ray equip- ment (25) ..	8	"
			Cot-sides (25) ..	7	"
			Blinds (25) ..	6	"
			Bed-tables (25) ..	5	"
			Chairs (25) ..	4	"
			Waste - paper baskets (25) ..	3	"
			Visitors' benches (25) ..	3	"
			Medicine bottles (25) ..	3	"
			Sputum mugs (25) ..	2	"

* These two sources of noise (Big Ben and river traffic) were in fact mentioned by the patients of only one hospital; they accounted for 21% and 14% respectively of the patients commenting from that hospital.

† This source of noise (Funfair) was mentioned by the patients of only one hospital and accounted for 10% of patients commenting from that hospital. The hospital concerned has since arranged for the Funfair to be moved to another site.

Table II

PATIENTS' COMMENTS ON NOISE
Comparative changes 1957-60

In the case of 14 of the hospitals that participated in both enquiries, the results were reasonably comparable between 1957 and 1960. The analysis below illustrates the principal changes that appeared to take place between the two enquiries. In each enquiry, a total of rather over 2,000 questionnaires was issued to the patients.

	1960	1957
Total number of questionnaires returned ..	1,582	1,744
Blank or complaint-free questionnaires included		
in total	490	613
Number of questionnaires with comments ..	1,092	1,131

(A) Noises that caused fewer comments in 1960.

<i>Source of Noise</i>	1960		1957	
	<i>Total No.</i>	<i>% of 1,092</i>	<i>Total No.</i>	<i>% of 1,131</i>
	<i>of comments</i>	<i>questionnaires</i>	<i>of comments</i>	<i>questionnaires</i>
Trolleys	289	26%	395	35%
Doors	133	12%	245	22%
Screens	54	5%	107	9%
Curtains	23	2%	106	9%
Lifts	55	5%	75	7%
Dustbins	9	1%	35	3%

(B) Noises that caused more comments in 1960.

<i>Source of Noise</i>	1960		1957	
	<i>Total No.</i>	<i>% of 1,092</i>	<i>Total No.</i>	<i>% of 1,131</i>
	<i>of comments</i>	<i>questionnaires</i>	<i>of comments</i>	<i>questionnaires</i>
Road traffic	266	24%	194	17%
Other patients	184	17%	138	12%
Crockery and kitchen noises	147	13%	95	8%
Electric cleaning machines	140	13%	75	7%

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