fo f- years and is consequently of a considerable thickness, but, owing to the cracks resulting from settlements and to other causes, the rendering and the paint have had to be cut away and renewed from time to time. At the present moment a great deal of the rendering is lacking in whole or in part and the painting has, of course, not been done for many years.

Size.—The houses vary considerably in size, the average house having approximately a frontage of 25 ft. and a depth of 40 ft., giving approximately 1,000 sq. ft. of floor area, and there are usually basement, ground, first, second and third floors, and occasionally a fourth. The total height is about 60 ft. and the cubic contents of the average house is about 60,000 cu. ft. Some of the houses are, however, much larger, extending up to 2,500 sq. ft., and some, on the other hand, are smaller, the smallest being about 800 sq. ft.

Cutting of Central Partition.—The central partition has in some cases been cut away so as to throw the front and back rooms into one forming openings varying in width. In some cases these extend nearly across from the staircase wall to the party wall. In such cases iron or steel beams have sometimes been introduced, and some of the continuous floor joists have been cut away in part on the central partition so that these iron or steel joists could be let up into the thickness of the floor, whereby, of course, the strength of the continuous joists has been reduced.

Downpipes.—The downpipes are frequently chased into the party walls and in the front and rear walls.

Balconies.—Many of the houses contain balconies at first floor. These mostly consist of Yorkstone slabs carried on cast-iron brackets and there is no flashing between the balconies and the walls, ingress of water to the wall being originally prevented by painting.

Where the balconies come out to the colonnades they are usually of timber construction with lath and plaster ceilings. Some tenants have had metal flashing added at the balcony, but this is an exception and not the rule.

Foundations and Damp Courses.—None of the walls have concrete foundations or damp courses.

The foundations to the walls mostly consist of three courses of footings projecting on either side about 5 inches to 6 inches and resting direct on the soil.

In most of the houses the soil consists of yellow London clay, but in a few of them of hoggin. Generally speaking, there is clay on the west side of the Park and along the south side up as far as 7, Cornwall Terrace. Hoggin was found under 8, 13, and 19, Cornwall Terrace and under York Terrace as far as York Gate. East of York Gate it appears to be clay again. I found hoggin under some houses in Upper Harley Street, and there is, I understand, another bed of hoggin about midway up the east side near William Road. I have had no bore holes sunk to determine how deep the hoggin is where it occurs and it almost certainly over-lies clay, and therefore is probably relatively thin. The subsoil may therefore in all probability be fairly described as being of yellow London clay with a few feet of over-lying hoggin in some places.

8. VIRTUES AND DEFECTS

The virtues of these houses obviously include their pleasant position, their large lofty and well-proportioned rooms on the ground and the first floor, the thickness of their walls, which would make them warm in winter and cool in summer, and if only they were in structurally sound condition they would obviously be desirable mansions for those who can afford this size of house and keep sufficient labour to run it. The labour required may be thought rather considerable having regard to the many floors, the comparative absence of lifts except in a few houses, the poor accommodation for servants and the rather obsolete character of the heating, cooking and other arrangements in most of the houses, though some of the tenants have improved matters in this respect by adding modern cooking apparatus and central heating.

The structural defects are, however, in most of the houses considerable, and include the following:—

(a) *Absence of Damp-Proof Courses.*—Such houses would, of course, not be permitted by any modern bye-laws, and in many cases we have seen damp rising a considerable distance from the basement floor. It would be a very expensive matter to introduce such damp courses now, and other alternative methods are, in my view, expensive and of doubtful efficacy. This damp will, of course, be mitigated but not eliminated in continuous occupation, and especially if there are boilers and cookers in the basement. But I note that de Soissons proposed giving up the basement and putting his kitchen on the ground floor.

(b) *Foundations.*—The foundations do not, of course, comply with the requirements of any local bye-laws, but, nevertheless, we may consider them strictly on their merits.

We have made calculations of the pressure which they exert on the soil and this appears to be about 2.3 tons per sq. ft., allowing only 20 lb. per sq. ft. for the weight of the floor and 20 lb. per sq. ft. for the superimposed load. The latter is, of course, considerably less than is required by modern bye-laws, but, nevertheless, may represent an average of all the floors taken together under normal domestic occupation.

There is to my mind no doubt whatever that this pressure on this soil must have caused very considerable settlements, but part of these would have occurred during building and if the building of a terrace went up uniformly in height over the whole terrace an unequal settlement would not necessarily be sufficient to cause much initial damage.

Nevertheless, 2.3 tons per sq. ft. is a high pressure for yellow London clay and the clay is bound to vary in its moisture contents and its carrying capacity, not only from place to place, but also from time to time. It is, therefore, inevitable that considerable unequal settlements would occur, and there is plenty of evidence of this. Even in Sussex Place, which in some respects is one of the best terraces, there are one or two more or less vertical cracks in every party wall, and most of the external walls in all the terraces have cracks of greater or less extent.

In the case of Pier 4 in the New Waterloo Bridge the net pressure on the clay is about the same as that under the walls of the terraces, i.e., about 2.3 tons per sq. ft., and though this Pier was carried down to blue clay, which is usually considered to be better than the yellow London clay, the settlement was of the order of 1 inch under the weight of the Pier alone, before the weight of the superstructure was transferred to it, and from the beginning of 1941 to the end of 1945 has increased by a further amount of nearly 4 inches, making the total settlement to date of about 5 inches.

In my view it is unlikely that the total settlement of the terraces has been as much as this, but, nevertheless, it may well have been 2 inches or 3 inches, and the foundations are still subject to risk of movement as the result of disturbance of nearby land, drainage, and the many possible changes in the course of the next 50 years or more.

If new loads, such as considerable additions in the shape of tower blocks, are constructed adjacent to the existing buildings and bonded thereto and if these new structures are founded on the yellow clay, they will, in my view, be subject to settlements and be likely over a period of years to cause differential movement between themselves and the old structure. I think this is a point which should be borne in mind when a long-term policy is under consideration.

(c) *Timber Floors and Partitions.*—The size of the timbers in the floors vary, but 9½ inches × 2½ inches at 15-inch centres is common, and the floor boards are mostly 1¼ inches nominal by 7 inches wide. In many cases floors have sagged considerably and the boards are in many places very rough and worn. They vary much, however, according to the up-keep by the tenants and the extent to which they were covered with floor finishes.

From ground floor upwards the central partition which carries the floors is itself of timber of rather light construction, frequently 4 inches × 2 inches at 15-inch centres. This partition carries first, second and third floors, and occasionally a fourth. It is therefore heavily loaded, particularly where it has been partly cut away to provide openings between the front and back rooms.

Apart from the question of dry rot, which will be referred to later, the use of stud partitions to carry several floors like this constitutes, in my opinion, a serious fire risk, and it is obvious from the construction that if the partition between ground and first floor were to be on fire all the upper floors in a typical house would shortly collapse.

(d) *Timber Lintols and Bonding Timbers.*—All the lintols over windows were of timber. Wherever moisture has gained access through lack of flashing or failure of rendering and paintwork in the upper wall the timber lintols have suffered seriously from dry rot (referred to later). In some cases they have already been replaced with concrete lintols but in a larger number of cases this has not been done. In some cases the lintols are missing and the brickwork seems to be carrying itself precariously. This is particularly the case in the lintols under the entablature over the portico columns, many of which have disappeared completely, and where the timber is in practically all cases rotten where this has not actually occurred.

The walls are provided with bonding timbers at 5 ft. or 6 ft. centres vertically, some of these were found to be 3 inches × 4½ inches section. The bonding timbers in the party walls were frequently halved with the bonding timbers in the front and back walls, and one or two wrought-iron nails connected the two at the scarf. It is curious to think that the strength of one or two french nails should have been considered adequate to bond one wall to another, but, apart from this, it is difficult to see what

function the bonding timbers served. They have unfortunately served a very unhappy function in forming bridging pieces by which the dry rot has been able to climb up the wall and find lodging at intervals on these bonding timbers. A very large number of them are shrank and cracked into rectangular sections in the manner which is typical of the effect of dry rot of the *merulius lachrymans* type, and here they are, of course, loose in the walls and only serve to weaken them.

(c) *Timber Trusses to carry Walls.*—Where the front porticos extend beyond the main wall, the main wall is usually carried from first floor upwards on 14-inch timbers strengthened with ties going up to a higher level. These timbers are frequently 14 inches square or thereabouts, and in many cases their ends have rotted. In some cases, as, for example, in 25 York Terrace, steel stanchions have been inserted to support this bressummer and cased in an ionic plaster column. This timber truss construction has in nearly all cases caused serious diagonal cracking in the front wall, particularly in the area vertically between the top of one window and the bottom of the window above, and these cracks are particularly well marked where the timber has, in addition, been subject to some rotting. It was obvious that these cracks were old and had been repaired from time to time and opened up again, and it is, of course, impossible to maintain a weather-resisting outer skin while these movements are continuing.

(i) *Lack of Flashing.*—The houses are in many cases provided with balconies, cornices and other projections, particularly on the front facing the Park. The balconies mostly consist of Yorkstone resting on cast-iron brackets, and the cornices appear to consist of 2-inch Yorkstone let only 2 inches or 3 inches into the wall and then cased with rendering. This construction is precarious and constitutes a danger to human life if perpetuated beyond it present age.

In good building construction all such projections would have been flashed with 4 lb. or 5 lb. lead or other metallic flashing such as copper, but nothing of this kind appears to have been done in the Regency Terraces, and the only protection appears to be paint, which, of course, deteriorates and wears away and cracks with variations of moisture or temperature. In consequence water from these projections has found its way into the porous walls of stock brick and lime mortar and penetrated to the timber lintels, trusses, bonding timbers, &c., and floors, which usually receive a bearing in the front and rear walls. This is one of the most frequent causes of dry rot, which is referred to later, and has also affected many of the roofs for the same reason.

(g) *Faulty Rendering and Bonding.*—A great deal of the rendering is either completely missing or loose. In some cases this has been temporarily made good by one or two coats of rendering (Spatterdash), but there is a tremendous amount of rendering which has not yet been so treated.

Defective rendering and painting causes conditions which in this construction tend to set up dry rot, because water gets in through the cracks and is soaked up by the porous brickwork, and when the rain ceases it cannot escape or evaporate readily, as it is trapped behind the rendering and can only evaporate through the crack which represents a tiny proportion of the total area, and in any case by this time the water has probably soaked away to other areas not near the crack through which it entered.

It was most noticeable that there was far more dry rot in the walls which were rendered than in those where the brick face is exposed to the outside, in spite of the fact that the latter would no doubt be the more porous of the two, but, on the other hand, more readily available for drying and evaporation.

In my view it is a most precarious method of preventing the ingress of water into porous walls of this type containing timber lintols and bonding timbers and trusses by dependence on rendering and paint, particularly when, as in the present cases, there are constant movements and cracks in the walls resulting from movements of foundations, deflection of timber trusses, rotting of timbers, expansion and contraction due to variations of temperature and moisture, and many other causes. In my view such protection can only be considered good for a few months after the painting has been done, and after that it must be considered that there is fresh liability to the entry of water sufficient to cause the dry rot risk even if not sufficient to be noticed by the occupant of the house.

(h) *Dry Rot.*—Nearly all the buildings are affected by dry rot.

This is frequently not visible until stripping of the plaster has been done. It travels from building to building through the party walls. On the 20th June an examination of all houses which had up to that date been stripped sufficiently to form an opinion showed the following:—

York Terrace, 1-23, all contained dry rot with a possible exception of No. 19, which had not been examined (occupied). The same applies to Nos. 24-43 with

the possible exception of No. 37. (Nos. 44-49 had been destroyed by bombing.) No. 60 contains dry rot though Nos. 58, 59 and 61 appear to be free.

In *Cornwall Terrace* dry rot was found in every house Nos. 1-21, with the possible exception of No. 1, which was not examined (occupied).

It would therefore seem that in York Terrace and Cornwall Terrace there are approximately 62 houses known to contain dry rot compared with 6 houses which could not be examined and which may or may not contain it.

In *Clarence Terrace*, out of 12 houses total, 9 are taken by the Ministry and all were found to have dry rot.

In *Sussex Place*, out of a total of 26 houses, 15 are taken by the Ministry and all have dry rot.

St. Andrew's Gate.—Out of 8 houses 7 are taken and all have dry rot.

Somerics House has dry rot.

Cambridge Gate.—Nos. 1, 2, 6 and 7 are taken and all have dry rot, No. 6 very badly.

Cambridge Terrace.—Out of 10 houses 8 are taken and only 2 of these are free.

In *Chester Gate* out of 5 houses 3 are taken, of which two have dry rot and the third was not stripped or visible.

In *York Gate* out of the first 5 houses No. 4 was blitzed and the remaining four were suffering badly from dry rot.

I think it is clear from the above that the exceptions to dry-rot infestations are few and uncertain and those where it has not been found may easily contain it, though it has not yet been discovered through lack of stripping.

In nearly all cases the dry rot was of the type known as *merulius lachrymans*. In this connection I must mention the Bulletin No. 1 on Dry Rot published by the Forest Products Research Laboratory from the authorship of Mr. Cartwright, M.A., F.L.S., and Dr. W. P. K. Findlay, D.Sc., D.I.C. This will make it unnecessary for me to repeat any of the valuable information which can be found in this publication.

Not being myself an expert in dry rot I sought the assistance and advice of Dr. Findlay and Dr. Ramsbottom of the Natural History Museum, and both these gentlemen were kind enough on separate occasions to accompany me on some of my examinations of houses and to give me their views. Appendices I and II set out a record of our joint observations on the houses which we examined together, and my understanding of the opinions expressed by these gentlemen in a subsequent discussion which I had with them. I have sent them a copy of these reports and received their confirmation or correction.

The extent to which dry rot has infected houses varies enormously. In a few cases it is confined to a few places in relatively unimportant positions such as cellars, cupboards, &c. In others it extends over many walls and floors and partitions, and must be regarded as extremely serious. Between the two there is every intermediate condition.

Some houses are still leaking as to their roofs and windows and allowing water to enter at every considerable downpour of rain. These houses are usually very badly affected. Those which have been under continuous occupation during the war and have not suffered much from blitzing or where their injuries were immediately attended to are relatively free, but these, unfortunately, are very much in the minority and it does not by any means follow that they are not affected, since until the plaster is stripped it is frequently impossible to see. The latter circumstance is accentuated by two considerations: The first is that dry rot of the *merulius* type will travel great distances and puts out mycelium threads which will carry water from a wet place to the end of the mycelium threads, which may be in a dry place, and will deposit water there in the form of drops (hence the name *lachrymans*) sufficient to start a fresh outbreak. The second circumstance is that these mycelium threads appear to penetrate 18-inch party walls with impunity. I have seen many examples of this. I first saw it in some houses in Cornwall Terrace and in York Terrace, where some upper walls were being taken down for replacement, and the mycelium threads were clearly visible in the mortar joints between the bricks and extended right through the wall. Then, again, we found an outbreak of *merulius* in No. 7, Clarence Terrace with the fruit measuring approximately 24 inches × 12 inches in a cupboard which Dr. Ramsbottom opined had come from the next-door building, i.e., No. 8, and on subsequently examining No. 8 we found the source exactly as he had said. Again we found a bad outbreak in No. 7, Cambridge Gate, which Dr. Ramsbottom thought was coming through the party wall from No. 6 and, on subsequently investigating this, we found that this was unquestionably the case. The two latter cases are referred to in Appendix II.

I have found many other cases where the same thing has undoubtedly happened. For this reason it must not be assumed that even a dry house which shows no visible outbreak is not, in fact, being affected from adjoining houses which are bad.

In quite a large number of cases dry rot had already been attended to to the extent of cutting back the floor joists some 5 ft. or 6 ft. from the front or back walls and supporting the floors. In some cases the timber lintols had already been replaced with concrete. The impression indelibly left in my mind is that nearly every house is suffering from dry rot in greater or less extent, some extremely badly and some as yet comparatively little, but that spores must be presumed to have alighted on most of the timbers and the houses are therefore susceptible to an outbreak as soon as the conditions of damp and temperature become suitable.

(i) *Poor Bonding.*—In many cases I found what would be regarded to-day as very inadequate bonding between the party walls and the front and rear walls to which they connect. In many cases also the walls appear to have a 4½-inch skin of good-looking brickwork very inadequately bonded to the rest of the wall behind and frequently bulged away from it. Inspections showed that the rear walls of many buildings have been partly rebuilt at various times and the Ministry of Works are partly rebuilding others in the course of their operations, but these only amount to a fraction of the total, and in my view there will remain a considerable liability in regard to bad brickwork resulting from causes of this kind.

(j) *Construction of Porticos.*—With the exception of the houses in Portland Place and Park Crescent, where the columns are of stone, the fine porticos appear, unfortunately, to be very badly constructed. The columns appear to consist of bricks on end and very rough brick-core frequently consisting of roofing tiles arranged vertically, surrounded by a coating of stucco in which the fluting and features of the columns have been formed.

In most cases there are horizonal lines across this stucco at intervals of 3 ft. or 4 ft. apart, and I have not been able to form a final opinion as to whether the stucco was formed *in situ* or applied. I incline to the former opinion, though the horizontal cracks are so straight and regular that there is a case for the other view.

On top of the columns timber lintols were used and the front and soffite of the entablature to the portico obviously consisted generally of lath and plaster because the plaster has fallen away in several places and exposed the laths. The timber lintols are frequently completely missing, having rotted away and fallen, and the brickwork which it supported is now precariously held.

In some cases the upper portions of the porticos have had to be taken down for safety.

The whole construction savours rather of what would be considered suitable to-day for exhibition buildings not intended to have a long life, and I think it is remarkable that they have lasted as long as they have.

(k) *Downpipes.*—Most of the downpipes are constructed in chases either in the party walls or in the external walls or both. Some of those in the external walls have leaked at the joints and caused outbreaks of dry rot.

(l) *Drains.*—Owing perhaps to settlements and other disturbances drains are mostly in a bad condition and the Clerk of Works to the Ministry of Works advises me that many of these are having to be repaired even for their temporary occupation. It is advised, therefore, that for more permanent occupation they ought to be more carefully dealt with and probably relaid *in toto*.

(m) *Sagging Floors and Ceilings.*—Owing to unequal subsidences in the building many of the floors are more or less on the slope and subject to considerable sag. This does not make them dangerous but is sometimes inconvenient.

In most of the buildings which have not been subject to continuous occupation the ceilings have fallen in whole or in part. Most, but not all, of the floors are pugged, and this pugging has done much to enhance the likelihood of dry rot as it holds the water.

Where ceilings are cut away a great deal of dirt is usually found on the ceiling, which helps to give these old buildings a characteristic smell, and which is another justification for cutting away all the plaster, which also serves to enable a proper examination for dry rot to be made and enables a more secure ceiling without this dirt to be reinstated.

(n) *Subsidences and Cracks.*—These have already been referred to in general under Items (*b*), (*e*) and (*g*).

Cracks have been caused by unequal subsidences due to high pressures on the clay, caused by lack of proper foundations, coupled with inequalities from time to time and from place to place in the moisture contents and the carrying capacity of the clay. This may well have been accentuated recently by pressure waves in the clay

resulting from bombing, and there is a liability to further subsidences if ever the conditions should be altered as a result of new buildings in the neighbourhood, change in the sub-soil, water conditions resulting from a change of drainage, squeezing of clay resulting from the building of new tower blocks or other additions to the existing buildings and, in fact, any condition which will alter the clay sub-soil.

Cracks have also been caused by sagging timber trusses, lintols and other supports accentuated by rot.

These cracks are not necessarily in themselves dangerous, and no doubt with sufficient expenditure of money they could be made good by stitching or partial rebuilding. They will, however, in my view be liable to recur, and this makes the maintenance of a really water-tight skin on the outside walls very difficult to secure permanently.

(o) *War Damage and Neglect.*—In my view the Terraces have undoubtedly suffered from war damage and general neglect in the last six years. This remark is made without reflection on anyone and one knows how difficult it was to get anything done with the shortage of labour and materials, which extends even to the present day. Even now many roofs are leaking very badly and the floors are continuously sodden. This is, of course, in hand by the Ministry of Works as regards houses which they are taking over, but it accounts to some extent for the very serious condition in which I find the bulk of the houses to be to-day. Many of the Terraces had their roofs damaged by blast and incendiaries and fire resulting therefrom, and most of the windows were blown out and replaced, sometimes until not much later, with tarred felt, which was itself blown out by subsequent incidents and in some cases by wind, with the consequence that many of the houses which were not occupied were more or less exposed to rain, both from the roof and windows, for several years.

Nevertheless, while this has unquestionably contributed very largely to the general decay and to the dry rot, there is very considerable evidence of dry rot pre-war. The Crown Surveyor can give you evidence from his records of many outbreaks which came within his knowledge, and there would be many which were no doubt dealt with by the tenants under their repairing leases without necessarily coming to his knowledge. Some of the dry rot is thought to be clearly pre-war, especially the bonding timbers with their shrunk charred appearance. It is, of course, also clear that during the war a great deal of stucco has fallen off or been blown off and not replaced for several years, which would add to the general internal and external damage and neglect, nor has there been any painting for the last 6 or 7 years externally, and in some cases longer, whereas the pre-war rule was external painting every 4 years.

(p) *Electrical Systems.*—All the houses which have been severely damaged by war or neglect have (except where they have been renovated) electrical systems which require complete renewal. The Ministry of Works are renewing (in exposed conduits) the electrical systems in all houses taken over by them.

(q) *Plumbing and Fittings.*—Except where the tenants have spent a large sum on renovation of plumbing and fittings, these are of extremely obsolete pattern and far below modern standards.

PART II

Conclusions

9. LONG-TERM POLICY VERSUS SHORT-TERM POLICY

From what has been said it is clear that the Terraces must be considered to be in a bad structural state, and in regard to this there are, of course, two views which can be taken, *i.e.*, the short-term policy and the long-term policy.

From the point of view of a short-term policy I can quite well understand the contention of people who occupy some of the houses which have been well maintained, that they are good for several years more of pleasant and convenient occupation, and this I do not question. There are, for example, several such houses, particularly in Hanover Terrace and Sussex Place, and, from a structural point of view, I should say that Hanover Terrace is the least badly affected. In Hanover Terrace out of 20 houses, 8 are occupied, 8 are let but not occupied and 4 are not let. The two middle ones, Nos. 9 and 10, have suffered very badly from incendiary bombs, fire in the roof and general war damage. This Terrace contains 3 porticos, one at each end with four columns and one in the centre with six. The centre portico is visibly out of plumb and the two end ones to a lesser extent. I should say of this Terrace generally that it could, without unreasonable expense, be kept in occupation for another 10 to 20 years, but that if it was required to put it into a condition that could be guaranteed for another 50 to 100 years, it would need as much doing to as the rest. Several of the houses were found to contain dry rot and I should say they are all liable to it unless expensive remedial measures are taken.

10. HOUSES CAN BE REINSTATED

If it should be decided that the houses should be reinstated as they were, that is to say for occupation as separate houses, there is no reason in structural engineering why this cannot be done.

While the cost on a short-term policy might be relatively small the cost on a long-term policy will, I think, be much greater, depending on what treatment is given and what residual risks are allowed to remain, and perhaps it will assist the Committee if I attempt to give them some idea of what these costs are likely to be.

Before attempting to do so there are two things which I would like to say.

The first is that any recommendations herein must not be considered to be in any way a criticism of the work being done by the Ministry of Works, which is directed to a short-term policy, and in my view the Ministry are justified in omitting things in a short-term policy which might well be considered necessary in a long-term policy.

The second is, that the question as to whether houses with basement, ground, first, second and third, and occasionally a fourth floor, are in sufficient demand to-day, having regard to the shortage of labour and the impoverishment of the people, is a matter on which I do not propose to venture an opinion as the Committee are in a position to get far more valuable evidence on the point from the Crown Surveyor and others.

I propose to confine myself strictly to an estimate of the costs involved in carrying out several alternative long-term policies and leave it to the Committee to reconcile this cost with the incomes likely to be derived, so that they may take this into account with many other considerations in formulating their policy.

The following figures are, of course, only approximate but are related to present-day prices. It will be obvious to the Committee that no very accurate estimate could be made because of the following factors:—

(*a*) Prices are constantly varying, both of labour and materials.

(*b*) The quantities required vary with each house owing to differences of size, arrangements, degree of damage.

(*c*) A great deal of the damage is not visible until stripped and only a few of the houses are at present stripped.

Under these circumstances it would no doubt be the height of prudence to decline to give any estimate, but I have felt that this would be unfair to the Committee and that any intelligent and careful estimate is better than none at all and, provided the reservations above mentioned are borne in mind, I propose to assist the Committee as much as I can.

11. FIRST STAGE REPAIRS

This would consist in adapting the houses to their pre-war use without the addition of lifts or any other modernisation, and merely leaving them as they were in 1939, but thoroughly repaired structurally for a reasonable anticipation of a further life of 50 to 100 years.

This would include, for example, stripping all ceilings so that a complete examination of the floors, partitions and other timbers can be made, eradicating all dry rot as far as reasonably possible by blow-lamp application to the walls affected, painting the latter with sodium-fluoride throughout, cutting away affected timbers and substituting new pressure-impregnated, rebuilding or stitching all cracked walls in whole or in part, cutting away loose or defective rendering and repainting three or four coats of paint on the outside where previously painted, rebuilding porticos as necessary, replacing faulty timber windows, glazing, etc., relaying faulty drains, flashing all balconies, cornices and projections with lead or copper, providing new down pipes where required, cutting out all timber lintels and trusses carrying walls and substituting reinforced concrete or cased steel ones, but not attempting anything by way of modernisation.

In arriving at an estimate for this we already have several things to go on, which, coupled with some rough calculations of my own, appear to be reasonably consistent within themselves.

In the first place the Ministry of Works have themselves prepared careful estimates for doing part of this work, and Mr. Henderson has been kind enough to put these figures at my disposal.

He divides the houses up into two categories as already explained in paragraph 6, page 4, and his estimate is £3,300 for Category (*a*) and £2,490 for Category (*b*). A part of this estimate was for adaptation for office use, such as cutting holes in party walls, providing new partitions for corridors, central heating, office lavatory accommodation, office electric light and power in exposed conduits, etc. The sums included under these heads are:—

£990 in Category (*a*) and £620 in Category (*b*),

leaving net amounts, exclusive of adaptation, of—

£2,310 in Category (*a*) and £1,580 in Category (*b*).

I have asked Mr. Henderson whether these figures are likely to be exceeded, and there are, of course, many reasons why they might be without reflecting any discredit on anyone concerned, when it is remembered—

(*a*) that some of these estimates were prepared last year before the substantial rise in the cost of labour which occurred on the 1st January this year took effect, as well as the many rises in the cost of various materials,

and

(*b*) when it is remembered that the surveyors could presumably only take for what they could see and more had to be done when defects were exposed on stripping.

Towards the middle of July I gathered from Mr. Henderson that he was already aware of extras likely to amount to about £400 a house at a time when about 50 per cent. of the work in those houses had been done. I have therefore deemed it expedient to add a figure of £800 for likely extras over the original estimates. This brings the cost of internal works, less adaptation, to—

£3,110 for Category (*a*) and £2,380 for Category (*b*).

This includes only a very small amount for dealing with the fronts, and I understand that a supplementary estimate, not prepared at the date of writing, is now in the course of preparation for this work, and that four houses are being put in hand with a view to arriving at some idea of the cost.

In the Ministry's short-term policy the idea is, however, only to carry this repair up to the stage which would include removing faulty rendering, providing two coats of Spatterdash, including removal of all bad timbers, rebuilding fractured arches, cutting out cracks and treating crazed stucco with a paint base. After discussion with Mr. Henderson, Mr. Leach and myself, it was considered that a sum of the order of £400* might be spent in this way on the average.

This would, of course, not finish the job and there would still be further sums which would have to be spent at a later date, which would include finishing the rendering to a finished face, providing decorative mouldings, repair or rebuild porticos as necessary, repair or replace all external decorative features, flash balconies, cornices, &c., prepare the outside for painting and thoroughly paint three coats. For this I have included a sum of £600.*

This brings the cost of Stage I works up to—

£4,210 for Category (*a*) and £3,380 for Category (*b*).

There are 155 houses in Category (*a*) and 44 in Category (*b*) out of the total of 199 which the Ministry have taken over out of the houses which I am considering, and the average of Categories (*a*) and (*b*), duly weighted in this proportion gives a figure of approximately £4,000.

It must, however, be remembered that the internal work done by the Ministry on a short-term policy for office user, does not go so far as one would reasonably require on a long-term policy for domestic user. For example, they are only painting new timber, whereas for a long-term policy it ought to be pressure-impregnated. Their standard of plastering and decoration is to the austerity office standard and something better would reasonably be required for permanent domestic user. They are not, I think, replacing all timber lintols and beams, but only those which are affected, whereas for a long-term policy it is clear that all timber lintols and beams should be replaced by concrete or steel ones.

It is therefore desirable to add something to the £4,000 previously arrived at to bring it up to a long-term policy domestic standard, and I think it would be prudent to increase it to £4,700 per house.

We can compare this with the valuable estimates which Mr. Sydney Paine, F.S.I., was good enough to supply, of which I have been privileged to receive a copy. I find on page 3 of his estimate, dated December, 1943, an estimate for dealing with 8 houses out of a group of 18, and while this contains a lot of sums which are extra to those which we are considering at the moment, such as the new addition at the rear and all the items from "Plumbing" down to "The removal of old pipes, wire, &c." we are left with the first 7 items entitled "Works to basement, ground, first, second, third, roof front and rear elevations." These total £3,972 and have to carry their share of preliminaries—£264—making a total of £3,176.

* Since writing I understand that the £400 estimate has increased to £550. I believe, however, this may correspondingly reduce the £600 item, leaving the total of £1,000 for dealing with the front unchanged.

To this has to be added 75 per cent. to bring it up to the present-day price, giving a figure of £5,566.

An examination of the plans with which these figures correspond showed that it also includes several items of new partitions, alterations in position of windows, new roof, new stairs above second floor required in connection with a modernised plan, and when these items are deducted it is clear that there will be no very serious discrepancy betweeen the residual figure and the figure of £4,720 previously referred to.

Applying this sum of £4,700 to 374 houses produces a figure of approximately £1,750,000.

12. SECOND STAGE: MODERNISATION WITHOUT A LIFT

It may then be considered necessary, so as to enhance the desirability of the property, to modernise it by doing internal plumbing, hot water, heating, new flue, electric light and power and bells, drains, removal of old pipes, &c. For this Mr. Paine has been good enough to supply figures amounting to £1,074. Adding its proportion of preliminaries—£97—and increasing the total by 75 per cent. to bring it up to present-day prices, we arrive at an additional sum of £2,050 per house, which brings our total cost per house up to £6,750, or the cost for 374 houses to £2,500,000.

13. THIRD STAGE: MODERNISATION WITH A LIFT, BUT WITHOUT CHANGE OF PLAN

The cost of adding a lift and the necessary trimmings, partitions, &c., which go with it would be approximately £1,500 per house, bringing the total up to approximately £8,250 per house, or for 374 houses approximately £3,000,000.

14. FOURTH STAGE: ADAPTATION TO HOUSES ONLY (PART OF DE SOISSONS' SCHEME)

If the houses are all to be dealt with as in Mr. de Soissons' attractive design for the 8 houses, then the cost per house, according to Mr. Paine's figures, is £6,510, plus 75 per cent. to bring it up to present-day prices = £11,400 per house, giving a total for 374 houses of approximately £4,250,000.

This would include rear additions, new roofs, new walls and partitions and new staircase for the top floor, as well as a new lift, plumbing, hot water, heating, &c.

15. FIFTH STAGE: ADAPTATION TO HOUSES AND FLATS (DE SOISSONS' SCHEME)

If, on the other hand, the whole scheme of Mr. de Soissons' adaptation in which the 18 houses are converted into 8 houses and 16 flats is adopted, then, using Mr. Paine's figures, the cost would be £11,250 per house, or the total for 374 so treated approximately £4,200,000.

This would give approximately 165 modernised houses and approximately 330 flats.

16. EFFECT OF MINISTRY OF WORK'S PRESENT PROGRAMME OF WORK

We must, however, give consideration to the fact that the Ministry of Works are at present engaged in adapting 199 out of the 374 houses for temporary use as Government offices, and on the basis of the previous figures mentioned in para. 11 apparently are spending an average of about £3,400 per house. This being the weighted average of—

£3,570 for Category (*a*) and £2,780 for Category (*b*).

Some of this work is, of course, work towards the restoration of dry rot timbers, and many of the other defects in the buildings, as well as the first stage of external repair. In this figure I have excluded sums they are spending on adaptation to offices which would not be useful for domestic user.

To restore these houses to domestic user a further sum of money would have to be spent. For example, it would be necessary to remove the corridor partitions, clear away the exposed conduit for office lighting, office fittings, office lavatories, close up the openings in the party walls, rebuild partitions to suit domestic user and decorate for domestic use. I estimate this would cost £850 per house.

Apart from the items previously enumerated there are, however, other things which the Ministry are doing eminently suitable for a short-term office standard, but probably not acceptable for a long-term domestic standard. I refer, for example, to the fact that where floor joists have been cut back some 5 ft. from the outside wall because of dry rot, a steel beam has been spanned across from the party wall to party wall for carrying the ends of these joists and the ends of the extension joists required to bridge the gap with new timbers. Where this occurs on more than one floor steel stanchions have been introduced with new foundations, so as to take the load off the party walls, which would otherwise be excessively loaded. These beams, at a distance of some 6 ft. or 7 ft. away from the front wall, while quite acceptable in an office, are probably not acceptable in high-class domestic property. The uncased steel stanchions standing out from the party walls are also more suitable for an

office than for high-class domestic properties, and I doubt whether you would, on architectural advice and on the advice of the Crown Lands Surveyor, retain them in a long-term domestic policy.

These are only examples of many things where I think the long-term domestic requirements differ from the short-term office requirements, and where a part of what the Ministry are doing would have to be considered as requiring additional expenditure to bring it into long-term domestic user requirements.

For this purpose, I have therefore deducted a further £500 per house, making a total deduction of £1,350.

Deducting this from the £1,400 previously referred to leaves a figure of £2,050 as an estimate of the value of the work done by the Ministry of Works, which will go to reduce the cost of structural work in the Terraces as a whole.

Applying this to the 199 houses which the Ministry are dealing with out of 374, this represents a total of approximately £400,000, and this sum may be treated as a deduction from any of the items mentioned in the previous five paragraphs, that is to say from Stages 1 to 5.

17. COMMENTS ON FOREGOING FIGURES

The foregoing figures may seem high to some, but only those who have had actual experience of the cost of dealing with houses like these are perhaps in a position to criticise them, and it may perhaps be relevant to mention that we examined one of the houses in Gloucester Gate which was not repaired. This particular house was adapted for ground and first as a self-contained flat with consulting rooms on the ground, while the second, third and fourth has been converted into a maisonette as I understand pre-war. I understand that the first estimate for putting this into good condition internally was £1,800, but the most recent estimate was £4,400, and the work is not yet completed. Furthermore, this does not include external repairs or decorations, and it is perhaps of interest to note that we found two dry-rot fruits on the underside of the balcony at first-floor level, which had evidently not been noticed, and drew the builder's attention to these before leaving. The significance of this, of course, bears on the question as to the possible recrudescence of dry rot in the future, not in this house in particular, but in all the houses.

18. RESIDUAL RISKS

The question now arises, what are the residual risks of defects in the houses even if all or some of the foregoing expenditures are incurred? Will the houses then be structurally as good and as free from future risks of defects requiring expenditure as houses of modern construction?

It seems to me that this is an issue which is difficult to answer, but which has to be faced, and considered as courageously as possible.

In the first place, let us consider the position in regard to dry rot. These buildings will contain timber floors. Both Dr. Findlay and Dr. Ramsbottom emphasised that all new timber should, for a long-term policy, be impregnated under pressure. It is no criticism of the work which the Ministry of Works are doing to state that they, in their short-term policy, are painting the timbers with sodium-fluoride or Cuprinol and not having them treated by pressure impregnation. In any case it is only the new timber which is either painted or impregnated, and a great deal of the old timber remains without either. This timber, as we know, has been subjected to spores from dry rot, which Dr. Findlay and Dr. Ramsbottom state fly off in enormous quantities from every *merulius* fruit and only await suitable conditions of moisture, temperature, &c., before they will cause fresh outbreaks. None of the old timbers in the buildings are being sprayed or impregnated in any way, and the experts gave it as their opinion that it would be no use doing so because the vital parts could not be reached by such treatment. I gathered that Mr. Paine's estimate was based on leaving 50 per cent. of the old boards and approximately 50 per cent. of the old floor joists, or even more. We therefore have the condition that, when all this money has been spent, the buildings are still liable in some measure to fresh outbreaks whenever the conditions for dry rot become favourable. In this connection it is perhaps of interest to mention an experience observed in No. 21, York Terrace. Here there was dry rot on the timbers of the vestibule flooring on the ground floor on the side remote from the Park. This was removed and the brickwork adjacent was burnt with a paraffin blow-lamp and a concrete floor on filler joists was substituted. Fourteen days later a fungoid growth was coming out of the brickwork below the concrete floor. This was removed and the brickwork once more cleaned and burnt with a blow-lamp under the personal supervision of an experienced clerk of works. Fungoid growth again appeared on the same spot (the 16th July). Dry rot now appeared in the vault walls, where there was none previously. I understand also that in Bryanston Square, where some buildings

were repaired by the Ministry under austerity rules in a manner not very dissimilar from that adopted in the Terraces, serious dry rot reappeared in the first winter, when heat was applied from central heating and anthracite stoves. In my view neither of these occurrences reflects any discredit on anyone concerned, but go to show how difficult it is to eradicate dry rot from a building which has been seriously attacked. We also have to consider whether fresh ingress of moisture can occur if the aforesaid remedial measures have all been taken, and I am bound to say that, while the risks would have been greatly reduced, I cannot see that they have been entirely eliminated. Undoubtedly the provision of flashing and the new rendering and the stitching up of all cracks in the outer walls will do a lot of good, but I do not think anyone could go so far as to say that there is no risk whatever of fresh settlement cracks with their consequent fractures in the rendering and the paintwork. The buildings will, of course, have become less liable to dry rot for this reason and also by reason of having had any timber lintols, beams, &c., removed or repaired, but there will still remain a great deal of timber in the buildings which must be presumed to have dry rot spores upon it and which has not been treated in any way. If fresh tower blocks or additions are added to the buildings I consider that there is some risk of settlement, as you cannot load clay previously unloaded without some settlement for the first years. This, again, may drag down some of the walls of the old building and cause cracks in the walls and rendering.

Lastly, there is the fire risk as compared with modern buildings, which would surely have fire-proof floors. The fire risk in the present buildings must be considered to be considerably greater, particularly so having regard to the fact that all the floors are carried on a timber stud partition near the middle. It is perhaps not for me to say what the value of this risk is, but it is clear that, if compared with modern buildings of fire-resisting construction, the latter must from that point of view be preferred.

19. CONCRETE FLOORS

The Committee may wish some consideration to be given to the question as to whether anything can be done to reduce the two residual risks referred to in the last paragraph, *i.e.*, that of dry rot and that of fire.

One way of doing this would be to eliminate all timber from the buildings completely. Unfortunately the foundations are not adequate to carry additional loads and, therefore, as new concrete floors are heavier than the existing timber floors, these would have to be carried down to the ground by an internal structure of reinforced concrete or structural steelwork encased in concrete.

I have made some preliminary figures on the average typical house to ascertain what this would cost. I find that the cost per house of taking out all timber floors and roofs and timber partitions, and substituting in lieu light hollow tile reinforced concrete floors carried on a light framework of reinforced concrete beams and columns brought down to fresh concrete foundations in the basement and finished with woodblock or boarding on battens, all pressure impregnated, would be approximately £3,360 per house. From this must, of course, be deducted the sum included in repairing or replacing the timber floors in the other schemes.

Mr. Paine kindly advises me that the total sum he had in for this in dealing with 18 houses was £5,922 at pre-war figures, amounting to about £330 per house. Doubling this to bring it up to present-day prices (I double this item instead of adding 75 per cent. as timber is one of the materials which has increased more than the average) gives us a figure of £660 per house. Deducting this from £3,360 I get a net figure of extra cost of £2,700 per house, or approximately £1,000,000 for 374 houses.

In the above estimate all the partitions are taken down and replaced with new partitions, which would not be load-carrying and which could be of hollow tile plastered both sides, or otherwise as desired.

The concrete floors have other advantages besides their resistance to dry rot and reduction of fire risk. They would go a long way towards the stiffening up of the buildings generally, acting as they do as stiff horizontal diaphragms to which the walls can be substantially anchored.

Whether in a long-term policy the Committee wish to consider the possibility of future wars I do not know, but one thing is certain, and that is that if these buildings were provided with concrete floors on an internal framework of steel or reinforced concrete to which the various walls were securely tied, it would certainly add enormously to their resistance to war risks.

20. METHOD OF CARRYING OUT WORK

The previous figures do not attempt to separate war damage, since presumably the expenditure comes out of a common exchequer and the separation into war damage or otherwise would be little more than an exercise in book-keeping on which I am not in any case the best expert.

In the same way it is a matter of argument as to how far these expenses, if incurred, should be paid for by the Crown or by the prospective tenants. It may, for example, be argued that if the houses were put into a satisfactory state structurally, all the modernisation in the way of plumbing, hot water, heating, electric light, cooking apparatus, lifts, &c., could be dealt with by the tenants under their leases.

There are clearly many different variations in which the cost could be divided between the Crown and the tenants, but I have not deemed it a part of my business to advise on this point.

If it were decided to go the whole way, including the provision of concrete floors, it would be far better that the whole operation should be tackled at one time, and therefore presumably by the Crown. I imagine that from a financial point of view there is not much in it, since if the Crown incurs the expenditure it would presumably secure high rentals, and, alternatively, if it is all left to the tenants the buildings would have to be let at very low rentals. These are, of course, matters rather for your surveyor experts, such as Mr. Osborne and his colleagues than for me.

Another advantage in having the work done by the Crown, if it is to be done at all, is that it would permit of district heating being provided. I am particularly interested in this subject and a member of the District Heating Committee, and have given the matter great study, and I have no doubt that, if these houses are to be retained and modernised, district heating is one of the advantages which would help to reduce labour and be economical of fuel.

21. COST OF REPAIRS, MODERNISATION AND CONCRETE FLOORS

It will be seen from the foregoing (para. 13) that if the repairs are carried out to Stage 3, which includes modern heating, hot water, electric light, drains, plumbing, lavatories, lifts, and thorough structural repairs, internal and external, the total cost is estimated at approximately £3,000,000.

If, however, the residual risks of fire and dry rot are to be eliminated by the substitution of concrete floors on reinforced concrete or steel internal structure, the additional cost is £1,000,000, making the total addition approximately £4,000,000.

We now have to consider what reduction can be made on this figure by reason of the work being carried out by the Ministry of Works. This was estimated previously as £400,000, but this was when the existing timber floors, partitions, roofs, &c., were to be retained. It is clear that if these items are not to be retained, the saving in expenditure in reconversion to domestic user with concrete floors would be far less, as a great deal of their work must be in connection with repairs to floors and partitions and the various things which are attached to or dependent on these, such as plastering to ceilings, &c., lavatory fittings and plumbing, work to drains, with which the new foundations may easily interfere, &c. I think, therefore, it would be prudent only to allow in this case a deduction, by reason of the work being done by the Ministry, of £200,000. We are therefore left with an extra cost to the Crown of £3,800,000.

It is interesting, perhaps, to compare this with the figures which Mr. Paine has given for the cost of rebuilding 18 houses to Mr. de Soisson's adaptation plan. This was given in his letter of the 21st January, 1946, and is £238,854, or, if executed in Portland stone, £293,974. Taking these figures as *pro rata* on 374 houses instead of on 18, we arrive at the following approximate figures:—

	£
Rebuilding 374 houses	5,000,000
Ditto, if faced in Portland stone	6,000,000

22. SEPARATION OF ESTIMATES

I regret that I am quite unable to give separate estimates for the different Terraces. To do this it would be necessary to employ an army of surveyors measuring each one up separately, and I doubt whether the work would be of much value when it was done as these surveyors would not be able to see what is necessary until the buildings have been completely stripped. This is, of course, impossible in the case of the occupied houses and is only partly done in the case of those taken over by the Ministry, and in any case I am sure it is far beyond the scope of what the Committee would expect me to do in this Report.

As far as a short-term policy is concerned some Terraces are better than others, and I should say that Hanover Terrace and Sussex Place, Chester Terrace, Portland Place and Park Crescent,* are probably among the best, with the serious proviso that many of these were only partly stripped, if at all, at the time when I inspected them, and there may well be hidden defects which will only come to light as the work proceeds.

Externally Gloucester Gate and Cumberland Terrace are perhaps the worst.

* Of these, only Sussex and Chester Terraces are now being taken over for stripping.

My own view, however, is that from the point of view of a long-term policy these differences tend to disappear, since, apart from slight differences in cost in putting back the exteriors, the very serious reconstruction work inside will be fairly common to all.

If one were considering individual houses one would, of course, have to bear in mind their variations in size, and the cost per house is for the average house of about 1,000 sq. ft. per floor. Some of the houses are very much larger, such as, for example, Somerles House. Here the cost per house will, of course, be proportionately greater, while in some of the houses, which only have about 800 sq. ft. of floor area, the cost will be proportionately less.

Apart from these general comments I find it extremely difficult to differentiate to any large degree as between the various Terraces. They vary clearly very much in their architectural treatment and character, and no doubt some of them have much more merit than others. This, however, is not for me, but from a purely structural point of view I would say that there is no considerable reason for differentiating between them in regard to whether they should be retained or rebuilt, confining myself all the time to a long-term policy in which they are to be considered good for a further 50 to 100 years.

It will be gathered from my Report that, if it is desired to retain the houses, it can in my view be done. There are many engineering difficulties, but it is the function of engineers to overcome such difficulties.

I have attempted to set forth the various standards and stages dependent on how far the Committee wish to go in eliminating future risks of further expenditure.

The cost is, of course, considerable, but it is not for me to say whether this cost should or should not be incurred, nor is it for me to say whether the houses would earn an economical rent with any of these expenditures or whether the essentials of Nash's original Conception could be obtained with suitable modern buildings incorporating a modern plan and using modern materials and methods of construction.

SUMMARY OF APPROXIMATE ESTIMATES OF VARIOUS ALTERNATIVE ESTIMATES

	Per House Cat. (a) £	*Cat.* (b) £	*Per 374 Houses.* £
1. *Repairs* (para. 11).			
M.o.W. estimate of repairs, including adaptation	3,300	2,400	
Less adaptation	990	820	
	2,310	1,580	
Estimated increased cost	800	800	
	3,110	2,380	
Additional work on fronts	1,000	1,000	
	4,110	3,380	
Weighted average	4,000		...
Interiors brought up to long-term domestic standard	700		...
	4,700		1,750,000
2. *Modernisation without lifts* (para. 12)	2,050		...
	6,750		2,500,000
3. *Modernisation with lifts* (para. 13)	1,500		...
	8,250		3,000,000
4. *De Soissons' scheme, adaptation for houses* (para. 14)	11,400		4,250,000
5. *De Soissons' scheme, adaptation for one-third houses, two-thirds flats* (para. 15)	11,250		4,200,000
6. Saving on Items 1, 2 or 3 resulting from Ministry's work (para. 15)	...		400,000
7. Extra cost of concrete floors and frame to carry them (para. 18)	2,700		1,000,000

	Per House. £	*Per 374 Houses.* £
8. Cost of repairs and modernisation (including lift) with concrete floors and frame (para. 20), as item 3	8,250	3,000,000
Concrete floors and frame, as item 7	2,700	1,000,000
	10,950	4,000,000
Less residual value of work done by Ministry on 199 houses	...	200,000
		3,800,000
9. Mr. Sydney Paine's figures for complete rebuilding to de Soissons' Plan	...	5,000,000
10. Ditto, faced in Portland Stone	...	6,000,000

General Notes.

(a) The above figures are, of course, only approximate estimates.
(b) They are on the basis of present-day prices (July, 1946).

APPENDIX I

REPORT ON MEETING AT THE SITE WITH DR. W. P. K. FINDLAY, D.Sc., OF THE FOREST PRODUCTS RESEARCH LABORATORY

By kind permission of the Director of the Forest Products Research Laboratory, Princes Risborough, Dr. W. P. K. Findlay, D.Sc., was kind enough to meet me on the site on the 28th June. We inspected—

7, *Clarence Terrace* and found large *merulius lachrymans* fruit in the cellar under the stairs, about 12 inches x 24 inches, brown in the centre and white at the edges. The same type of dry rot was also climbing up the basement stairs wall. During a subsequent visit on the 4th July I found that this proceeded from No. 8, Clarence Terrace and had passed through the party wall. The basement skirting and the floor were very wet as were also the boards. Exposed footings were examined and found to be of clay. Dry rot was found on the wall in the ground floor over the cupboard in the W.C. All the above was in the back addition. There was also dry rot on the first floor ceiling near the front wall. There was also *Peziza* on the central partition on the first floor. The party wall against No. 8 had *merulius* dry rot showing on the wall above the second floor and also on the front wall. The third floor joists had been cut away from the front about 6 ft. owing to the dry rot.

6, *Sussex Place*.—We found *merulius* on the third floor bay window facing Regent's Park with large fruits.

6, *Cambridge Gate*.—We found *merulius* dry rot on the second floor joists of the back and the boards of the sub-floor, and in the deep skirting at the back wall. Also on the third floor joists as seen from the second floor, and on the first floor joists at the back as seen from the ground. All these joists were badly rotten. Also on the first floor joists in the front as seen from the ground floor. A heavy fruit of *merulius* was found in the vault under the entrance.

2, *Cambridge Terrace*.—Very old large fruits of *merulius*, about 4 inches projection and 2 sq. ft. in area, were found at the back in the basement on the wall. The whole basement back wall was permeated.

9, *Cambridge Terrace*.—We found *merulius* at the back in the ground floor on the side walls to the area. No ceilings were down so that the floors could not be examined.

9, *York Gate*.—Ground floor mezzanine at the back of stairs was badly attacked all up one wall and ceiling. Also first floor mezzanine ceiling. The ceilings had not been stripped so that no examination of the floors could be made.

36, *York Terrace*.—*Merulius* was found on the wall in the basement and in the tradesmen's entrance all up the wall to the ground floor.

Dr. Findlay subsequently gave me some general observations in reply to some questions which I addressed to him in the office. I asked him to consider the condition of the houses if the following steps were taken:—

(*a*) Cutting away the rotted timbers and replacing with new treated with Cuprinol or sodium-fluoride.

(*b*) The application of a blow-lamp to the brickwork near affected places.

(*c*) Preventing fresh ingress of water through the walls at cornices, balconies, &c., by flashing or otherwise.

(*d*) Strip all damaged rendering on the fronts, re-render and paint, and arrange for repainting every four years.

I asked whether under those circumstances there would be a likelihood of further dry-rot attack in 50 to 100 years. Dr. Findlay replied that for a long-term policy the new timber should be pressure-impregnated, which I understand is not being done. He said there would be some chance of reoccurrence if any damp reappeared owing to the maintenance being less than perfect, and said it was difficult to eradicate in the basement owing to the risk of permanent dampness resulting from lack of damp-proof courses and the construction generally.

I asked if he considered damp-proof courses in the walls necessary for preventing dry rot, and he said he thought not, provided that no timber was retained in the basement except timber which had been pressure-impregnated with Walman Salts, which contain sodium-fluoride. I asked if there was any better method of eliminating dry rot, and he said the walls should be sprayed with sodium-fluoride. This is not at present being done on a short-term policy, though I understand that some of the walls are sprayed with Cuprinol.

I asked if it would be necessary to treat all the existing timber with Cuprinol or sodium-fluoride, and Dr. Findlay answered, "No, it would not help much because the vital points cannot be reached."

I asked what would be likely to cause a further outbreak of dry rot, and he said any fresh incidents of dampness.

These houses were not specially selected as being bad, but as being average, and had been selected not by me, but by officials of the Ministry, as being convenient for inspection at that date, inasmuch as the dry rot had not been cut away so that it could be inspected.

APPENDIX Ia

COPY OF LETTER FROM DR. W. P. K. FINDLAY

Department of Scientific and Industrial Research,
Forest Products Research Laboratory,
Princes Risborough, Bucks.,
29th July, 1946.

Dear Dr. FABER,

I received your letter on my return from leave to-day.

I am in agreement with your general conclusions and have to suggest only a few minor amendments:—

(1) I think it would be as well to refer to the Dry Rot Fungus at its first mention by its full name, *merulius lachrymans*, and subsequently as *merulius*.

(2) I think mention of the Peziza in 7, Clarence Terrace might be omitted as this is harmless to the woodwork and of secondary importance.

(3) P. 2, para. 9.—My remarks about pressure treatment apply, of course, to new timbers used for replacement.

(4) P. 2, para. 11, line 2.—I suggest insertion of word "existing" before "timber with sodium fluoride or Cuprinol."

My general feeling is that the dry rot in the houses can be eliminated provided: (1) the work of renovation is done thoroughly and that pressure-treated timber is used for replacements in places where brickwork is permeated with the fungus or where dampness is likely to persist. (2) The buildings are maintained in future in such a condition that further penetration of dampness does not occur.

It would be, of course, impossible, with buildings of this age and type of construction, to guarantee that no further isolated and sporadic outbreaks of dry rot will occur, since leakage of water may sometimes take place for some time before it is detected.

Yours sincerely,
(Signed) W. P. K. FINDLAY.

APPENDIX II

Report on Meeting at the Site with Dr. Ramsbottom, of the Natural History Museum, on 4th July, 1946

Dr. Ramsbottom, of the Natural History Museum, kindly accompanied me round an inspection of some houses on the 4th July with the following results:—

7, 8, *and* 9, *Clarence Terrace.*—We saw beautiful large fruit bodies of *merulius*, about 12 inches × 24 inches, reddish brown in the centre and white at the edges, in the cellar under the stairs. Dr. Ramsbottom expressed an opinion that infection had not started here but had come through the party wall, and that if we looked for it we should find bad dry rot in No. 8, Clarence Terrace, which was the start of the bad fruits that we saw in No. 7. Subsequent inspection in No. 8, Clarence Terrace, confirmed the accuracy of this statement and the outbreak in No. 8, Clarence Terrace was found to be bad. In No. 7 we also saw dry rot on the wall in the ground floor over a cupboard in the back addition, and on the first floor ceiling near the front wall, and on the party wall in the second floor against No. 8 and also on the second floor front wall. In No. 8 we found the basement boards were completely destroyed and white with the growth of *merulius*. We also found some beautiful specimens of *coniophora*, which looked like delicate miniature trees which start white and become dark brown.

8, *Sussex Place.*—We examined this and found *merulius* on the bay window on the third floor facing Regent's Park, including large fruits.

7, *Cambridge Gate.*—In the ground floor rear we found mycelial cords hanging down about 2 ft. from the first floor in the party wall to the south and climbing up or down the wall towards the south. Dr. Ramsbottom opined that they had their origin on the other side of the party wall, i.e., in No. 6, which subsequent inspection proved to be the case. The first floor was pugged and there were also threads of mycelium coming through from No. 2 on the second floor.

6, *Cambridge Gate.*—We found that on the ground floor ceiling in the front room the plaster battens were destroyed by dry rot, also in the back room. This is a very bad outbreak. We found the origin of the dry rot which we had seen in No. 7 and which Dr. Ramsbottom had opined started in No. 6. The first floor of No. 6 was also very bad with dry rot.

7, *York Gate.*—The ground floor cupboard was full of white *merulius* mycelium and there was also bad dry rot on the first floor near the back.

In a subsequent general discussion on dry rot Dr. Ramsbottom explained that these fruits emit thousands of spore a minute, which will start a fresh outbreak wherever they fall if the conditions as regards damp are suitable and provided they find timber to live on.

He said that there could be no guarantee against further outbreaks in any of these buildings unless the whole of the timber had been pressure-impregnated or access of moisture could be entirely prevented.

The work being done by the Ministry of Works was explained to him, consisting as it does of cutting away all infected timbers and replacing with new timber which had been painted with Cuprinol or sodium-fluoride, and the walls, where affected, being treated with a blow-lamp and in some cases painted with Cuprinol. I gathered that he took the view that this was a very reasonable way of dealing with the houses on a short-term policy, but that, as there would be a lot of old timber left which had not been impregnated, there would always be a liability for dry rot to break out again if any of the conditions producing damp were to return.

APPENDIX IIa

Copy of Letter from Dr. Ramsbottom, dated 2nd August, 1946

British Museum (Natural History),
Cromwell Road, London, S.W.7.

Dear Dr. FABER,

I must apologise for the delay in answering your letter. The report gives a "reasonable record" of our visit.

I would suggest that the second paragraph (Clarence Terrace) should read:—

"We saw beautiful large fruit-bodies of *Merulius*, about 12 inches × 24 inches, reddish brown . . . an opinion that infection had not started here . . . white with the growth of *Merulius*. We also found some beautiful specimens of *Coniophora*."

Sussex Place.—*Merulius* in place of *lachrymans*.

7, Cambridge Gate.—We found mycelial cords.

York Gate.—Merulius in place of *lachrymans.*

My view certainly is that, unless dampness is prevented in the various ways you understand better than I do, there will be no end to the trouble. If the whole of the infected wood is removed and all renewals made with properly seasoned wood the infection can be stopped. Pressure-impregnation of the renewal timber and the treatment of walls as suggested are further safeguards to cover up defects in the main measures. It is impossible to deal with old structural timbers which are undamaged and are to remain in place beyond the measures suggested by the Ministry of Works.

This is only saying in my own words what you have more or less said in your report.

I was interested in the visit, and if I can be of any further use please let me know.

Yours sincerely,
(Signed) J. RAMSBOTTOM.

Dr. Oscar Faber,
1, Worley Road, St. Albans, Herts.

APPENDIX C

Verbatim Report of Evidence by Dr. Oscar Faber

CHAIRMAN: Dr. Faber, we are very much obliged to you not only for the trouble and care you have been at but also for the way you have kept to a time-table to let us have this in plenty of time for this meeting to-day.—*A.* (DR. FABER): Thank you, Sir.

Q. It is so detailed and full that I do not know that I have a very great number of questions to ask, but I would like you, first of all, to say anything in addition to what you have written down, if there is anything you would like to add.—*A.* Thank you. In the first place, I notice there are one or two minor corrections, quite small ones, which I think I ought just to point out.

Q. If you will, please.—*A.* This is not a correction, it is an amplification which you may not wish to have in, but on page 5, the last paragraph, before you get to section 8, I have mentioned that boggin was found in Upper Harley Street—that was actually in No. 6, Harley Street, and I also found boggin at 6, St. Andrew's Place, and also at 13, Park Square East. That helps to define where the boggin actually was.

Q. Would you tell me—I am not quite clear and perhaps the others are in the same position—what boggin is?—*A.* Boggin is almost the same as ballast. It is a dirty ballast. It is the sort of thing you very often put on paths in the garden for making gravel paths. It has got enough clay in it to bind it. It is a material that is found in many places in London overlying the clay.

Q. What is the architectural significance of boggin?—*A.* It is my view that boggin is a better foundation soil than clay. Boggin, in my view, will carry a rather greater load than yellow clay, and therefore buildings on boggin are generally less liable to settle under heavy loads than buildings on yellow clay. Then on page 7, about fifteen lines down, I say: "It is curious to think of the strength of one or two French nails". I have corrected that in the sentence before. Those nails, of course, are not French nails, which had not been invented at the date when these buildings were built, although they look very much like the modern French nails. That should read "iron nails". On page 10, almost exactly half-way down, there is a line which starts with the word "neighbourhood", and then there is "change in the subsoil, water conditions". There is a comma after the word subsoil which rather spoils the sense of it. That comma should be deleted so that it reads "change in the subsoil water conditions". On page 21, at the end of the paragraph, in the letter to Ramsbottom which starts, "7, 8 and 9 Clarence Terrace" in the last line it has got "miniature tress", which is intended to read "trees". Then when I looked at the summary, on pages 18 and 19, I began to wonder whether I had tried to put too much into the summary so that it was beginning to cease to be a summary and was beginning to try to set out the argument again *de novo,* and therefore was losing some of its desired properties as a summary, and thinking that might be the case I have this morning prepared a shorter summary which, if I may, I would like to present to you and which you might consider easier to follow (*Copies handed in, as reproduced at the end of this Appendix*). It is a great deal shorter than the other.

Q. Thank you. It is not a substitute for the other, but an addition, I take it?—*A.* Well, I would like your advice as to how you would like it treated. Before, in paragraph 1, I set out exactly how I arrived at those figures, which one does not

really need to do in a summary—you can go back to the report—because that complicates the summary, it seems to me. Then later on we have item 6, "The savings in items 1, 2 and 3 resulting from the Ministry's work", which it seems to me is more conveniently dealt with from your point of view by deducting from each of the items to which they refer, so that you get a much smaller list of totals, which are more easily comparable.

Q. What I meant was, it is not an alteration of figures?—*A.* No, it is only another way of setting them out which I thought might be more easily understood, and also perhaps gives them in a way whereby the relative expenses of different procedures is more easily grasped. There is no inconsistency between the two.

Q. Are there any other alterations?—*A.* No, Sir.

Q. Then will you say, in general, anything you wish to add?—*A.* I do not think I have anything to add, Sir.

Q. Then may I take you through one or two of the points?—*A.* Yes.

Q. What I should like really a little more, if you can tell us, is this question of what further deterioration, either dry rot or any other defect, might reasonably be expected if more stripping were done. It is the end of your paragraph 4 on page 3.—*A.* Would you mind saying that again, Sir; I did not quite gather it?

Q. I wonder whether you can say anything more about that.—*A.* The point I was trying to make was this, that one goes to some of the Terraces and sees houses which have not inside very much evidence of serious dry rot or other infestation. Is one therefore to conclude that they are free from such infestation? The only way you can answer that, it seems to me, is to take some of those houses and strip them and then look at them again. That, of course, I was not in a position to do, but I was assured, both by Mr. Leach and by Mr. Henderson, that many of the buildings which they had in fact stripped in Cornwall Terrace, and in the two York Terraces, had looked as free from infestation as some of the other apparently free houses, and then when they came to strip them they found there was no end of dry rot in them. Therefore my view is that it is very dangerous to conclude, just because you go into a house in which the wall-paper and the linoleum and the other finishes appear to be in good condition, that they are therefore free from a serious attack of dry rot, which may well be hidden.

Q. Would you go further and say you would assume it probably would be there?—*A.* I can only say that I have given you later on a statement, on page 8 under item (*h*), of the number of houses in a great many of these Terraces which were found to have dry rot, and although many of these houses, I am assured by both Mr. Leach and Mr. Henderson, appeared to be in quite perfect condition when they entered them there was this dry rot. Of course, I have only their word for that, because they had already been partly stripped at the time when I was first able to inspect them, but I was assured by them that they were as perfect or appeared to be as perfect as many of the other houses, and yet, you see, there were 62 houses which were found to contain dry rot, as compared with only six houses which may or may not have dry rot, because we could not examine them, so that I cannot help concluding that something of the order of 90 per cent. of the houses have got dry rot.

Q. Then can you tell us something more of your view as to how far it may be reasonably possible either to eradicate that altogether, or to eradicate it sufficiently for it not to be a source of continual danger?—*A.* Yes, I have tried to set that out, and I have indicated that it is all a question of cost. Under the first item in my summary, which involves a total expenditure of approximately £1,350,000 on the new schedule, that includes for cutting out all affected timber, replacing it with new timber which is impregnated with sodium fluoride, stripping all the ceilings and putting back new ceilings, flashing all the cornices and balconies, repairing all the leaks to downpipes, gutters, and so on, replacing any loose rendering with new, stitching up brick walls where they are cracked, cutting out all timber lintels and substituting concrete, cutting away timber trusses which carry walls and substituting steel casting concrete or reinforced concrete, and generally making a complete structural rehabilitation. If that is done, and that involves going a good deal further than the Ministry of Works are going now, because they are engaged on a short-term policy and we are discussing a long-term policy; we do not blame them in any way for what they are doing, but if we do all that then my view is that there will still be some residual risk of further outbreaks of dry rot, and there will still be fire risk residual.

MR. FORSHAW: Would you excuse me for a minute, Sir—you are describing there, Dr. Faber, the detail of paragraph 11 of that estimate, are you not?—*A.* Yes.

Q. I just want to be quite clear about that.—*A.* Yes, that is quite right. That estimate does not include taking out the whole of the timber floors, or the whole of the timber partitions which carry the floors, and they therefore will not be impregnated

or in any way protected against dry rot, and both the dry rot experts whom I consulted assured me that to paint them by a process of spraying or applying with a brush sodium fluoride to protect them from the attack of dry rot would be of no use, because there would be so many places that the application would not reach. For example, timbers in the walls, the back surface would not be exposed, the joists in the floor which carry the boarding, you would not reach the upper surface of the joists where it is covered by the boards, and there would be so many surfaces which you could not reach in that way that it would not be effective. That is confirmed, you see, in Dr. Ramsbottom's letter, on page 22, where he says: "It is impossible to deal with the old structural timbers which are undamaged and are to remain in place beyond the measures suggested by the Ministry of Works." That being so we are in the position, it seems to me, that we have cut out all the infested timber and replaced in with new, but we have left perhaps half or three-quarters of the unaffected timbers in the building without any protection, and we know that they are covered with dry rot spores; therefore as soon as the conditions for setting up dry rot, which are conditions of moisture and temperature, become favourable, I should expect to find further outbreaks of dry rot. The question then arises, can you guard against those conditions being set up? Well, you can guard against them but you cannot guard against them 100 per cent. I have mentioned on page 15 an experience which I observed at No. 21, York Terrace, where, after the Ministry of Works had treated the walls and the timbers to what they thought was their complete satisfaction, dry rot appeared again and then they went and had another go at it, and even after that dry rot appeared again, and I have seen several cases where dry rot appears over again even when all the measures which the Ministry are taking have apparently been taken. Then I mentioned at the bottom of the page the experience in Bryanston Square, where some buildings were repaired by the Ministry under austerity rules, in a manner not very dissimilar from that adopted in the Terraces, and serious dry rot reappeared in the first winter when heat was applied from central heating and anthracite stoves. I feel, therefore, that it would be very imprudent not to reckon on a good many additional outbreaks, because the dry rot in these buildings is exceptionally bad.

CHAIRMAN: Is that accentuated by there being no damp courses?—*A*. That is accentuated by there being no damp courses, by the very serious war damage which caused many of the roofs and windows to stand open to the sky for several years, by the porous nature of the walls containing timber lintels, by the lack of having the outside walls given their normal periodic repairs and painting over a long period, whereby rain has been driven in through cracks and has been unable to get out, and altogether these houses have unfortunately had a very bad time for the last eight years.

Q. Passing on a little bit from dry rot, to the rather kindred subject of settlement, can you tell us a little bit more about that, because it seems to me from what you say on page 10, the last sentences of (*m*), that that is linked up also with the subject of dry rot.—*A*. It is very much linked up with it. If one could ensure an impervious skin to the outside of the walls, as one could have done if the walls had been constructed in modern construction, with good foundations and perhaps with Portland stone facing, then I should feel that the likelihood of further outbreaks of dry rot was small, but those conditions unfortunately do not appertain, and with walls built of stock bricks in lime mortar and depending for their protection against rain on a layer of painted stucco, on which the paint is renewed perhaps every four years, I feel there is risk of further cracking, and that water is likely to get in when that cracking occurs before the next four-yearly period of painting occurs.

Q. Can you say anything more than you already have, Dr. Faber, on the question of risk of movement? I am thinking now of page 6, the two concluding paragraphs of (*b*).—*A*. My view is that unquestionably the Terraces, lacking foundations and producing a high pressure on soft yellow clay, must from one's experience have caused quite considerable settlements when they were building. As long as the Terraces were built more or less uniformly, by a complete Terrace built up together the whole height, one could expect those settlements to be fairly uniform, and they probably did not matter very much; but the carrying capacity of clay depends chiefly on its moisture content, and clay also expands and contracts with variation in moisture. The Terraces are very long, many of them, and you have got many rather complicated subsoil water conditions in Regent's Park—underground rivers, the proximity of lakes, and so on—and I feel that any change in the existing condition of the subsoil water is going to affect the clay and is going to be a cause of possibly further unequal settlements. Settlements do not matter, it is only the inequalities of the settlements that matter, in my view, and the carrying capacity of the clay varies from time to time and from place to place. It is subject to seasonal changes, depending on dryness and wetness, and it varies from place to place because some places have access to water from the ground which other places have not, and therefore I think it is impossible to view a further lease of life on a long-term policy without recognising that there

must be some likelihood of further unequal settlements taking place. As regards evidence of settlements, I notice, for example, that the porticoes in Hanover Terrace are quite distinctly out of plumb, although Hanover Terrace is in many respects one of the better Terraces. There are very bad settlement cracks at the south end of Chester Terrace, and all the party-walls in Sussex Place—which again is otherwise a rather good Terrace—have got one or two cracks going from top to bottom in every party-wall. There are cracks all over the buildings, and it is quite clear to me that there is a certain amount of movement which is likely to continue. I do not say that it is serious except from the point of view of making it difficult to ensure the maintenance of a water-tight skin by means of stucco.

Q. It has been suggested to us by some that no matter what you did behind you must preserve the facades. How far would this question of subsidence have a bearing upon the tying of the old facades to any new work behind?—*A*. I think it would be very difficult to pull down the back of the house and maintain the facade without having very considerable unequal settlements in the clay.

Q. Pulling apart, you mean, and dry rot resulting?—*A*. No, I did not mean that. I may have misunderstood you, but I imagined you were referring to a possibility of pulling down the back of the buildings, leaving only the front wall.

Q. That has been suggested as one possibility.—*A*. Well, I think that would represent a very difficult structural problem. I do not quite know what would render the front walls stable when you took down the back with a view to rebuilding it. You would have to give it continuous horizontal support. I do not quite know how you would provide that, because that at present is provided by the party-walls, and when you have done it it seems to me that the new structure that you build at the back would provide fresh pressures on the clay, which would have to squeeze a certain amount on those new pressures, and you would still be left with a facade, with all the difficulties arising in depending on stucco for your watertight skin. Of course, if your back structure was going to consist of concrete floors and impregnated materials perhaps it would not matter very much if a little water got in, but without knowing the construction of the building you are going to put behind your facade it is a little difficult to say.

Q. I think there is only one other general question I wanted to ask you, and that is a matter at the end. You sum up: "It will be gathered from our report that if it is desired to retain the houses it could in my view be done".—*A*. Yes.

Q. Some of your observations rather seem to go against that statement. I do not know whether you would like to explain exactly what you mean by that, or whether you could retain the houses, or in what position. It is on page 18.—*A*. May I refer to that summary that I handed you this afternoon? My view is that any of these proposals are perfectly practicable. If you do the first one it will give you a complete structural repair; it will give you buildings which still have the planning which was deemed most suitable in 1812-28. As to how far that planning answers modern-day need is not for me; no doubt the Crown Surveyor would be able to tell you what sort of rents he would be able to get for houses with that kind of planning, having regard to present-day incomes and present-day shortages of labour for domestic purposes, remembering that the houses are generally basement, ground, first, second, third and occasionally fourth, generally free of lifts, and generally with rather obsolete plumbing, hot water and heating, but from a purely structural point of view No. 1, at an estimated cost after allowing for the Ministry's work of £7,350,000, would give you houses in as good structural repair as is possible in those houses, with the exception of the concrete floors, which come on later. Item 2 gives you the same thing but with modernisation in regard to plumbing, hot water, heating, and so on. Item 3 gives you the same thing with lifts, and it is not for me to say whether lifts are required or lifts are not required; some people may be quite satisfied without lifts; on the other hand some tenants have installed lifts. Anyhow, if you decide that all the houses are to have lifts it makes the difference between £2,100,000 and £2,600,000. If you decided that only half the houses were to have lifts you would have a figure that was intermediate, between the two, and it seemed to me that with those figures you would be in a better position to decide on your policy, but when you have done either 1, 2 or 3, all of which are quite practicable in my view, you are still left with the residual risks of dry rot and the residual risks of fire resulting from having all the floors depending for their stability on a stud partition on the ground floor. The London County Council I do not think would approve of constructions of that type in modern buildings. I do not think the London County Council would approve of modern buildings without concrete foundations and without damp courses, but nevertheless, treating the things strictly on their merits, the buildings would have been repaired in every conceivable way and have been put back into some condition of which, at any rate, one could say they would be better than they were pre-war, but they would still have this residual dry rot risk and the residual fire risk. If you care to go to the next item in the

summary, No. 8—although it is only the fourth one down, I have altered the numbering a little bit to conform to the other summary—under that item you could pull out the whole of the timber floors, put in a light framework of reinforced concrete inside your constructional steelwork, and complete concrete floors with floor finish of timber which was completely impregnated, and then you would have buildings where in my view the fire risk had been entirely eliminated, and the dry rot risk had also been completely eliminated, and that, you see, is still considerably cheaper than some of the schemes of complete re-building, but, of course, it does not give you 1946 planning, it still leaves you with 1820 planning.

Q. When you have done these long-term constructional repairs, what length of life do you give the houses?—*A.* I suppose it is no answer to one question to ask another. Are there going to be atomic bombs over London?

Q. Oh, well . . .—*A.* Without knowing the future history of this country I think it is really impossible to say, but barring any kind of war-time activity I should say 50 to 100 years.

Q. Is there anything else you would like to add generally, before my colleagues put questions to you?—A. I do not think there is anything I want to say apart from questions.

MRS. BOLTON: To carry on with that list, 4, 5 and 9, I should like to ask if you think these are practicable additional works? For instance if they were adopted you would have to have extra fire precautions, and so on, in the buildings. Would you say that these could equally well be done if we were willing to spend the money on them, that the fire risk, dry rot risk, and the risk of settlements would not be sufficiently great to prevent these buildings lasting from 50 to 100 years?—*A.* I am not perhaps an expert on the de Soissons scheme, and I speak subject to correction, but I think I am right in saying that it did not include for substituting concrete floors instead of timber ones, and I think I am right in saying that it did not propose to cease relying on the central stud partition for the support of the upper floors, and in those circumstances it is difficult for me to say that the residual dry rot risk and the residual fire risk would have been eliminated.

Q. Then you cannot give us a figure for 8, plus adaptations?—*A.* Yes, I think I could, because if you will look at the old summary you will see that the extra cost of concrete floors and frames to carry them is about £1,000,000.

Q. Then it would be these figures plus £1,000,000?—*A.* Yes. I am not prepared to say that absolutely, because there might be certain adjustments.

Q. It would be £1,000,000 perhaps, plus . . .?—*A.* Yes, there might be certain other adjustments to make, but I think the nearest estimate I could make here and now, without further consideration, would be that it might be those figures plus £1,000,000 if you wanted the new concrete floors and frames.

Q. Then there is another question that this Committee would have to consider. If we decided that the Nash houses were impracticable we should have to consider re-building. Would rebuilding on this subsoil make rebuilding very expensive here?—*A.* No.

Q. Would it make it quite exceptionally expensive?—*A.* No.

Q. In fact the subsoil is not exceptional?—*A.* Not at all.

Q. There was one general question that as a layman I feel I would like to ask. I must say that these reports on dry rot are rather horrific to me. I would really like to ask if it is dangerous to conclude that many houses in London are free from serious attacks of dry rot? Is the state of these Terraces very much worse than the state of a number of other London houses?—*A.* It is worse than in most other London houses.

Q. There are an enormous number of houses without any damp courses, which have been subject to bombing and which are old, where we cannot lay bare the walls.—*A.* There are many other houses which are subject to serious dry rot infestation, but I do not think they are a very large percentage of the total houses in London.

MR. FORSHAW: Dr. Faber, you have cleared up a lot of points I had in your detailing, but there are one or two I would like to ask you. I would like to refer to a point raised by the Chairman on the keeping of the facades. You mentioned there that it would be necessary to be satisfied about the proper buttressing in order to save the facades. Under your scheme . . .—*A.* I have not got a scheme.

Q. Under what you outline as a possibility, that is (8) really where you introduce a concrete . . .—*A.* I would like to make it clear I have not advocated any one thing against any other.

Q. I accept that, but you do put something fresh to us as a method, it may not be your scheme, you say it is a method; if that method was employed it would be possible to preserve the facades, would it not?—*A.* Yes. The facades would be preserved in any of these first four methods.

Q. I appreciate that, but in answering the Chairman you explained how difficult it would be to keep them watertight.—*A.* I agree, but I would not like you to feel if we went ahead on (8) we were going to demolish the party-walls.

Q. But you are going to stiffen them.—*A.* I was going to stiffen the whole structure with a concrete frame. When the Chairman asked me about retaining the facades and putting new buildings of different plans behind, rightly or wrongly, I fancied the party-walls might be part of the structure that was coming down.

CHAIRMAN: I am not an architect, I could not say what would be necessary. I was only putting ideas to you that have been put to us.—*A.* It is difficult to criticise the ideas without having them specified accurately.

MR. FORSHAW: I think what is in the Chairman's mind and what is in my mind is the party-walls, if they are to be retained, there would have to be a cutting away.—*A.* If you are going to retain the facade, that is to say, the front and back walls, and you are retaining the party-walls, what is it you are going to alter other than the floors because I am going to alter the floors under (8); what is the difference between us?

CHAIRMAN: The back walls were never to be retained in that scheme; there was to be considerable alteration behind.

MR. FORSHAW: There may be an appendage behind keeping the facade to the Park.—*A.* Would the appendage be a high or a low one?

Q. It would be the height of the building. It may go to four or three storeys. Generally speaking it would go to four. I think you have satisfied me on that point. I would now like to refer back to your first stage repairs, para. 11, page 12, and there you say the cost would be £1¾ millions and on your summary there would be a saving, an allowance for the cost of the Ministry's work bringing it down to £1,350,000, and that would be putting in a state of repair as it was in 1939, or as you say rather better than 1939.—*A.* I think so, yes.

Q. With a possible life of from fifty to a hundred years.—*A.* I think so.

Q. Yet the risk of dry rot remains?—*A.* Yes.

Q. And that might appear in six months or even six weeks.—*A.* Then it would have to be dealt with. I should consider it extremely unlikely that it would appear in six weeks or six months because having just made a good job of the rendering and the painting I should consider that wall free from any likelihood of leakage for some considerable time. It would be much more likely I think to leak a little later.

Q. You do not think heat would bring it on quickly?—*A.* I do not know enough about it to say. I know in Bryanston Square it did, it did in the very first winter. I had nothing to do with Bryanston Square and I do not really know all the circumstances relating to it. I feel there are others who would be in a better position to answer that question than myself. I should like Dr. Findlay and perhaps Mr. Leach and Mr. Henderson to be asked that question which this Committee could easily do. Mr. Leach has a lot of exprience on that question, and if I may make a suggestion I think it might be worth your while to ask him to give evidence. He has seen a great deal of this dry rot on these and many other buildings. I only want the Committee to have the truth, the whole truth and nothing but the truth. It might be worth while hearing what his evidence is.

Q. That is working out at £4,700 a house.—*A.* Yes, less the Ministry deduction.

Q. Can you tell us briefly what number of houses you have been into that are inhabited, with people living in them?—*A.* None, for several reasons. Firstly, I did not want to disturb the tenants. Secondly, it was quite obvious the ones that are inhabited are being well maintained. They are a very small minority of the total and I did not see much point in examining their wallpaper and linoleum which is all I should see.

Q. You may think it is curious for me to ask that question, but I felt it might help you to visualise what you are giving us under (12). I take it generally speaking the finish and the reparation under paragraph 12, first stage repairs, would be the state of the house that is being lived in to-day?—*A.* Yes.

Q. You would agree that?—*A.* Yes, I do agree that. In fact, I think it would be better because the houses that are being lived in to-day have mostly got timber lintels retained whereas under my scheme all the timber lintels would be taken out and concrete lintels would replace them and many of those being lived in have the exterior stucco in a very bad condition and that would be all new and repainted. It would be in a better condition than the majority of houses being inhabited to-day.

Q. You would confirm I am right in recording that you said you believed up to 90 per cent. of the houses are infested?—*A.* Yes, Sir, that is my view.

Q. I do not know whether you have any drawings or sections with you, Dr. Faber, but I think I should like to see, and maybe the Committee would like to see paragraph (7) illustrated, that is walls carried on timbers, and you refer to porticoes and the ground floor generally projecting beyond the upper floor?—*A.* No, they are all plans. I can easily sketch you an elevation and a section.

Q. I have visualised that. I wondered if you could say more to the Committee about it, explain to the Committee what the position is?—*A.* Will you give me one minute to make a sketch. (Sketch produced.) May I explain it to you, Sir? That is a very rough elevation of a typical building with a portico. This might be your columns which sometimes start at first floor level as it might be from there to there. The front wall goes up to first floor level. You get a floor across here. The front wall sets back here. Carrying this main wall you have sometimes got two 14" × 7" timbers separated by a strong iron bolt with tie rods going round that bolt up here to another timber across here, these bolts being diagonal like that so as to give a certain amount of truss effect and this appears as a beam in the ceiling of the ground floor. In some cases we found the ends of that rotted, but whether it was rotted or not there was a good deal of sag in that which causes diagonal cracks in this brick work. In some places it had gone so badly a new iron column has been inserted to support that. The Ministry of Works where these occur are substituting steel beams.

Q. Just one other question, supposing the Committee felt they would like to find a temporary use for the remaining number of buildings, would you think that what the Ministry of Works are doing is the minimum, or if we wanted a residential use we could do something less for a temporary period?—*A.* The Ministry of Works are doing a good deal of adaptation in the way of new partitions, cutting holes in party-walls, putting in office lighting in exposed steel conduits, putting in lavatory fittings adapted for large office lavatories instead of small private ones and many things of that kind which of course would be quite unnecessary for short term housing policy.

Q. I am thinking of the period when it would be impossible to do anything of a major operation and we want probably to have in mind what could be a useful purpose for the next five years for the balance of the buildings?—*A.* For the next five years you are dealing with a problem which is entirely different from the problem I have been considering and practically nothing I have said in my report applies. For a five year period there would be enormous differences between one building and another which rather tend to wash themselves out when you are dealing with a long term policy. If you are considering a long term policy you might wish to have fire proof floors. For a short term policy you probably would not, and those buildings that have been excellently maintained may for another five years require nothing doing to them. Those that have suffered fairly seriously from dry rot would have to have a good deal done to them and it would require going over the ground entirely afresh on a short term policy basis.

Q. You do get very near to my point in paragraph (9), part II, page 11, speaking of Hanover Terrace. You speak there of the next ten to twenty years. Admittedly Hanover Terrace, as you say, is one of the best preserved probably, so you might think there was a life in the other Terraces of ten to fifteen?—*A.* Only on a short term policy the actual houses in a Terrace vary enormously from house to house. You may get one, two or three houses adjacent to each other where water has been trickling through the roof with holes in it from blast and bomb damage, where they are in a shocking state. You may get three or four other houses which have been reasonably well maintained where nothing would need doing at all. One would have to make quite a separate survey from a short term policy point of view I think, but I do agree if it were a short term policy with no adaptation to new purposes the expenditure might be less than that which the Ministry of Works are incurring.

SIR DRUMMOND SHIELS: I would like to ask something about settlement. The problem arises, I understand, because these houses are built directly on the clay?—*A.* Yes.

Q. Is it not the case that during the considerable period they have been erected there has been a good deal of settlement already?—*A.* Yes.

Q. Is it not true that in an earlier period of the existence of the house it is more likely to have settled than in the later period and that a certain adjustment has been reached?—*A.* Yes.

Q. Therefore, is it true that you anticipate in the future there will be an equal amount of settlement to what there has been in the past?—*A.* No, I do not think there will be a lot.

Q. So you feel as regards that aspect of it, it lies more in the past than in the future: the cracks that have taken place have taken place and there they are; there will not be others?—*A.* I think that is going too far.

Q. Because the settlement has not been completely adjusted?—*A.* My view is that that would be going too far. The clay is subject to seasonal changes with alternation of wet and dry seasons and these seasonal changes affect some portions of the Terraces more than others. Some of the Terraces have their sub-soil filled with water from underground streams and rivers; other Terraces have not, and the drainage of the sub-soil has to be taken into account. My view is although the subsidence due to pressure in the first place is probably largely finished, you will still have movements resulting from changes of moisture in the sub-soil.

Q. You do not think it will be as serious as it has been in the past?—*A.* I do not think the future subsidence should be as great as the past subsidence.

Q. In regard to the fire risk, I am much interested in what you say about that; would you say these buildings have a greater than usual fire risk?—*A.* Yes.

Q. There does not seem in the history of their existence to be reports of any serious fires taking place.—*A.* I would prefer you to ask Mr. Osborne for the history; he would know better than I.

Q. I think that is true. It seems to suggest the buildings have been unusually fortunate if they are a greater fire risk than the average.—*A.* You take an ordinary house of normal construction such as might be put up to any local authority to-day for approval, I think I am right in saying the floors though of timber would not rest on stud partitions on the ground floor.

Q. Just one last point, on page 14, paragraph 16, you say that restoring these houses to domestic use would cost some £850 a house. In a recent answer you spoke about the very large alterations necessary. I do not think you have considered what has been put to us once or twice, the adaptation of the buildings to public purposes, say to headquarters of cultural bodies or trade unions and hostels. In some of these cases would it not be true to say that what the Ministry of Works has done could be utilised with very little change or adaptation. You mentioned corridors from one house to another. In some of these suggested cultural headquarters they would require perhaps two or three houses and corridors might be a convenience. I just want to know if in that case, if they were used for that purpose you would estimate it might be less than £850 a house?—*A.* Yes. It is difficult to say without knowing more details of the requirement. Hostels are something rather different from trade union offices. Hostels would require a lot of bathrooms, lavatories and W.C.'s I imagine. Trade union offices probably would require big conference rooms; I do not know what they do in trade union offices.

Q. There have been a good many suggestions that they might be used as university hostels.—*A.* The hostel problem is quite different from the trade union office problem, and the problems are so different I think it would be very difficult to give you an answer.

Q. If you were not adapting it to individual domestic use there might be some things the Ministry of Works has done which would be suitable to that use.—*A.* There might.

SIR ERIC MACLAGAN: I should like, if I might, to ask Dr. Faber in amplification of the answers he has already given to Sir Drummond and Mrs. Bolton. He has told us taken all round the Regent's Park Terraces houses are probably worse as far as dry rot is concerned than the other districts of London and perhaps the fire risk is greater. Especially in regard to the fire risk in the answer you gave Sir Drummond you were really comparing the fire risk with that of a modern built house. Surely we have to realise a very large number of people who live in London are in point of fact living in houses which are nearly as old as the Regent's Park houses, in some cases older than the Regent's Park houses and presumably offer more or less the same fire risks.—*A.* You would probably know better than I on that. I should not have thought the majority of houses in London dated back to 1820.

Q. Perhaps not the majority, but a large number of them date back to the early part of the 19th century.—*A.* I should have thought a much larger number of the houses were Victorian. I do not think the majority of the Victorian houses have stud partitions, but I think Mr. Forshaw would know better than I about that.

MR. FORSHAW: I think as a general statement that is correct; the majority are Victorian houses.

SIR ERIC MACLAGAN: While it is true that these Regent's Park houses are not the kind of houses that would be built now for occupation of a family, as far as I can see from the number that we did visit that are occupied they did not differ materially in this respect, they are inconvenient for modern conditions, from say a large number of houses in London.—*A.* I have not criticised the inconvenience at all.

Q. There is another point about these estimates, I take it one might say, I believe I am right in thinking hitherto the sort of practice of the Crown Lands Commissioners

has been to let the houses to people and the people have done their own modernisation; people in the past have been prepared to take these houses entirely devoid of labour saving conveniences, lifts, extra bathrooms and so on, and have in point of fact at their own expense sometimes put in lifts, frequently put in bathrooms and done other kinds of modernisation which would be included in your rather more expensive schemes.—*A.* Yes.

Q. I suppose it would be perfectly possible to take something approximating to your scheme No. 3 and continue that kind of policy and tell people "If you get one of these houses it will not have this and that modernisation; it will not have lifts but you can put them in if you are prepared to meet the cost".—*A.* I am sure that would be possible. Whether the rentals you would get in those circumstances would give you a reasonable return on the capital invested is not a matter for me, of course. You might find that though you could let them on lease under those terms, the rentals that you got would show a very small return. That is a matter which no doubt the Crown Surveyor could deal with much better than I.

MR. WATSON: I had a number of questions, but they have all been covered by Mr. Forshaw. There is one general question referred to on page 19, your first schedule. There are various possible courses you suggest in that schedule with the approximate estimated cost in each case. Supposing one confined oneself, supposing the Committee confined itself to considering one of those courses, viz., course 3 which is modernisation with lifts and what I might call the de Soissons scheme, we are then faced with an alternative expenditure to the tune of £3 millions or something costing towards £5 millions and a good deal more if you are going to put in concrete floors.—*A.* Is that quite right. If you were first of all to look at this new summary you will see that scheme 3 when you have allowed for the work which the Ministry are doing comes down to £2,600,000.

Q. And the de Soissons scheme costs more than that.—*A.* He has given you various alternatives. He has given you two for adaptation without complete rebuilding, Nos. 4 and 5, and then perhaps 9 and 10 were merely figures which Mr. Sydney Paine produced on what the cost of rebuilding to the same plans would be. It might be unfair to Mr. de Soissons to call those the de Soissons scheme because I imagine if Mr. de Soissons were completely rebuilding he would not rebuild to that plan.

Q. I do not think the exact estimate is exactly material to the question I want to put to you. No. 5 is the de Soissons scheme and the form it takes is something more expensive than your modernisation with lifts scheme.—*A.* May I put it this way. I want to be sure that I know what your question is. I think your question is if we had scheme No. 3 we should be spending £2,600,000, whereas the complete cost of rebuilding would be either £5 millions or if we use Portland stone it would be £6 millions whether to Mr. de Soissons' scheme or the scheme of some other architect.

Q. Working from that point, if this Committee were to recommend and as far as the recommendation was accepted, that we should apply the modernisation scheme with lifts throughout, as to whether it succeeded or not would obviously depend upon whether a sufficiently large number of people were forthcoming to take the houses in their present form and according to their present plan even if they had lifts.—*A.* Yes.

Q. We have had a large number of people who live in the houses who have said "I have no doubt I could find you lots of tenants who would like a house like mine". We have had estate agents who have come before us and said "No one will have them". If a scheme came before us costing that money it would be in the nature of a gamble. Supposing it did not come off; supposing we applied the modernisation scheme throughout the Terraces and after a period of years found a number of houses empty and came to the conclusion it was never going to be possible to find people who could afford to live in such large houses and the powers that be then said "I suppose there is nothing for it but to do what Mr. de Soissons originally recommended and divide a good many of these Terraces up into flats"; if that course were then taken it would involve doing the show in two bits which would obviously be extravagant like any conversion scheme done in two bits. Can you let us know what the overlap would be. Would it be grotesquely extravagant to do a modernisation scheme with lifts first and then afterwards carry out the de Soissons scheme. I want a general picture. I wondered if you would hold up your hands in horror and say it is impossible.—*A.* I would not say that, but if you like I would take time to give you a considered reply. I do not think I would like to venture a reply now.

MRS. BOLTON: As a politician would you not say it depends on the costs of building material and labour and also on the interest on the money invested. If you have a time lag you have to take that fluctuation which is a very important thing at the moment into account. Costs are likely to go down in the next fifteen years.

CHAIRMAN: May we leave this to Dr. Faber if he thinks he can usefully add anything.

MR. WATSON: I think we must take it that the cost of building will be what it is now. Assuming building costs are stable, would it be very extravagant doing modernisation now and then doing the de Soissons scheme later on.—*A.* I think there would be an amount of overlapping, and I will try to form an opinion on what the overlap would be.

MRS. BOLTON: There was one other question I would like to put about the estimate of cost and the way it was arrived at. I am a lay person and you must forgive my simple questions. Were there detailed quantities taken on this or were they spot figures or were there schedules of the work on which quantities could be taken later on? We are going to consider the cost of this, the financial side of this and I would like to know how far they were spot figures and how far they were detailed quantities which you or your officers took of them.—*A.* The short answer is that the figures were arrived at in two ways which were found to be in substantial agreement. The first way was set out on pages 12 and 13 showing that they were really based on the Ministry of Works actual experience. The Ministry of Works had their surveyors go over all the buildings in Cornwall and York Terraces, I think that was the first group, and they prepared an estimate at the time. When I last had the opportunity of discussing these figures with Mr. Leech and Mr. Henderson that work covered by those figures had been approximately 50 per cent. down. At that stage they estimated that their costs were about £400 greater than their estimates so it seemed to me a reasonable thing for me to assume when they were 100 per cent. down they would be likely to be about £800 greater than their estimate and that is the basis of the figure which I have given you which takes you up to a certain stage. In regard to the other additions to those figures, approximate quantities have been taken and prices at normal recognised prices. For the later estimates I have used the figures which were prepared by Mr. Sydney Paine and priced by him after consultation with Messrs. Mowlems and I have multiplied those figures by the percentages to allow for the increase in the cost of building between 1939 and 1946 at the same figures which Mr. Paine recommended would apply which I agree with.

Q. 75 per cent.?—*A.* Yes.

MR. FORSHAW: What percentage did you add?—*A.* 75 per cent.

Q. From 1939 to to-day?—*A.* Yes, except in the case of timber floors I added 100 per cent. So I think the short answer is that these estimates are really very largely based on the Ministry of Works actual experience, but also checked on the basis of quantities and prices and the two were in such close agreement I felt a considerable degree of confidence in them.

CHAIRMAN: We are very much obliged to you for coming; thank you very much.

(*The witness withdrew.*)

Summary
of approximate alternative Estimates at July 1946 prices

	Per House £	*Per 374 Houses* £	£
1. Long term Structural Repairs (para. 11)	4,700	1,750,000	
Less Saving from Ministry's work...		400,000	
			1,350,000
2. Ditto with modernisation but no lifts (para. 12)	6,750	2,500,000	
Less Saving from Ministry's work...		400,000	
			2,100,000
3. Ditto with lifts (para. 13)	8,250	3,000,000	
Less Saving from Ministry's work...		400,000	
			2,600,000
8. Ditto with concrete floors and frame to carry them	10,950	4,000,000	
Less Saving from Ministry's work...		200,000	
			3,800,000
4. De Soissons' Scheme adaptation for houses (para. 14)	11,400		4,250,000
5. De Soissons' Scheme adaptation for one-third houses, two-thirds flats (para. 15)	11,250		4,200,000
9. Complete Rebuilding to de Soissons' Scheme from Mr. Paine's figures (para. 21)			5,000,000
10. Ditto, faced in Portland Stone (para. 21) ...			6,000,000

APPENDIX D

On instructions from the Committee, the Ministry of Works were asked whether the statement in section 18 of Dr. Faber's report, describing the dry-rot treatment applied by the Ministry, was a fair account of the position. The following reply was received:—

Ministry of Works,
Lambeth Bridge House,
Albert Embankment,
London, S.E.1.

20th December, 1946.

I agree that in the main the methods for the treatment of dry rot in the Regents Park houses are fairly described in the report. It is incorrect, however, to say that none of the old timbers are being treated.

The characteristics of dry rot fungi and *merulius* in particular make any guarantee of total eradication a matter of the greatest difficulty, even in cases of fairly limited attack. In the opinion of our technical officers nothing short of the total demolition of all structural and finishing timbers would be effective at Regents Park for complete eradication, and even then success would not be certain. The fungus has a hold on the brickwork and, as stated in Dr. Faber's report, even burning the surfaces with a blow-lamp failed to achieve complete sterilization.

Where practicable and likely to be efficacious old timbers, together with all the adjacent surfaces of whatever type of material, have been treated with preservative. At the same time it is true that the parts most liable to infection, i.e., those that are built in, remain inaccessible unless wholesale demolition is resorted to. This is obviously impossible, but all reasonable precautions are being taken both as regards eradication and prevention. In the event of the re-appearance of the trouble local treatment will be given as necessary.

It must be remembered that our user is a temporary one and that the work is already proving very expensive.

Yours sincerely,
(Signed) L. W. BURTON.

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