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AERONAUTICAL NOISE: SESSION B: COMMUNITY NOISE

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THE EFFECT OF AIRCRAFT NOISE ON THE COUNTRYSIDE

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INTRODUCTION In the siting or the extension of an airport, one of the major factors involved is the effect of the noise blanket upon the surrounding countryside and environment.

Unfortunately, it is an all too common feature of airport noise studies that they predict noise contours, count houses and in the United Kingdom use the results of the Heathrow Social Surveys to describe the impact in terms of the number of people who will be 'annoyed'. Whilst the prediction of noise is an essential start to the problem of evaluating the impact (see figure 1 for example of computerised contour plotting of aircraft noise), the interpretation of the noise in this way is, in most cases, a little short of meaningless. The conditions around Heathrow are relevant to few other airport sites and no matter how the impact of noise is described the chances of the new site and its environment being similar to that of Heathrow is remote; virtually no planner in the United Kingdom would now dream of positioning an airport in a comparable situation. It is obvious that particularly to the east of Heathrow, the area is highly urbanised, has a high background noise level as a result of road traffic and has few characteristics which could normally be regarded as rural both in terms of the environment itself and of the characteristics of the people living there. The survey carried out by the Roskill Commission's Research Team in estimating the impact of aircraft noise on property value (see figure 2) indicated by far greater impact for comparably priced houses in the vicinity of Gatwick than in the vicinity of Heathrow. Doubtless the factors mentioned above contributed to this significant difference in the effect of the noise.

SIGNIFICANCE OF NOISE TO EXISTING RESIDENTS That background noise has an effect on the significance of the impact of aircraft noise is beyond doubt. This has been amply demonstrated both in terms of the impact of a single overflight and in terms of the overall environmental situation created by aircraft noise in the vicinity of an airport. Differences in background noise usually result from differences in volumes of road traffic.

Further, the presence of traffic and aircraft noise as the background to daily living must, in the course of time, have an effect on the population which lives in the vicinity of an airport. This effect may be the adaptation (both social and physical) of those living in the vicinity of the airport and the self-selection of the population such that those who chose to live in the vicinity are perhaps less sensitive than the average to noise. Bearing this possibility in mind, it is not so surprising therefore, that although the noise exposure around Heathrow has increased during the last 10 years, the second social survey in the vicinity of Heathrow did not show a significant increase in annoyance as a result of aircraft noise.

It is obvious therefore, that the reactions of the population in the vicinity of Heathrow to aircraft noise cannot be used (directly. at any rate) as means of indicating the response which will be produced in a population freshly exposed to noise.

The environmental assessment of the impact of a new airport or the extension of an existing one is thus made extremely difficult by this need to take into account a number of factors which may differ from the Heathrow situation. As a rough guide the table indicates the increase in NNI levels which are appropriate to the consideration of areas subject to aircraft noise relative to the response at Heathrow and makes some estimates of the rate at which 'populations' adapt to aircraft noise.

TABLE Estimated Effective Increase in NNI compared to response in the vicinity of Heathrow.

Type of area or Background noise by day	NNI Increase	
Urban 50 dBA	0	
Suburban 45 dBA	5	
Rural 40 dBA	10	
Freshly exposed population	10 for first year	5 for next five years

The chances are, however, that with a new airport in particular, the number of existing residents likely to be affected will be small and the total item will be a fairly small one in the total balance sheet, simply because the site will have been chosen to avoid disturbing too many people. However, in certain parts of the Country and particularly in the South East region of England there is a significant shortage of land and it cannot be assumed that because the noise blanket is substantially over open countryside, it is of no significance.

EFFECT OF NOISE ON THE COUNTRYSIDE This shortage of land in the South East region of England, relates to geographical location. There is ample countryside in Scotland but it is not readily accessible for the people in the South East, where the gradual increase in population has led to a high density. This population, in turn, is demanding countryside for recreation etc., at the same time as 'consuming' it for development and residential development in particular.

Thus there is a shortage of countryside where it is most needed and for many years successive governments have pursued a policy of preserving parts of the countryside by restraining residential development. In particular residential development has been confined largely to existing areas and specific new towns. This has resulted in the density of urbanised areas being forced up beyond that which people would naturally desire. The density of London is roughly 40 people per acre in the central parts and 20 people per acre overall; whilst direct comparisons are impossible, for cities such as Los Angeles, Dallas and Toronto, the averages are 7,2 and 4 people per acre respectively. Indeed, the average density in the South East region of the U.K. as a whole is 2.5 persons per acre.

Looked at another way, within a 50 mile radius of London there are approximately 5,700 square miles of undeveloped countryside and if the third London Airport had been sited within this area, the noise affected area would have represented more than 5% of this total.

It is worth considering what is the significance of the present policy of preserving the countryside when people are prepared to pay in the region of £20,000-£100,000 per acre in order to develop it for housing purposes. The policy implies in effect that the community puts a value on the countryside in excess of that attached to it by individuals for development purposes (less the costs to society of servicing

the development i.e. the costs of roads, sewers etc.)

The question remains as to whether the use of the land for recreational and other countryside purposes is more sensitive to noise than its use as residential land.

CHARACTERISTICS OF THE COUNTRYSIDE What is it about the countryside that causes a value to be put upon it? This is perhaps one of the most difficult issues involved. Until those attributes of the countryside that contribute to its value can be defined more precisely it is going to be difficult to put an accurate value on the countryside. It is also going to be difficult to grade different qualities of countryside.

The countryside has a number of specific attributes:-

(i) Specific recreational facilities, hiking, fishing etc.
(ii) The use of the countryside for agricultural purposes.
(iii) The countryside as a lung to urbanised areas providing breathing space both psychologically and physically.
(iv) The aesthetics of the countryside, e.g. the view obtained when walking or driving through it.
(v) Undeveloped land for use by ourselves or future generations i.e. reserving opportunities for alternative development.
(vi) A 'home' for a major part of the eco-system.
(vii) A home for a few people with a particular liking for the rural environment.

Of these only (ii) and (vi) are relatively insensitive to noise. The total value of agricultural land, however is only of the order of £1,000 per acre and so does not contribute to any significant extent to the policy of the preservation of the countryside and it must be assumed that the above items and others which have not been mentioned make up the bulk of the value which is attached to it.

It is, in fact, an extremely difficult task to put specific values to the items mentioned and it is perhaps easier at the present time to consider the costs of the opportunities which will be foregone. That is to say one can consider the reduction which noise would cause in the value of the land for development purposes. On a simple basis the recent memorandum issued by the Secretary of State for the Environment indicates the levels at which different sorts of development will be allowed and the use of these will give a crude indication of the opportunities foregone and the costs thereby incurred.

Considering a major international airport at an inland site in South East England, the area of countryside within which for noise reasons it would be inappropriate to use land for residential purposes represents the extra land required by natural Urban growth for the next 20 years and the costs of this foregone opportunity would be something like 20 times as great as the effect on the existing residents.

One aspect which can be looked at in some detail is the distortion which the noise blanket will cause to existing plans and policies. The obvious one of the preservation of the Countryside has already been mentioned but there may well be plans for the development of a new town or simply an extension of an existing residential area which will have to be modified as a result of the noise. These are examples of more immediate consequences which are nontheless of the type which have been discussed above in more general terms. Airports are potential centres of development and as aircraft become quieter people will be able to live nearer to their work. Conversely, at the moment, the noise is forcing them to live further away and this represents a further practical example of the opportunities for development which are foregone as the result of noise i.e. what actually happens is worse than it would otherwise have been without the noise and this extra loss of benefit or this extra cost has to be taken into account; quite clearly it would not be by simply counting the number of existing residents subject to different levels of noise.

USE OF APPROPRIATE VALUES IN COST BENEFIT ANALYSIS It might be argued, and indeed is argued in some quarters, that because of the inability to put a precise value on the countryside that it should not be quantified except as one of those items which have to be taken into account in a final subjective assessment. The Author's view however, is that in a social cost-benefit analysis the usefulness of the final balance sheet is minimal if major items have been left out. All items should be included however large the range of values attached to them. It would mean, at the very least, that the final judgement would be systematic even though the issues might not be as clear cut as some people would like, although the probability of one site being better than another could be worked out if a range of values and the appropriate probabilities were estimated for each item. This would be preferable to using single values of estimates which give an undue air of accuracy to the final comparison.

CONCLUSION In short, the area of countryside available is decreasing because of residential and industrial pressures at the same time as the value placed on amenity is increasing. This would suggest that the countryside is going to rapidly increase in value. This paper has perhaps indicated that this value may already be significantly high. In any event the need to preserve the countryside in an acceptably quiet form for future generations is something which must be taken into account in the analysis of developments which involve the use of the countryside for purposes not compatible with it.

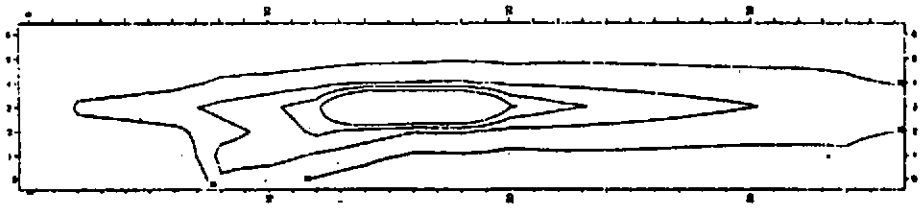

Fig 1 Computer plot of NNI (25,35,45,55) contours

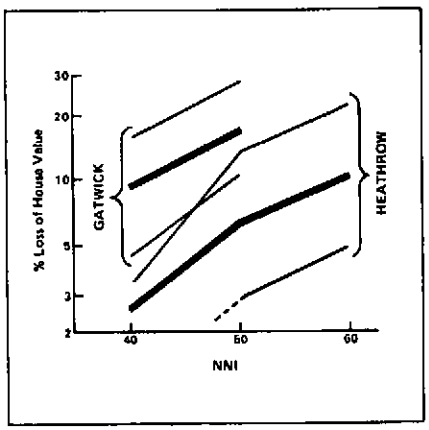

Fig 2 Effect of Noise on Home value