

Equally on the question of housing itself, Mr. Williams points to past mistakes and to errors which require correction. In the early stages roads were unmade, there were no shops, several houses were without light; public halls, cinemas, baths, libraries, and welfare centres found no place in the schemes. With few exceptions all the houses in the earlier municipal housing estates have three bedrooms, with the result that there are both empty and overcrowded bedrooms even in the same street. To-day in Norris Green there is little relation between the houses supplied and the accommodation required. There is no suitable accommodation for the majority of ordinary working-class families of seven persons, and none at all for those of more than seven.

Similarly, the absence of accommodation for young couples when they marry is driving them to find accommodation elsewhere. Had the local authority given more attention to the social needs of the people in the early days the number of removals would have been considerably less.

The study shows conclusively the important contribution which the sociologist might make to the rectification of past errors and the prevention of similar mistakes in the future. It is an admirable illustration of the type of study for which there is indeed great need and which might well arrest the attention of scientific workers, as that of the local authorities primarily responsible for the housing estates.

ATMOSPHERIC POLLUTION

THE twenty-fourth report on "Atmospheric Pollution" issued by the Department of Scientific and Industrial Research appears in a new format and in two volumes, namely, the report on observations up to March 31, 1938 (H.M. Stationery Office, 2s. net) and the other a supplement giving deposit tables over the same period (H.M. Stationery Office, 4s. 6d. net). This arrangement will be a convenience to those who are interested in the general results rather than the actual observations. These show that there has been a tendency for the air to become cleaner. Again Cardiff provides the lowest figure for sooty matter and many will learn with surprise that the London area provides some of the worst figures. Greenwich had the greatest number of days with heavy smoke haze. Stoke followed next and then Victoria Street, London.

The report contains a section explaining in simple terms how fogs are formed. In Great Britain fogs are said to be caused either by water droplets in the atmosphere or by smoky particles. The water droplets in a fog are only a few thousandths of a millimetre in diameter and for this reason the sun, if visible, appears as a white disk. In a smoke fog, particles are smaller and the sun therefore appears red because the smaller smoke particles scatter light of shorter wave-lengths but not the longer red wave-lengths.

It appears essential, the report continues, in the formation of fog that the air should contain very small particles on which the water condenses, for example, sea salt and nitrous and sulphuric acid. The other essential condition for the formation of a water fog is that the temperature of the air must be cold enough for condensation to take place. A high wind may prevent fog, but some wind is essential so that the air can be cooled rapidly.

During condensation fogs, there is usually at a few hundred feet above the ground a layer where the air is warmer than the air below. On a nearly calm day this layer of warm air forms a kind of lid or ceiling below which fog forms. The formation of this layer is an important link between a smoke fog and a water fog.

Smoke escaping from an ordinary chimney is accompanied by hot gases which carry it upwards and the smoke particles may then meet an upper air current which carries them away. If, however, they reach a layer of air which is as warm or warmer than themselves, they cannot escape through this

ceiling. If the ceiling is well above the tops of the chimneys and there is not sufficient wind to carry off the smoke, it collects between the ceiling and the ground; we may then get what is known as a 'high fog' where the accumulation of smoke occurs in a layer above the house-tops of the city leaving the air in the streets comparatively clear. Should the level of the ceiling be low enough, smoke accumulation will occur near the ground.

"If," the report states, "we consider the extreme case which might occur, it may make the matter clearer still. Supposing that over a city like London, the wind fails completely up to a height above which the smoke cannot penetrate. The result of this will be that, after a few hours of a winter's day, the city will be covered by a pall of smoke, and this will get darker as the smoke accumulates overhead until the equilibrium is established between the rate at which the smoke particles settle out of the air on to the ground and houses and that at which they are poured from the chimneys. Ultimately, under such conditions the soot fall in the city would be just equal to the soot emitted from the chimneys; but before this condition could be reached, the city would probably be in complete darkness and life might become practically impossible, because not only would the smoke accumulate but also other products of combustion, such as carbon dioxide and sulphur dioxide. Wind is therefore of vital importance as the principal scavenger we have to rely upon to protect us from the smoke which we ourselves produce.

"The smoke fog of our large cities is simply a result of failure on the part of the scavenging forces of Nature, which we rely upon to clear away the smoke, as in the past we relied upon our streams and rivers to carry away our sewage.

"So far as condensation or water fogs are concerned, our cities are less likely to suffer from these than the surrounding country. This is due to two main factors, first that the air over the city is warmer than that in the surrounding country, while the drainage due to the provision for carrying away rain from roofs and streets is such that the ground is very rapidly dried up even after rain and has little opportunity of contributing to the water content of the air in contact with it."

The time is surely past when we should rely on the chance forces of Nature to scavenge our atmosphere and maintain tolerable urban conditions.