ordered; and by the middle of October no less than 498 heavy and 609 light guns were deployed in the " box " and " strip ".*

125. The changed direction of attack brought new problems. For various reasons, of which the chief were the intermittent character of the attacks and the geographical position of our own bomber airfields, I could not give the gunners the same freedom of fire as they had enjoyed in the south-east during the summer. Although I was able to establish the principle that flying over the " box " or " strip " below 6,000 feet should be prohibited in normal circumstances during the hours of darkness, I was forced to defer to the needs of Bomber Command to the extent of permitting their aircraft to fly over the " strip " (though not over the " box ") at any height they pleased provided they gave prior warning to my headquarters. This concession entailed a corresponding restriction of gunfire; and I also had to reserve the right to restrict gunfire at any other time in order to safeguard friendly aircraft which, for one reason or another, were unable to avoid flying low over the " strip " to reach their bases.

126. Another problem for the guns arose out of the fact that, instead of maintaining a height of 2,000 or 3,000 feet during the greater part of their flight, the bombs launched from aircraft often approached the coast as low as 1,000 feet. A new type of equipment for controlling low-angle fire was coming into service, but only in small quantities; consequently General Pile had to get over the difficulty by siting the rest of his equipment so as to give the best results against low-flying targets. This meant sacrificing some of its capacity to give early warning.

127. Despite these limitations, the performance of the gunners was beyond all praise. Out of 576 bombs which approached the coast between the 16th September, 1944, and the 14th January, 1945, without being shot down into the sea by fighters or the Royal Navy, 321 were brought down by anti-aircraft fire. One hundred and ninety-seven of these fell into the sea and the remaining 124 on land.

128. For the fighters the chief problem arose out of the fact that all activity was now at night. There was a natural tendency to suppose that interception at night would be easier than in daylight simply because the tongue of flame emitted by the bomb was so conspicuous in the dark. Unfortunately, seeing the bomb was not enough: pilots had also to estimate its range, and this proved extremely difficult, as anyone who has tried to judge his distance from a light on a dark night will understand. Sir Thomas Merton, the distinguished spectroscopist, designed a simple range-finder which eventually proved of great value to pilots; but individual skill and experience remained the biggest factor in overcoming this difficulty. Some pilots showed remarkable aptitude for this work, so baffling to many; for example, one Tempest pilot, Squadron Leader J. Berry, shot down more than 60 bombs at night before being himself shot down while on an offensive sortie.

129. During this third phase of the attack we used two types of fighters against flying-bombs at night: Mosquito night fighters in front of the guns, and Tempest day fighters piloted by specially-trained night-fighter pilots between the guns and London. Although the Mosquito was too slow to catch a flying bomb except in a dive, these aircraft brought down a total of 21 bombs during this phase. The Tempests, which had been outstandingly successful during the main attack in the summer, now operated with the aid of a searchlight belt extending from Saffron Walden and Sudbury in the north to Southend and Brightlingsea in the south.* They brought down 50 bombs, most of which fell harmlessly in open country. Thus, throughout the four months of this phase, only 205 bombs eluded the defences out of 608 seen or detected on their way to the capital; and of these only 66 reached Greater London.

130. To supplement these orthodox measures of defence my staff worked out a scheme whereby Mosquito night fighters were sent to the area from which the He. 111 aircraft of the German air-launching unit despatched the bombs, in order to shoot these aircraft down. This was not a simple undertaking. The German aircraft flew low, rising to a height of 2,000 feet or so for only a short time while they released their bombs. Thus the night fighters, too, had to fly only a few hundred feet above the sea. For the fighter as for the bomber this was a hazardous proceeding; and at such low altitudes the radar normally employed by night fighters to make contact with their targets was not at its best. Furthermore, the radar stations on land which were used for controlling the fighters were often unable to detect the bombers except when the latter gained height to launch their bombs.

131. As a step towards overcoming some of these difficulties we modified the equipment of several radar stations and also tried the experiment of controlling the fighters from the naval frigate H.M.S. Caicos and from an aircraft equipped with A.S.V. Mark VI. But these measures bore little fruit until the air-launched attacks were nearly over. All the more credit is due, therefore, to the skill and perseverance of the night-fighter crews, who claimed the destruction of sixteen launching aircraft, the probable destruction of another four, and damage to four more, between the 16th September, 1944, and the 14th January, 1945. There is evidence that these losses, coming on top of the natural hazards incurred by heavily laden aircraft operating almost at sea-level, imposed no little strain on the German unit responsible for air launching.

132. Nevertheless, the Germans seem to have remained unaware how small a proportion of the bombs launched were reaching London, or else to have resigned themselves to receiving a poor return for their efforts so long as some sort of offensive could be continued against this country. For they not only persevered with the operations, but even took steps during the winter to increase their scope. This fact, of which our intelligence service was aware,

* The permanent defences of towns like Harwich and Lowestoft were incorporated in the " strip " and are included in these figures.

* At first these searchlights were deployed at intervals of 3,000 yards. Experience showed that so thick a spacing tended to dazzle pilots and we altered the interval to the normal 6,000 yards.