

524. Signals security is also all-important. It is of little use having scramblers or other devices unless they work efficiently over considerable distances.

525. The value of scientific research into current operations may also be mentioned here since quite apart from its application to day-to-day technical problems, the information which it provides is of great use in the field of planning. An up-to-date check of bombing accuracy and the effectiveness of the weapons used makes it possible to predict within reasonably accurate limits the amount of effort which is required for particular tasks, and thus one aspect of economies of alternative operations can be assessed in advance. In this way, the cost of the major air operations in "Neptune" was assessed with a relatively high degree of accuracy. At the same time, such studies, once again, demonstrated that too great a value cannot be placed on training, and on the improvement of bombing accuracy. As the latter improves, the potential power of a bomber force also increases, but at a far greater rate.

#### *Relationship of Strategic to Tactical Bomber Operations*

526. The concept of strategic and tactical air forces as separate entities frequently breaks down in operations in which the activities of the air are interwoven with those of the ground forces. Phased operations by strategic and tactical air forces are sometimes different and at other times the same points within the same target system and within the same general time limits means that there is an inter-relation of effects throughout the whole period the target system is under fire.

527. The inter-relation of effects becomes evident when one considers the premier part played by the strategic air forces in setting the state for "Neptune", not only for subsequent operations of a tactical nature by the tactical air forces, but also for the ground battle. As we have already seen, this preparatory phase occupied the three months preceding D-Day by which time heavy bomber, and to a lesser extent, medium bomber attacks on rail centres achieved their full purpose of causing a catastrophic decline in the potential of the railways. The ensuing chaos, which is difficult to describe, was accentuated by the subsequent fighter and medium bomber attacks on bridges, on trains, and on open lines. If they had not been aided by the heavy blows which had already been delivered by heavy bombers on the key points of the railway systems, the tactical air forces could hardly have played the successful part they did in bringing organised rail movement to a virtual standstill; nor could the isolation of the battlefield have been subsequently achieved as rapidly as it was. Further, the preparatory bombing of the railway system by the strategic forces at the same time drove the enemy increasingly to the roads in spite of his precarious M.T. and fuel situation, and so fighter bombers and fighters were presented with road targets, which, as the record shows, they were able to exploit to the full. In fact, as we now know, road and rail movement became so hazardous an undertaking that the enemy's forward troops were as frequently as not starved of the means with which to continue the fight. These integrated and phased

operations against the enemy's lines of communication were a decisive factor both in the success of our initial landings, in that they slowed down considerably the enemy's build-up and concentration of reinforcement, and in the successful outcome of the whole battle in France.

528. Again, in the sphere of direct Army support, whilst it was the fighter bomber which in general had the last word so far as the Air Forces were concerned in the tactical defeat of the enemy in France and Belgium, it was the heavy bomber and medium bomber which, two months before D-Day, began the attack on the enemy's defences. Thus, although the pre D-Day attacks on coastal batteries were unsuccessful in destroying guns under thick concrete cover, they not only stopped constructional work in half finished batteries, but also caused sufficient general damage to reduce critically by D-Day the efficiency of those which had been completed. In fact, opposition offered by the coastal defences was relatively so slight that there was virtually little opportunity for the employment of the fighter bomber against enemy forces in the landing areas.

529. Moreover, the operations in Normandy again made it clear that heavy bombers when used in support of a land battle can, in addition to their direct assistance to the land forces in the attack, open up to the tactical air forces a wealth of targets normally otherwise denied them when the static battle in consequence of the bombing became a war of movement. Major retreats, or the marshalling of forces for a counter-attack, could be carried out only in the open, and once the enemy was exposed the result of the fighter bomber attacks was a foregone conclusion.

530. In a sense, this fusing of the operation of different components of the air forces is merely an extension of a principle which has already been recognised in attacks on the G.A.F. The destruction by our strategic air forces of the enemy's aircraft factories and of his fuel industry represents only one part of a single comprehensive plan. Apart from the attrition as a result of air fighting, there was also the complementary action—the exploitation in "Neptune" of the bombing of airfields. The latter operations achieved their purpose, in particular by still further reducing the resources the enemy enjoyed in France, both in aircraft and crews, in airfields, and in aircraft maintenance factories.

#### *Unified Control of Air Effort*

531. Because of the foregoing considerations, and if the best results are to be achieved in the most economic manner, it is essential that the direction of air operations which call for the employment of air forces from various countries and commands should be placed in the hands of one airman to ensure the necessary unity of command and planning. The need for this is equally apparent when one views the inter-relation of the ground and air forces in operations in which heavy bombers are used in a tactical role.

532. The latter operations are in every sense of the term "Inter-Service Operations". The danger of treating the bomber as merely a component part of a Corps artillery, thrown in merely to add some fire support, can at