

MORALE AND FLYING EXPERIENCE : RESULTS OF A
WARTIME STUDY.

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FLYING STRESS.

COMPARABLE with the misconceived diagnoses of shell shock (1) and D.A.H. (2) which were current in Army practice in the World War of 1914-18 were the terms Flying Stress (3), Aviators Fatigue (4), Aviator's Neurasthenia and the American Aeronurosis (5), of aviation medicine. With all, a convenient label covered unjustified assumptions about pathogenesis.

Symonds (6) has dealt succinctly with the ambiguity of the term Flying Stress. He succeeded in establishing its only permissible use as a description of the stresses to which the flying man is liable rather than of the reactions which he displays. It is with the nature of the particular stresses involved by the operations of Bomber Command, and their effect upon the men who were called upon to endure them, that this paper is concerned.

During the war the Command consisted in a central organization controlling a number of groups of advanced training and operational stations. On each of these stations were operational aircraft, twin-engined or four-engined. Members of aircrew selected for duty in Bomber Command were posted to their advanced training stations in the Command for final flying training and for welding into a crew ; at the time of their arrival the pilots had completed an average of 200 to 250 hours flying, the other members of the crew between 30 and 100 hours in the air. At their operational training unit, abbreviated in description to O.T.U., they met together and were made up into separate crews, each of which from that time onwards would remain as far as possible united, on and off duty, until ultimately their operational tour was completed.

This conception of the solidarity and integrity of a crew begun and fostered at this stage of the men's flying career, was a tremendously significant influence in their lives and their attitude to their job. The fundamental and insistent need which all men have, to identify their greatest efforts with something beyond and bigger than themselves, found here a temporary expression. A good captain's concern for his crew, each individual member's sense of obligation and responsibility towards the whole was more than simple comradeship, more even than comradeship tightened and tempered by war, with its shared perils, terrors, and experiences ; it had become an act of faith.

These crews, newly formed, spent then a period of one or two months in training by day and night for operational flying against Germany and occupied Europe. They attended lectures, were drilled in the technique of meeting emergency in the air, and of fulfilling their complicated tasks in the face of

every conceivable hazard or handicap ; they were taught how to abandon their aircraft in the air or on the sea after forced descent, if so compelled ; they undertook cross-country flights in darkness and daylight at operational heights with full use of oxygen and protective clothing, until they were judged competent to take their place among the operational crews in squadrons actually flying against the enemy from neighbouring stations in the Command.

At this stage the crew would consist of five men ; the pilot, who was in addition captain of the aircraft, and who bore the ultimate responsibility for all decisions during flight, the navigator, bomb aimer, wireless operator and rear gunner. But before this nucleus of a trained operational crew could join a squadron in the later years of the war, they had to complete their preparation by conversion from the twin-engined operational training bombers, to the four-engined heavy bombers in which their operational flights would be undertaken. This involved a further two to four weeks' training at a conversion unit, where two more members, a flight engineer and mid upper turret gunner joined the crew. The flight engineer was primarily responsible for the care of the engines during flight, and apart from his initial flying experience which might vary between an hour or two in the air to 30 or 40 hours as a passenger, he was characteristically far less accustomed to flying as a background to his activities than were the rest of the crew.

Before leaving the conversion unit the crew undertook a final series of full scale rehearsal flights for operations ; these included night flights as exercises over London and industrial England, over the sea, and sometimes over the less heavily defended areas of occupied Europe. These approximated as closely as possible the actual operational sorties ; when they took place over England opportunity was taken to include full scale night fighter and searchlight exercises over the cities upon which the dummy attack was planned. Several hundred bomber crews in the final stages of their training would be briefed for such an exercise and take part in it.

Their training accomplished, the crew were finally posted to an operational squadron. Here they remained until they had completed a tour of approximately thirty operational sorties, or had been killed, wounded, or taken prisoner in the attempt. A single completed sortie or mission was reckoned as one on which the crew had reached and bombed the primary target, or if that had proved absolutely impossible, had identified and bombed an approved secondary objective. Only in exceptional circumstances, as for example when weather conditions precluded sufficiently accurate identification of a target in occupied Europe to justify the bombing, was return from a mission without attacking the objective permitted to count as a completed operation towards the full tour.

Before 1944 the vast majority of heavy operations by air crews of Bomber Command were undertaken by night, at heights between 15,000 and 25,000 feet, involving temperatures between -15° and -45° C., and necessitating the continuous use of oxygen breathed through special masks by each individual member of the crew. They lasted usually between three and eight hours.

Preparation for a particular trip began, for the air crew concerned, with the preliminary briefing for captains, navigators, bomb aimers, and wireless

operators, when the target and the nature of the operation, together with the detailed technique to be employed, was explained. Later came the operational meal followed by the main briefing for all crews some three and a half to four hours after pre-briefing; then all men dressed themselves in their flying clothing and were driven out to their aircraft about an hour before the time set for taking off. At any stage during these preliminaries the operation might be cancelled, postponed or altered, necessitating further briefings or a period of standing by, during which no one could be certain whether the operation would finally take place or not. Such alterations, cancellations and delays are inseparable from war—or indeed from any form of organized planning dependent on circumstances beyond the control of the planners.

No one who saw the mask of age which mantled the faces of these young men after a period of continued standing by punctuated by inevitable false alarms, is likely to forget it. Their pallor, the hollows in their cheeks, and beneath their eyes, and the utter fatigue with which they lolled listlessly in chairs about their mess, were eloquent of the exhaustion and frustration which they felt. In ten hours they seemed to have aged as many years.

After a long and exacting operational flight similar evidence of fatigue, both of body and mind may display itself. But in this case there is no element of frustration; the emotional hangover is far less; and because tension has dissolved in action, sound sleep may be expected to restore resilience in all but those who are already in need of medical assistance. This assistance must be based upon a reasoned appreciation of the situation prevailing in any particular case; an appreciation immensely facilitated in practice by an understanding of the fluctuations to which morale was normally subject during the various stages of the operational tour.

On return from an operation the crews were interrogated by intelligence officers, gave their reports, had breakfast and went to bed. Any returning wounded, shocked, or in any way requiring medical care and attention, received it on the spot, being admitted to the Station Sick Quarters or to Hospital after resuscitation, if this was their need. But quite apart from this their Medical Officer was always present at briefing, mingled with them in the dressing rooms, advising them about measures to prevent frost-bite, to deal with frozen oxygen masks, to maintain alertness, and to overcome thirst or exhaustion. On their return he spent his time between the airfield and the interrogation room, meeting each crew as they landed.

In this way he was able to exercise a continuous unobtrusive supervision over each one of them and they in their turn came to know and to trust him as someone always associated with their efforts and unfailingly on hand whenever they might want him. This was the foundation of his work for them, providing him with his experience and them with their confidence in him.

A crew did not as a rule operate on two successive nights, although during phases of operational urgency this might be necessary; for example during the Battle of Berlin from December to January, 1943–44, some crews bombed Berlin three times in four nights. But it was more usual for a crew to make an average of about three to four operational sorties a week with an interval of one or two nights in between.

What were these operations like? They were like nothing else in the world. The air crew flew in darkness relieved only by the dim orange glow of a lamp over the navigator's table and the faintly green luminosity of the pilot's instruments, three or four miles high, through bitter cold over hundreds of miles of sea and hostile land, with the thunderous roaring of the engines shutting out all other sounds except when the crackling metallic voice of one member of the crew echoed in the others' earphones. For each man there was a constant awareness of danger; danger from the enemy, from sudden blinding convergence of searchlights accompanied by heavy, accurate and torrential flak, from packs of night fighters seeking unceasingly to find and penetrate the bomber stream; of danger from collision, from ice in the cloud, from becoming lost or isolated, from a chance hit in a petrol tank leading to loss of fuel, and a forced descent into the sea on the way back, if nothing worse. There was no single moment of security from take off to touch down, but often the sight of other aircraft hit by flak and exploding in the air, or plummeting down blazing to strike the ground an incandescent wreck, even when a crew's own aircraft had escaped attention. These were familiar aspects of the flying man's experience. To these he had to adapt himself so that he could eat, sleep, read, work and play, not unaffected by them, for that would be impossible, but undefeated by them (7). The average rate of loss over this period was officially assessed at 5 per cent. on each operation, but this referred in fact only to aircraft which were missing. It did not include crashes in the United Kingdom, either on take off or return, whether due to the normal hazards of flying or to enemy action. In practice the chances of any particular individual surviving his 30 trips alive, unwounded and without having been taken prisoner, or having been forced down over enemy territory were generally accepted by the air crew themselves as being just about one in five.

This then was the basic ordeal confronting the flying man in Bomber Command. Faced with such an ordeal, it was inevitable that there should be a certain proportion of men who became unable to sustain it. From the point of view of combatant service they had to be divided into two main groups; those whose inability to continue was not primarily medical, but was the expression of an innate reluctance which dominated their reaction to further flying; and those whose actual medical fitness to persist had become impaired by the conflict between excessive fear and sense of duty, or desire to fulfil the standard of war service for which they had volunteered. This conflict was of course, to a large extent universal; but among those in whom it precipitated a breakdown in morale and mental health, the reactions encountered varied in precisely the way that men's reactions to conflict normally do vary. The types of mental illness displayed by such men corresponded to those already familiar in civilian life. There were anxiety states, hysterical reactions, depressions, fatigue states and less commonly obsessive compulsive reactions.

Anxiety states were by far the most common; hysterical reactions, while considerably less frequent, tended to arise more often in men whose reluctance to persist was more closely related to a lack of will; men who, with more insight, would never have become medical cases at all although their reluctance would not by this have been diminished. Depressions, often coming on top

of continuous anxiety and suppressed fear, deserved particular attention. Such men were apt to blame themselves, to call themselves cowards quite unjustifiably, and in some cases risked being accepted by their executive superiors at their own valuation, with consequently hardship and injustice, to say nothing of loss of their highly trained services if they were dismissed from flying as unwilling to continue before the nature of their disability and its comparatively good prognosis had been fully recognized.

The importance of a sound initial approach to all these cases was beyond question ; men unnecessarily referred away from their own unit for a second opinion were affected by this very action ; some being alarmed by the implied seriousness or complexity of their problem, others seeing in this the confirmation of their half formed suspicion that their case was unique. In every case where uncertainty about a case hampered the Unit Medical Officer it harmed the patient.

The writer, for eight months a squadron medical officer to an operational medium bomber squadron, and for three and a half years senior medical officer to a heavy bomber station, attempted during this period a careful study of the general attitude of the aircrew to their job, with particular reference to the relationship, if any, which might exist between morale and flying experience; between reaction to flight and stage of tour reached or degree of stress sustained. This was supplemented by an analysis of every case of doubt, hesitation, or complaint of whatever kind connected with flying by a member of aircrew, seen on the Station.

Investigations into the relationship between morale and other factors such as predisposition, domestic anxiety, or other non-flying stress, had been or were being undertaken by other workers. A most valuable and authoritative comparison between the relative degrees of flying stress imposed by operations in Fighter, Bomber, Coastal and Transport Commands as evidenced by the reaction of the corresponding groups of aircrew was subsequently completed by Symonds and Williams of the Aircrew Research Detachment at Oxford, and incorporated in the Croonian Lectures for 1943 (6, 8). But the problem which claimed the particular attention of the author and which the performance of his Service duties gave him full opportunity to study was the influence of the cumulative stresses of operational flying upon the morale of the individual concerned, and the extent to which this might be offset by the increasing skill and confidence of experience on the one hand, or reinforced by the mounting fatigue of continued emotional tension on the other ; finally, the degree to which morale could be sustained despite these depredations by any means at the disposal of the unit medical officer or squadron commander.

A STUDY OF MORALE.

There were two aspects to the study of morale among operational aircrew : the first the basic attitude of the men to their job ; the second, the changes which that attitude underwent in any particular man during the course of his final flying training and his operational tour. By living with the crews, enjoying their confidence, and by flying with them, a subjective appreciation

of both aspects could be obtained ; an appreciation not based simply upon patients, but deriving also from the majority of operational aircrew of the writer's acquaintance, who at no time exhibited a psychopathological reaction to the stresses of flying, but whose remarkable courage and equanimity emphasized for him the degree of adaptation to a totally unnatural existence and expectation of life of which successful aircrew have to be capable.

During the early part of the war there was a tendency to regard the flying crews of the R.A.F. as dauntless dare-devils, thirsting for action, undeterred by odds. This was not accurate. An apparent wildness and irresponsibility were occasionally displayed by some men during periods of leisure as a deliberate indulgence, but were by no means universal, whereas on the job for which they had been trained they characteristically displayed shrewd judgment, responsibility and determination.

Not one man in a hundred looked forward to an operation with relish although most of them derived considerable satisfaction from doing an operation well and returning safely. On return one pilot, distinguished both by his courage and his acceptance of reality, described his feelings as "on waking from a bad dream" ; all that most aircrew wanted after furnishing their reports was breakfast and bed and sleep. They did not remember vividly every detail of all their operations, but they were conscious of no urgent desire to forget them.

Everyone looked forward to the completion of his tour, but so strong was the crew spirit in Bomber Command that it was not an uncommon occurrence for a man to volunteer to do as many as 10 extra trips so that he and his crew could finish together, if for any reason he had joined them with more to his credit than they had done.

Their attitude to losses and the death of friends was particularly striking ; it was one of supreme realism, of matter of fact acceptance of what everyone knew perfectly well was inevitable. They did not plunge into outspoken expression of their feelings, nor did they display any compromise with conventional reticence about the fact of violent death. They said "Too bad . . . sorry about old so-and-so . . . rotten luck" ; their regret was deep and sincere, but not much displayed or long endured. They were apt and able to talk of dead and missing friends, before mentioning their fate, just as they talked of anyone else or of themselves (8). It took the loss of particular friends or leaders, flight commanders or squadron commanders to produce a marked reaction among a squadron. Then they might feel collectively distressed, have a few drinks because of that, go on a party and feel better. But they made no effort to escape the reality of the situation, nor was there any of the drinking to forget referred to in accounts of flying in the last war. They were young ; they were resilient ; they lived until they died.

Their reaction to the popular conception of the R.A.F. was one of amused contempt. A caption in a daily newspaper in 1941, "Do we fly low, do we?" parodying a popular song of the time, excited only derision among the aircrew who had actually flown in low level attacks on shipping and ports. The majority enjoyed adulation like most other people, but as they did not enjoy the risks of burning or maiming or violent death any more than anyone else,

they resented what seemed occasionally to be a tacit assumption by the public that they were so effortlessly gallant and irresponsibly "devil-may-care" as to be insensitive to all but the immediate present and indifferent to their own ultimate fate.

This, however, applied much more to the situation in 1941-42 than to that prevailing among the later years of the war. They were never completely unconcerned about their fate. They knew their job was highly dangerous and never was that knowledge far from consciousness. A moving example is given by this conversation between a squadron leader, D.F.C., and a senior flying officer, both of a Blenheim squadron, at about 6.30 p.m. one evening in 1941:

F/O.: "What do you think you're going to do after the war, Eddie?"

S/Ldr.—gazing thoughtfully into the bottom of his glass—"Oh, I don't know. I don't really think I shall last as long as that."

This was said quietly, matter-of-factly, and sincerely by a sound, intelligent man of a calm and cheerful disposition.

Another effect of the constant awareness of uncertainty whose detailed consideration would demand the space of another paper was the mushroom growth of superstition among the aircrew. Personal mascots, ranging from hare's feet to girl's silk stockings were taken very seriously. A young W.A.A.F. officer who had lost two men friends in succession, both on operations, developed an acute depression with considerable feelings of guilt in response to the rapidly accepted verdict among the rest of the squadron that she was a jinx and carried "the kiss of death." This was not a grim joke; it was an even grimmer belief, sincerely held; one Captain of Aircraft, a Flight Lieutenant with D.F.C. and bar, going so far as to forbid any member of his crew to take her out, on pain of expulsion from the crew. There was no point in adding to the risks, he said.

This wide acceptance of a primitive system of magical ideas by men whose duties made them familiar with some of the most highly developed scientific apparatus at that time in use, was an ironic comment upon the materialist illusion of inevitable progress.

The attitude of non-commissioned flying crews differed from that of their officers in that they more frankly expected privileged treatment and special consideration. They were rightly encouraged in this by such concessions as special rations, vitamin extracts to supplement their diet, ultra-violet irradiation and extra leave; these were enjoyed of course by all aircrew, officers and N.C.O's.

But except in the air, N.C.O's. were more inclined to be resistant to discipline than officers. In this connection it must be admitted that there was a very small but definite proportion of Aircrew Sergeants who differed completely from the rest of their colleagues. Their motive for joining was simply glamour and promotion, their attitude to flying and its risks unconsidered. Most of this minority were air gunners or flight engineers, neither of whom have usually had the same degree of preparation or length of training, or been selected with as much attention to suitability of temperament as the other members of the

crew. The educational standard required in their case was correspondingly less exacting. Such men provided the bulk of cases displaying low morale in a squadron, and they were fairly characteristic. They lacked the conscientiousness, integrity and responsibility of their more impressive colleagues so that they were apt to claim operational successes (for example targets hit or enemy aircraft shot down) which they had not achieved. They lacked self-respect, and so their discipline was bad and their standard of personal cleanliness was often indifferent. Their mental attitude was often surprisingly adolescent and immature; off duty they pictured themselves rather as cinematograph heroes than as the men they were, attempting a most exacting job in this very real war. But, as has been stressed above, they constituted a small minority.

The foundation of this attempt at an appreciation of aircrew psychology was laid in 1941 (7); at this time the conception conveyed to the public mind from all available sources of information of the attitude of aircrew to their job lacked understanding or imagination. This was perhaps because the public were assumed to want their heroics simplified; subtlety might suggest fallibility; so despite all popular acclaims, propaganda about the R.A.F. tended to misunderstand and underrate the quality of their courage. The core of this quality, now more widely recognized, its most terrible and unforgettable characteristic, was the subordination of the instinct of self-preservation to an endeavour to fulfil a very high standard of war service; a determination to see the job through despite the greater love for wife or child or for life itself.

This was reached by deliberate decision; by intellect rather than by emotion, maintained by will, not by recklessness. It was in most instances an adult and considered choice—a vindication of self-respect and of dedication to a tradition of courage.

An understanding and sensitive appreciation of this was essential to the physician responsible for these young men; it was in fact a most necessary part of his clinical equipment. He had scrupulously to eschew the insidious fiction that flying men are intrinsically less vulnerable to acute misgivings and apprehension than their fellows in less arduous occupations; and a grasp of both their personal attitude and of the changes which it was likely to undergo during their tour of operations, was as invaluable to him in the treatment of those who, faltering, turned to him for help, as it was indispensable to him in the decisions he was called upon to make about those who could no longer continue. These decisions covered not only prognosis and disposal of medical cases; but also the distinction which had inevitably to be made between the medical and non-medical case; the man who was unfit and the man who was unwilling. It was no part whatever of the medical officer's duty to indict a man whose reason for ceasing to fly was not medical, nor did he pronounce judgment; but he could not evade his responsibility for giving an honest opinion in an expert capacity whenever this was requested. And in the Royal Air Force a medical opinion is required in every case of failure or refusal to persist with flying duties.

The second aspect whose importance became increasingly apparent was the effect of experience of flying stress in producing fluctuations in morale, which in turn determined both the type of man most likely to succumb at any particular

stage and the reaction he would probably display with its corresponding prognosis.

From the beginning the decision to volunteer for aircrew duties implies an acceptance of risk. The precise nature of this risk is rarely fully understood until actual flying begins, and then its perception may be gradual and cumulative or sudden and catastrophic, depending upon whether or not the airman experiences a crash himself or sees one involving men he knows well at an early stage in his training. This happens in a number of cases; flying is one of the few activities where training and preparation exact a casualty rate comparable with that of combatant service. From the very beginning the experience of flight is apt to be disturbing as well as novel and exciting and interesting. Armstrong (9), dealing with both civil and military aviation in his book devotes considerable space to an analysis of the factors contributing to emotional disturbance in flight, quite apart from the risks of combat; they include:

(1) Labyrinthine, visual and auditory stimuli of a most unfamiliar kind; sometimes mutually contradictory as when in rough air violent sensations of rocking and rising and falling are accompanied by comparatively little observed motion of the horizon.

(2) Visceral disturbances such as nausea and vomiting (which may themselves be partly psychogenic in origin).

(3) Psychic disturbances, such as a feeling of acute apprehension, consciousness of height, and sense of insecurity and potential danger.

To these may be added:

(4) The discomfort of cold and the necessity for additional oxygen, indispensable at altitude. Both these factors introduce in their turn the necessity for wearing bulky and restrictive clothing and unfamiliar respiratory masks.

The normal individual rapidly accustoms himself to these experiences and to a varying extent may become almost unconscious of them. It is, however, interesting to note that, contrary to popular belief and the experience of those whose flying has been limited to one or two trips, totalling perhaps less than fifteen hours altogether, the sensation of vertical height anticipated before flight by the novice, and strikingly absent during his first few hours of flying (Armstrong (9), p. 463) tends to return as experience is gained, sometimes with profoundly disagreeable intensity. Naturally, the degree of emotional tension produced by this varies very considerably; it is not usually great or troublesome, but it may occasionally obtrude into consciousness during flight, as for example when flying high above the ground, but comparatively low above a level of cloud which completely obscures the underlying view. On such an occasion the airman may be conscious of a sudden sense of visceral constriction as the aircraft sails out over the edge of the cloud bank, "as though he were driving over the edge of a cliff." This is cited, not as evidence that such an awareness of height is normally a serious strain upon the flying man, which it is not, but as an indication that the subconscious emotional tension of flight may be affected by this, as by other better recognized elements.

Later on in training, bad weather, the experience of being lost, or of running short of fuel, and the almost inevitable shock of flying accidents involving others

on the course, all add to the latent stress. But the time is approaching for the commencement of operations, and eagerness and a desire to find out what it is really like provide a strong counter support for morale. In a squadron the critical test of the man's whole career begins. For this he has been selected, trained, become perhaps a member of a highly interdependent crew, and from this point on there can be no voluntary turning back without dishonour, or at best a great loss of self-respect. He is keyed up, emotionally tense, eager but apprehensive, conscious of the comprehensiveness of his training and preparation, but fully alive to the dangers it was designed to meet; then he begins.

His first two or three operational sorties are so full of novelty and amazement, however intelligent and imaginative his anticipation of them may have been, that unless he is fundamentally unsuited to operational flying he will not suffer from actual fear to a very great extent; but by the time he has completed five to eight sorties he will have discovered to a large extent the magnitude of the task he has undertaken. By this time he has probably seen another aircraft shot down—perhaps followed its course right down to its final explosion on the ground, and seen some, but not all, of the crew escape by parachute; or watched it fall burning, without a single man getting out. The extreme novelty of operational sortie has gone; to be succeeded by a growing recognition of the cost. Symonds, in his Croonian Lectures (8) summed up admirably the mental state necessary to enable a man to continue his tour of operations through this and succeeding stages. He called it confidence and assessed it as a blend of resolution, bravery and fearlessness; the latter quality depending partly on temperament, partly upon the sureness of good aircraft, good training, and sound organization behind the planning of the operation. He argued that the smaller the margin of fearlessness, the greater the dependence of the individual upon his resources of courage and determination to sustain his morale and ward off breakdown.

In all except the very few, confidence is bound to undergo fluctuations throughout the operational tour with a tendency to ebb with the passage of time, as the element of fearlessness becomes lessened by experience of disaster and by the exhaustion of continued emotional strain. None the less, immediately after beginning a tour there is a perceptible rise in morale; this is due to the feeling of accomplishment and maturity now that the long months of training are left behind, and to the novelty, excitement and interest of this final stage of experience and adventure. By about the fifth sortie this surge in morale has begun to give place to the recognition already mentioned of the formidable reality of the tour. This tends to continue, in some cases almost subconsciously, until by the twelfth or fifteenth sortie the man has reached the stage in which the full realization of the danger and unpleasantness of the job has been forced upon him while there stretches in front of him an ominously large succession of repeated sorties before he can achieve the honourable completion of his tour. Indeed, while seeming more desirable than ever before, this now appears so remote as to be an unprofitable and almost impractical goal on which to pin his hopes. At this point his chances of survival are bound to occupy his mind to a greater or less extent, depending upon his commitments,

domestic situation, and temperament, and at this time they must appear at their lowest ebb. He is passing through the critical phase of his operational tour, and he has probably never been so consciously close to death in his life before. This is a realization that lives with him in the background of his mind all the time during these days, and he sees it reflected in his friends in the Squadron and in inevitable losses among them. Siegfried Sassoon, writing of a different aspect of war—the infantryman's—has none the less captured this exactly :

“ We are all near to death ; but in my friends
I am forwarned too closely of that nearness.”

The general life of the Mess strikes a strange contrast. Other people, non-flying or non-operational people, may be heard to talk of “ next month—when I go on leave . . . ” or “ Christmas,” or “ Easter,” with reasonable confidence, and the tacit assumption that to plan ahead with some degree of assurance is nothing strange. But for the operational flying man that might be a waste of time ; time present and actual before the next trip, which is the only time of which he can be certain. Next week may be too far off for him. His next leave forms a focal point in his existence beyond which he probably does not choose to look. This is not to say that he is necessarily consciously unhappy or apprehensive all the time, nor that he lives deliberately for the minute, as airmen in the 1914–1918 war were said to live. It is simply an indication of the degree of emotional tension by which he is bound, and the background to his conception of his existence which this particular situation has created. All this his unit medical officer must understand if he is to be of any value to the flying man.

As his total of completed sorties mounts up (if he survives), the end of his tour gradually comes into the sphere of his permitted expectation and the average aircrew member looks forward to this with unconcealed eagerness. Later—after a period of rest and change—he will be again ready and keen to resume operations ; but for the time he longs to achieve a satisfactory completion of the tour. As this prospect increases and his wisdom, experience and confidence deepen, his morale rises steadily ; he is over the worst of it. But by the 25th trip the cumulative stress and resultant fatigue begin to tell in all but the most exceptional cases, and at any time from then onwards his C.O. may wisely decide to suspend his tour. None the less, by far the majority of aircrew who survive a tour complete their full quota of 30 operational sorties.

An attempt to illustrate all this graphically has been made in the accompanying diagram (Fig. 1). It must be emphasized that the graph is purely indicative of the fluctuations referred to above, and that no mathematical assessment of morale in terms of units is proposed or intended. Nor, indeed, could it be justified. It is, however, necessary for a clear illustration of the cumulative effects of stress, as described, to be given in order to link these with the incidence of breakdown at corresponding stages of the tour. The vertical axis of the graph is intended to provide an index of morale, based upon confidence in the sense used by Symonds (8). The horizontal axis is graduated in numbers of operational sorties completed by bomber crews. The curve is the index of the confidence of the individual concerned during the course of his

tour ; the upper horizontal line is the critical level for morale. If morale falls below this line the man can no longer undertake operational flying. Since this level does exist in every flying man, although it may vary widely from one to another and is anyway not statistically measurable, it may be drawn as shown, at a purely arbitrary level on the vertical axis, which is itself, as previously explained, an essentially subjective conception. By following the curve of morale from left to right one may acquire a mental picture of the reactions of the individual to the stresses of operational flying just described.

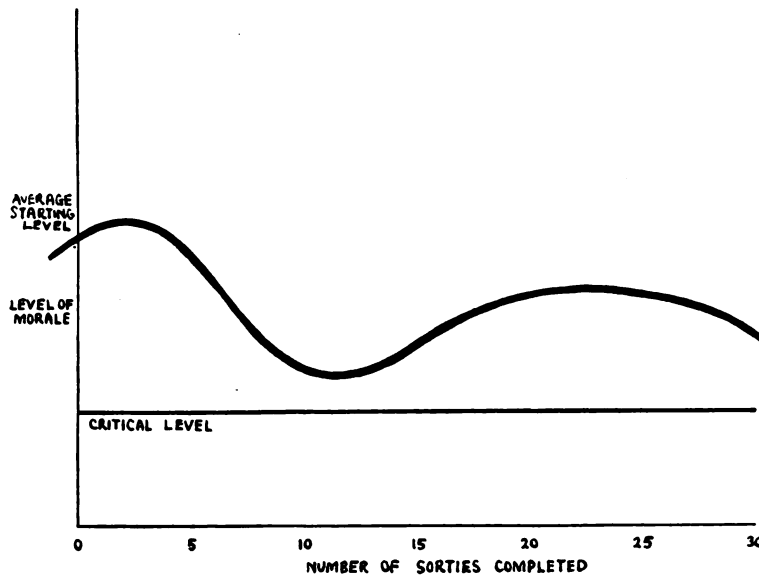


FIG. 1.

THE MECHANISM OF BREAKDOWN.

All that has been written so far applied generally to the great majority of operational aircrew in Bomber Command. The particular problem raised by the small percentage of men who broke down demanded special consideration.

Reaction to flying stress was an inevitable psychological response in every individual. In the vast majority of flying men it remained within limits which did not effectively diminish the man's capacity to perform his duties in the air and on the ground. It was only when actual interference with his efficiency as an airman occurred that the reaction was considered pathological. What began purely as a difference in degree was apt to end as a difference in kind. But in practically every case the responsible stresses were the same, and it was in contemplation of their nature that the first essential difference between the problem of civilian and aircrew became apparent.

It is the emotional reaction which underlies the production of symptoms in an anxiety state. The prolongation of these symptoms and their apparent association with stimuli which are not ordinarily associated with emotion, often characterizes the condition in the civilian patient. That symptoms may be produced by the operation of a conditioned reflex of whose associations the

patient can, and often does, remain remarkably unaware, is generally accepted. Among civilian patients insight into the precise cause of their development of an anxiety state is relatively uncommon ; but this was not so of flying men in time of war. For them the provocative stresses were nearly always so obvious as to be inescapable ; the conflict between duty and desire, self respect and self preservation, broke through into consciousness, leaving the patient bewildered, worried, and unhappy, but only too well aware of the reason. This was at once a striking and significant characteristic of these cases. But in treatment this insight was far less helpful for them than it would have been for a peacetime civilian patient, because it was not so much the symptoms as their cause which worried them. The airman did not dread flying because, when it was in prospect, he could not eat or sleep. He could not eat or sleep because he dreaded flying ; and this he nearly always knew. Moreover, such knowledge only added to his distress ; it did not diminish it. This did not mean that he was not helped by a sympathetic discussion of all his symptoms with a view to their evaluation. He usually was, and his gratitude and appreciation were sincere. But even more did he appreciate a full understanding of the strain which had fostered them ; and it was by reinforcing his own capacity to meet this strain that the physician helped him, when he could.

The flying man's problem might or might not be complex ; it was bound to be vital and acute. He might or might not be married, his wife might support or undermine his resolution by her attitude to his job ; he might have financial worries or aged parents dependent upon him, but one over-riding consideration inevitably underlay his development of an anxiety state as a reaction to flying. This was the natural instinctive fear of death, of maiming, of burning, or of becoming a prisoner ; the violent and overwhelming disaster or chain of disasters that wait upon all those who fly in time of war. There are many aspects of this tremendous factor which must be separately considered. But stripped of all less vital associations, this outstanding emotional strain confronted the airman inescapably. The neurotic patient may exaggerate or shirk his difficulties ; he may over-value the objects of his ambition or dread unduly the possibility of failure ; but the physical realities of violent death, mangling or incineration are sufficiently vivid for the most balanced imagination, once they have been brought home, as sooner or later they were bound to be brought home to all who flew on operations or in preparation for them.

Under peacetime conditions in addition to discussion and evaluation of a patient's symptoms, with the object of providing insight and understanding, the therapeutic approach to his problem may well include attempts to adjust his environment to his needs, as far as possible.

In the case of the airman the conflict admitted of no comparable solution. It was not in the doctor's power to mitigate the severity of stresses involved in operational flying ; nor was it any part of his job to diminish his patient's valuation of life or physical integrity. The conflict was between a very real dread based on a very real hazard on the one hand, and a sense of duty, of dedication to a pledged endeavour, and self-respect on the other. No one could honestly discount the first nor discredit the second ; nor has anyone any right to attempt to do so. The physician's task in such a case was quite unlike

that imposed by the civilian patient ; and there was a corresponding difference in the primary goal at which it was his duty to aim. In all cases this was of course to help the patient to become well. But in every case in which the prognosis did not exclude it, "to become well" included and implied a sufficient degree of recovery to resume full flying duties. This was an inescapable aspect of the medical officers' duties, although positive exhortation along these lines was better left to the executive.

If a return to flying had formed no part of the aim of treatment, the simplest and perhaps most generally successful measure would have been to advise the suspension of every case displaying an anxiety reaction from the obligation of further flying duties indefinitely, leaving the patient's self-respect to decide unaided when, if ever, he should attempt to resume the duties for which he had volunteered. By removing the cause of conflict this would unquestionably have removed all symptoms in many cases, although among the most intelligent of the men, the haunting implication that even with the doctor's approval, they had ceased a little too readily from mental strife, would have survived to distress them. But in point of fact the unit medical officer had a duty to the unit as well as to the individual ; and if he had evaded this by offering each individual a solution to his difficulties at the expense of the more resilient members of the Group, he would have ended by betraying them all. He had his part to play in the maintenance of general morale ; and indifferent morale can rot the fittest body of men. There are few epidemics as formidable.

The extraordinarily high level at which morale in fact prevailed, despite the casualty rate already mentioned, may be deduced from the following figures. The incidence of breakdown among aircrew in Bomber Command over the whole period of the war did not exceed 5 per cent. The casualty rate over the same period, as given in round figures by Air Marshall Sir Arthur Harris, was 44,000 killed and 11,000 taken prisoner, out of a total flying force of 125,000. To this would have to be added the number of those wounded or injured in crashes, which he estimates at over 20,000.

The casualty rate for killed and missing therefore was in the region of 48 per cent., and for killed, missing, wounded and injured, 64 per cent.

That the majority of aircrew could not fail to be aware of the practical implications of the second figure only serves to make the first the more remarkable.

ANALYSIS OF CASE MATERIAL.

The tendency of cases with psychogenic symptoms to fall into one of four groups when analysed from the standpoint of stage of tour reached and flying stress sustained was exemplified in a striking manner by a series of 46 consecutive patients seen by the writer. See Table I.

The three groups revealed here clearly correspond to three phases of the operational tour ; the beginning, the middle, and the last four or five sorties. The reason for postulating the existence of a fourth group is apparent if prognosis is taken into account, based on a follow-up in every possible case, and correlated with the nature of the precipitating stress.

TABLE I.

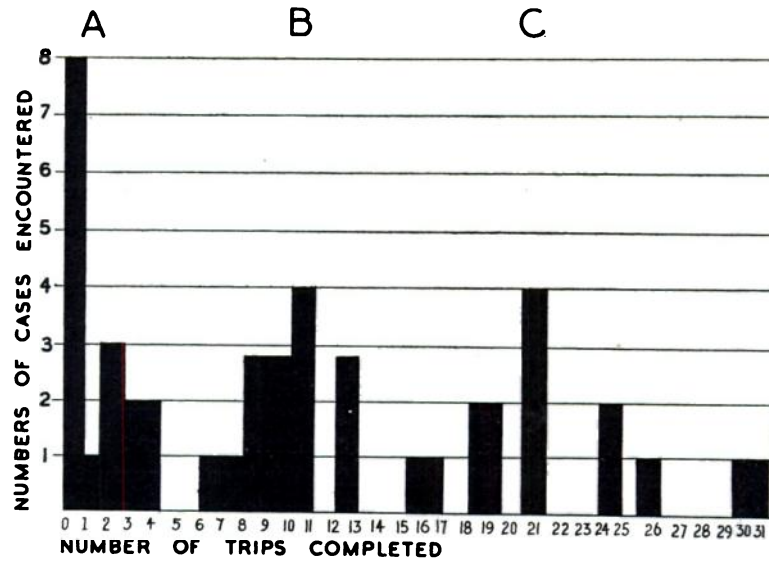
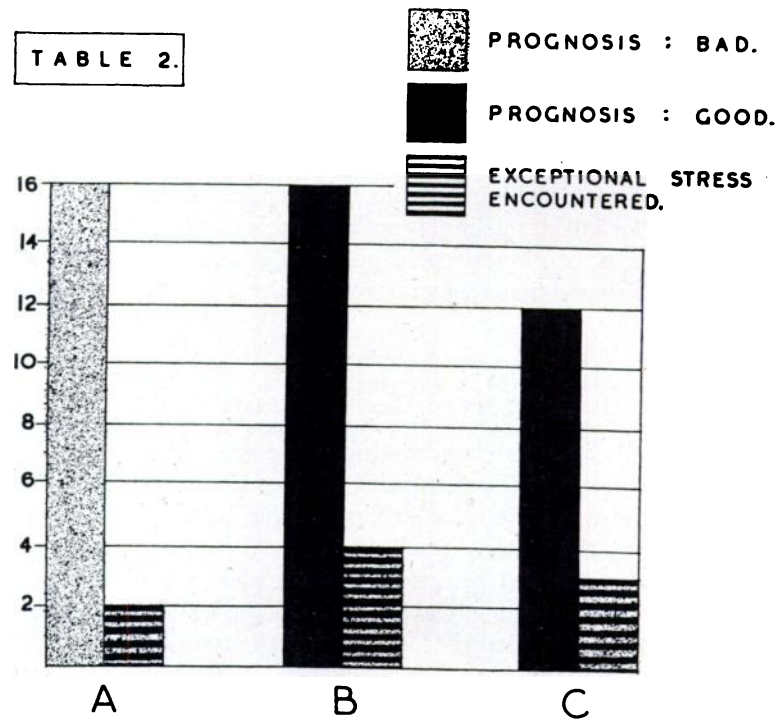


TABLE 2.



In Table II the three groups are represented as three separate columns corresponding in height to the number of cases falling into each. Beside them are smaller columns representing the cases in which altogether exceptional stress was encountered. Prognosis is shown as GOOD in all cases in which return to full flying duties in the same tour or a second tour was known to have been achieved; it is shown as BAD in cases in which removal from further flying duties ultimately became necessary on medical or executive grounds, or in which considerable doubt was felt as to eventual recovery for such duties.

It will be seen that of 16 cases in Group A, all carried a bad prognosis, but only 2 had been subjected to exceptional stress; whereas in Group B, all carried a good prognosis except those 4 whose stress was unusually severe. In each one of these 4 cases (Nos. 38, 39, 40 and 41 in the appendix of case histories) it is worth noting that the severe stress had culminated in a single appalling experience. Similarly, in Group C the only 3 cases whose prognosis is noted to have been bad are the three who had suffered an overwhelmingly terrifying ordeal (Cases 34, 35 and 36).

The inference from this is that incidence of psychogenic disability in aircrew displays a tendency to occur at three different stages in the operational tour, leading to the appearance of three groups of cases; those groups in turn differ in prognosis for return to full flying duties; the general outlook in the first being poor while that of the second and third is good. Cases whose breakdown has been precipitated by flying stress of exceptional severity form a group of their own whose prognosis seems not to share this relationship with the stage of tour attained. Separated, they constitute a fourth group.

By labelling these four groups A, B, C and D respectively, and proceeding with a further analysis of the series of cases, the following table is obtained.

TABLE III.

Group.	Loss of confidence.	Anxiety.	Hysteria.	Depression.	Fatigue.	Total cases.	Prognosis for further flying.				
A . . .	5 .	3 .	5 .	1 .	— .	13 .	Generally poor (see discussion)				
B . . .	— .	13 .	— .	1 .	— .	13 .	Good				
C . . .	— .	4 .	— .	2 .	2 .	7 .	Good				
D . . .	1 .	8 .	— .	— .	— .	9 .	} Generally poor (see discussion)				
Mixed group- ing . . .	1 .	3 .	— .	— .	— .	4 .					
Total . . .	7 .	31 .	5 .	4 .	2 .						
Percentage distribution (neuroses only) . . .							79.4 .	12.8 .	10.4 .	5.2 .	} Total cases . 46 Medical . 39 Non-medical . 7 Total reactions 42

The percentage distribution of neuroses is calculated after subtracting the 7 non-medical cases: leaving a total of 39 cases which displayed 42 types of reaction.

This is a table showing the incidence of the various types of reaction in each group; the diagnosis of "Loss of Confidence"; "non-medical" is a

Service term reserved for cases whose reaction to stress is characterized by a collapse of morale rather than by conflict leading to true psychogenic illness. The heading of mixed grouping covered four cases whose history and general characteristics qualified them for inclusion in one of the first three groups, but who had also experienced particular stress adversely affecting their prognosis.

In this and subsequent tables it will be noted that the total number of reactions encountered exceeds the total number of cases; this is because some cases displayed elements of more than one reaction.

Table IV is an analysis of the percentage distribution of all reactions in this series. It is of value in indicating that the series, although necessarily limited in number, provided a fair cross section of the common types of case to be encountered in work of this nature. An analysis of 1197 cases of neurosis or loss of confidence in aircrew by Symonds and Williams (10) (F.P.R.C. 412 (g)), has given very similar figures. These are reproduced for comparison in Table V.

The 39 "other reactions" in this table include such comparative rarities among aircrew as schizophrenia and organic reactions. None of these were encountered in the author's series.

TABLE IV.

Total cases = 46.

		Percentage of <i>all cases.</i>	Percentage of <i>medical cases.</i>
Anxiety	31	67.3	79.4
Hysteria	5	11.1	12.8
Depression	4	8.6	10.4
Fatigue	2	4.3	5.2
Loss of confidence (non-medical)	7	15.2	—
Total of all reactions	49		

TABLE V. (Symonds & Williams F.P.R.C. Report).

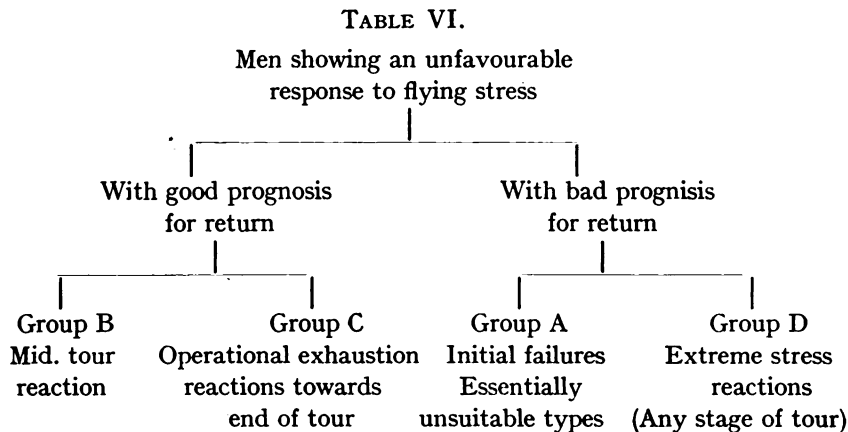
Total cases = 1197.

		Percentage of <i>all cases.</i>	Percentage of <i>medical cases.</i>
Anxiety	789	65.8	77.2
Hysteria	117	9.7	11.5
Depression	107	8.1	10.7
Fatigue	59	4.9	5.8
Loss of confidence (non-medical)	176	14.7	—
Other (psychoses, etc.)	39	N/A	N/A
Total of all reactions.	1287		

DEDUCTIONS.

From the results of the investigation just described four main groups of cases emerged ; this accorded with the general experience of the author and led to the conception of a classification based upon the type of reaction encountered, together with the accompanying history, environmental stress and stage of tour reached.

This may be diagrammatically represented below :



The groups are designated by letters in the order in which they are likely to be encountered during a tour of operations ; this, too, by a coincidence which is not difficult to understand, is directly although not rigidly related to the respective frequency with which they are seen. In subsequent consideration the group under discussion will be referred to by its letter as above.

GROUP A.

These are the men who break down or decide to give up operational flying before beginning operations or during the early stages of their first tour, typically within the first six sorties, without having been subjected to exceptional stress. They are drawn largely from that small section of aircrew already described whose attitude to flying and its risks was never related to reality. Many of them are perfectly well aware of the implications of their failure, and have made up their minds to try no more before being sent to see the doctor. A frank admission of inability to carry on, without constitutional symptoms, marked remorse, or distress, is common in such cases. The absence of any deep or sincere regret may be very striking. But cases do occur when the picture is one of temperamental unsuitability hitherto concealed, with diffidence, shame and mortification.

If neurotic traits are displayed they are likely to consist of a type of shallow subterfuge which strikes the observer as lying very close to consciousness. For example, men may protest that they are not so much concerned about themselves as about the rest of the crew : " I'd be ready to carry on except

that it wouldn't be fair to the rest of the crew . . ." is a remark which, in experienced ears, can almost be said to sound the knell of a patient's prospects of recovering the confidence or determination necessary to resume flying.

Other cases falling into Group A may display symptoms which suggest a mildly hysterical basis, while others still may have had their misgivings and resolution so delicately balanced that a single word from a wife or parents may tip the scales and determine them finally to refuse to continue.

As a typical example the following case may be described.

CASE 6.—A sergeant flight engineer, single, who complained of abdominal pain and throbbing headache at an altitude of 20,000 feet. He was aged 21, and had completed seven operational sorties. He gave a history of a crash in a training aircraft a year before, in which he had fractured his left external malleolus. Six months later, having resumed flying, he was involved in another crash in which neither he nor any other member of the crew was injured. Three months later, on his seventh operational sortie, his aircraft was forced to come down in the North Sea, the captain and rear gunner were killed, and the remainder of the crew spent 14 hours in a dinghy before being rescued. After this the crew were reformed with a new captain and rear gunner, but the patient had not felt fit to return to flying since his rescue from the sea. His present complaint had been troubling him for about six weeks he said.

Neither his personal history nor his family history included any neurotic traits, nor did he himself display any evidence of anxiety or nervous tension; he affirmed quite simply that he had this pain between 15,000 and 20,000 feet, that he did not know what caused it but that he did not consider he was fit for further flying under the circumstances. He had recently returned from leave during which he had been urged by his family to give up aircrew duties.

On physical examination no abnormality of any kind was discovered, and so the medical officer took the opportunity of accompanying him on a long cross-country flight, during which the aircraft flew at altitudes varying between 10,000-20,000 feet. It was arranged that an additional member of the crew should fly to perform this patient's duties so that it would not be necessary for him to know by the instruments at what height the aircraft was flying. The flight was made at night and during it the patient displayed no objective signs of distress, although he complained from time to time of vague abdominal pain and discomfort which was not in fact confined to the heights he had specified, nor referable in any way to the normal fluctuations in barometric pressure encountered during a flight at varying altitudes.

Owing to his delay in resuming flying he had been supplanted in his crew, whereupon he said that he did not consider he should fly with a new crew after what he had gone through. His general attitude suggested very strongly that he was unwilling to try further but his reasons for ceasing to fly were not considered to be medical. In deciding his disposal, due consideration was given by the executive to the stress to which he had been submitted, but the prognosis for further flying was considered to be very bad.

Other cases displaying similar traits are quoted in full in the Appendix of case histories to this group; not infrequently a previous organic or traumatic disability supplies the focus for complaint, and the hysterical element becomes evident only after full clinical examination has revealed complete physical recovery or an unwillingness to co-operate in treatment directed to that end.

One man insisted that an old meniscectomy scar completely incapacitated him for flying, but refused to perform remedial exercises (Case 9); another blamed an empyema treated successfully several years before for pain experienced only in the air in the last stages of pre-operational training (Case 11); a third, although troubled by visual disturbance, would not wear the corrected

lenses provided for him (Case 13). In such cases insight is not very difficult to provide, but it is apt to be most unwelcome when provided.

In all these cases a full and sympathetic attention to history and physical examination is clearly necessary; diagnosis must be made with particular care to determine the correct and fair disposal; but almost all of them are ultimately an executive and not a medical problem. In the author's opinion there can be no doubt whatever about the prognosis. Group A cases are absolutely useless from an operational standpoint. Their breakdown is final because their morale is intrinsically poor. Any attempts at encouragement, exhortation, or therapy to induce them to return to duty are just so much waste of time; moreover they are contra-indicated because, as has already been stressed, it is no part of the medical officer's job to indict a man whose reason for ceasing to fly is not medical. These men are essentially unwilling to fly. They have no wish to persist, no desire for any solution of their problem which will involve their return to operational duty.

There can be no compromise about their disposal; it must be immediate and decisive, and the first step is their prompt removal from the operational unit. But this, as has been stated, is the responsibility of the Executive.

GROUP B.

Men who have reached their eighth or ninth operational sortie may begin to display symptoms of anxiety or to experience a sense of deep misgiving about their capacity to continue, which brings them under the care of their medical officer. This is a characteristic and recognizable reaction, which may be expected to occur at some point between the eighth and fourteenth sorties. Despite a tendency to spontaneous recovery, immensely facilitated by treatment, morale during this critical phase may only barely maintain the level below which continued operational flying becomes impossible.

But in contrast to cases in Group A the attitude of the men in this group is one of deep distress that their resolve seems to be failing them; their underlying response is positive and courageous. They desire above all not to accept defeat, but to overcome a reluctance which they do not always recognize as natural.

They are usually frank about this reluctance and sincerely troubled by it. The symptoms are typically those of an anxiety reaction. Insomnia, battle dreams or dreams of crashes or terrifying falls, tremors, sweating, loss of weight, anorexia, tachycardia and palpitations may all be encountered. In many cases, however, the conflict is entirely present in consciousness, and the emotional reaction is tinged with despair at what the patient may mistakenly regard as his exceptional infirmity of purpose or faint-heartedness. A young pilot, whose flying record was remarkable for persistence in the face of exceptional danger, accused himself of cowardice because after twelve hazardous operational sorties he detected in himself symptoms of acute anxiety and apprehension. He was convinced he was heading for disgrace and would deserve it; but in fact he ultimately completed an outstanding tour and gained the D.F.C. (Case 22).

Again, family ties may be worrying him. Such situations are tragically hard for a man whose love and sense of personal obligation to his wife and children conflict so mercilessly with Service duty.

CASE 19.—A sergeant pilot, married, aged 24. This man consulted me after his eighth trip when he had just become a fully-fledged captain of aircraft. He said that he was afraid that his nerve was beginning to go, and that he would not be able to complete his tour of operations. In the course of conversation it was discovered that he had an additional worry, quite apart from the stage he had reached in his operational career, because his wife was pregnant and post-mature. This worried him considerably and he was waiting from day to day for news of her progress. The trips he had already completed had included several particularly unpleasant experiences, attacking well-defended targets in industrial Germany where the strength of the opposition was notorious.

His history suggested no inherent instability and, apart from a mild tachycardia and increased tendon reflexes, he showed no physical abnormality. His weight had remained steady but his appetite was poor.

Treatment consisted of a full discussion of all his problems with the suggestion that he was nearly over the worst of his troubles; and this in fact proved to be true. He was given three days' rest from flying at night, together with further encouragement and a simple tonic. He then undertook his ninth operational trip, from which he returned feeling considerably relieved and belief in his ability to regain confidence and resolution on the station. Once this definite advance had been gained arrangements were made with his Squadron Commander for him to have a few days' leave to visit his wife; during this leave her baby was safely delivered and he subsequently returned to resume and complete his tour without further trouble.

Tragedy will inevitably attend some cases where therapeutic success has been achieved; in war this must be realized and accepted. It is better that the memory of such cases should remain with a medical officer for the rest of his life than that he should discount or forget them.

CASE 21, a sergeant wireless operator, aged 28, was one. This patient reported sick on the day following a most alarming crash when his aircraft was actually taking off, from which he and the rest of the crew had managed to escape, but which had been followed immediately by fire in the aircraft, with subsequent explosion of the full bomb and petrol load. The patient had been detained in sick quarters overnight and had received 3 gr. of nembital, which had procured him eight hours' sleep: his condition on admission had been one of restless and almost hilarious excitement which is frequently seen in men whose immediate relief at escape from a terrifying situation has not yet been overshadowed by a full and sober realization of the narrowness of the margin by which that escape has been achieved. Realization had, however, followed with the morning; this man said frankly that he wanted to give up flying; he had done eight trips and under the circumstances that was enough for him. He also said that his wife was pregnant, and he felt that he owed it to her to take no further unnecessary risks.

He was given a few days rest from all flying and in the course of several conversations the question of whether continuance with the duties for which he had volunteered could in fact be justly considered an unnecessary risk was discussed with him. The medical officer's task in this case was to help him to reach a decision in whose rightness he could honestly believe, so that the conflict by which he was troubled could be solved without the development of further symptoms. The outcome of these consultations was his decision to resume flying; this was obviously a very difficult decision for him to make, but having made it he seemed relieved at having overcome his irresolution for better or worse. He did not falter in his purpose, but he was killed in a collision in the air on his tenth trip when his aircraft was returning from operations.

The general tendency in these cases is to recover morale and confidence sufficiently to continue full duty and, if they survive the hazards which it

involves, to complete their tour. The medical officer's obligation towards them is to assist them in regaining their self-respect and in recovering their original attitude of resolute courage. That is what they seek when they come to him, and in the great majority of cases it is in his power to help them to achieve it. Once through this unhappy period they are unlikely to falter again, although a small proportion of them may recur in Group C, suggesting a less hopeful prognosis for a second tour after their rest. Many of them, however, recover completely, resuming flying out of the resources of their own courage; and they do not look back.

GROUP C.

Cases in this group are precipitated by emotional fatigue linked usually to anxiety due to the cumulative stress of continued operational flying. They are seen typically in men who have successfully completed a fair number of operations; usually more than two-thirds of their tour. Such patients commonly exhibit tachycardia, insomnia, chronic lassitude, depression and anorexia, with often marked loss of weight.

Symonds and Williams (10), of the Aircrew Research Detachment at Oxford have visited many operational stations in the Royal Air Force, including that under the medical charge of the author, to study the early signs of this condition at first hand, and to discuss them with experienced medical and executive officers. In a subsequent report on the results of their investigation they quote the comment of one squadron commander of proven soundness and reliability, who remarked that while no hard and fast rule for the characteristic behaviour of such patients could be laid down, they were apt to exhibit a reversal of their usual habits; the noisy, exuberant extraverted type of fellow became silent, morose and solitary, while the naturally shy or secretive individual assumed a false jocularity, often accompanied by unwonted alcoholic indulgence and talkativeness. But in both cases the pathological nature of the reaction is evident; there is frequently a paranoid or depressive element in the reaction of solitude, a desperation underlying the gaiety. Drinking too much and too often is sometimes a significant indication of a man's sense of subjective fatigue. Emotional lability, leading to sudden quarrels or unexpected tears, may also be observed. A man who had successfully completed an operational tour burst into tears when he realized that his medical officer was sincerely concerned to help him over a subsequent dread of even non-operational flying; kindness had released an emotional outburst which the anticipation of hostility had until then held in check (see Case 31). Another extremely conscientious individual with an innate and very severe fear of any form of flying wept openly when attempting to discuss his difficulties (see Case 33).

A wise commanding officer can often detect these cases as early as their medical officer. They occur typically among a good element in the aircrew who tend to drive themselves unmercifully and who are often of a mildly obsessive frame of mind. They may have become fatigued because the cumulative strain of operations in their case has been excessive, because their

imagination and sensitivity are unusually highly developed, or because their resistance, although adequate, is not extreme.

Such men deserve and require immediate rest from further operational flying ; decision on the part of the medical officer, coupled with the co-operation of the squadron commander, can always achieve this. Lord Moran (11) records that he has learnt from commanding officers in the R.A.F. that the changes just described suggest a poor prognosis for eventual return to full flying. " They taught me that when a pilot's behaviour on the ground changes, when a lad who had been the life and soul of the mess becomes silent and morose, when he loses interest and zest, and becomes critical and bad tempered, then it is too late to save him."

This generalization is true only of the current tour. Correct treatment involves its ending. But provided these men are caught in time, before continuing and increasing exhaustion causes them to break down or to make a fatal mistake in the air, as, if they are missed, it almost inevitably will, prognosis for a second operational tour, after adequate rest and change, is good.

GROUP D.

In this group are included all men whose breakdown had been precipitated by an exceptional strain, often imposed by a single appalling experience which has utterly horrified and distressed them. The precise nature of the exceptional strain will of course vary in each case, but its severity is the criterion for the inclusion of any particular case under this heading.

These cases include some of the most exacting with which the medical officer has to deal. Assessment, diagnosis, prognosis and management are all frequently complicated and difficult ; breakdown may occur at any stage in the tour, and it must be remembered that an exceptional strain may precipitate collapse of morale in any of the types described in the previous three groups, as well as in otherwise resilient aircrew.

Previous knowledge of the man, and full understanding of the nature of the strain are unquestionably essential ; as always, but above all in these cases, sympathy and imagination are indispensable to a wise and fair decision. Whether or not the case is considered to be purely medical, allowance must be made for the effect of the strain on the man's demeanour in assessing disposal or prognosis.

A man who still has it in him to complete a tour will usually show marked improvement within 48 hours of the development of the acute emotional reaction which is almost invariably seen in these cases. This reaction may take the form of a hectic exhilaration amounting to hypomania, or it may be characterized by extreme pallor, physical and mental exhaustion, and shock, succeeded after a few hours by utter dejection and weary, tremulous depression.

But persistent symptoms of depression or anxiety state, or a frank inability to face any kind of flying after three days, suggest a bad prognosis for resumption of the tour. Prognosis for a second tour scarcely comes into the picture at this stage, but it will depend ultimately upon the man himself more than upon the severity of the experience which has temporarily overwhelmed him.

A particularly vivid example of such an experience is provided by CASE 40. This N.C.O., a flight sergeant rear gunner, displayed an acute anxiety reaction produced by severe flying stress. He was rear gunner in a crew who had completed twelve sorties, on the fourth of which, returning from Berlin, they crashed into the sea and spent twelve hours in the dinghy before being rescued by the Air Sea Rescue Service. They continued to operate after this and on every one of five successive trips were attacked by night fighters; this was at a time when enemy opposition had reached its most energetic stage. For persistent and devoted duty over this period, the captain received the Distinguished Flying Cross. On their twelfth trip a night-fighter destroyed their starboard outer engine over Germany; the aircraft began to spin and the starboard inner engine failed. With both port engines over-driving in the spin the aircraft was crashing out of control and the captain ordered the crew to abandon aircraft. Owing to the force of "G" (the centrifugal force developed by the powered spinning dive which the aircraft was undergoing), this rear-gunner found that he could not open his turret doors to reach his parachute and, after struggling furiously for several minutes, and seeing the parachutes of two others of the crew open far below him, he attempted to resign himself to certain death, trapped in the turret of an abandoned and crashing aircraft. When describing this he remembered covering his eyes and weeping, and then feeling there must be something he could do, and renewing his attempts to force his way out of the turret. After several minutes the aircraft gradually resumed level flight and he was able to escape from his turret into the rear of the fuselage, where he saw two other members of the crew. They, and the captain, had remained with the aircraft because another member of the crew's parachute had fallen out, leaving him unable to abandon the aircraft. By this time the aircraft had lost about 13,000 feet of height, but by a miracle the captain had it under control again. They returned to base across Germany on two engines and below 10,000 feet, until after half an hour the inner starboard engine started up again. On his return this N.C.O. and the rest of the crew were admitted to the sick quarters for the night and given the routine treatment for emotional shock, and by the following day they were fit for discharge. The patient stated frankly that he felt quite unable to face entering an aircraft again for the time being, and he was permitted to proceed on leave without doing so. He was an Australian and had no real home in this country, but spent most of his leave visiting relatives of the men who had baled out over Germany.

On his return he reported sick, complaining of acute depression, exhaustion and anxiety. There was no evidence of pre-disposition on previous history, and apart from his pallor and loss of several pounds of weight, his physical condition was not abnormal.

Immediate treatment by the medical officer on the station is of the utmost importance in these cases. Continuous unobtrusive supervision and the provision of sound sleep play a large part in the medical officer's management of a man whose immediate response to treatment on the station has been favourable. There is of course a tendency to substantial and rapid recovery in all these cases, who are usually young and emotionally resilient; but it must be remembered that they are also naturally impressionable, and the prospect of resuming flying once this has gained a terrifying association in their minds may itself prolong symptoms of the emotional reaction.

In cases where this occurs, treatment away from the unit offers the only reasonable hope of complete cure, quite apart from any question of an ultimate return to flying, which must take second place in the mind of the physician.

These men are ill; they are psychiatric casualties; and if what they have suffered has proved too much for them to bear, premature attempts to encourage or persuade them to resume full flying duties are as misplaced in their case as they would be in cases falling under the Group C classification.

XCV.

3

DISCUSSION.

As can be seen from the description of the four groups and a study of the appended case histories, certain conditions are more likely than others to be encountered in a particular group.

Group A cases usually include *all* men whose basic attitude to flying is unsatisfactory, whose motives for volunteering were inadequate or ill-considered, or whose morale, courage or confidence are below the minimal requirements for successful aircrew. Practically all men severely predisposed to the development of neurosis can be expected to break down in this way; but a small number may last into Group B or C, and some complete a tour despite the immense handicap imposed by their neurotic tendencies (Symonds) (8, 10). Of the frank or early neurosis seen in Group A, anxiety states predominate, although the few cases of hysteria seen in aircrew are largely confined to this group. Fatigue syndrome or obsessive compulsive reactions are most uncommon under this heading.

On the basis of completed sorties, the line dividing Group A from Group B cannot be rigidly drawn, but it is valuable as a general indication. Cases have been reported where men whose attitude to flying, response to encouragement, and subsequent performance justified their inclusion in Group B, came to the medical officer after their third or fourth sortie. This is uncommon. Men whose desire to continue is sufficiently positive do not usually experience serious difficulties as soon as this.

Group B cases include most of the mildly obsessional types of personality encountered among aircrew; as has been stressed, they are typically very keen to continue if they can, and to a certain extent their obsessive trend can be utilized to help them to do so. Emotional reactions characteristic of anxiety, and to a lesser extent true early or mild anxiety states are also to be expected; hysterical symptoms, if seen are usually very amenable to explanation and vanish readily; however, they are uncommon in this group, and where they occur predisposition is likely to be severe and the case a borderline example between Groups A and B.

The typical case seen in Group C might be expected to be the fatigue syndrome: but by definition this syndrome excludes anxiety or depression, being characterized by apathy and indifference. Such cases are a small minority in Group C. Those commonly encountered are anxiety states or depressions in which prolonged stress has led to an emotional and often subjective exhaustion. They were originally called fatigue cases with anxiety, or anxious depression, by the author, but this led to confusion with fatigue syndrome and has been abandoned. Anxiety is so frequently a significant factor that it is certainly true to say that of all reactions to the stresses of flying, anxiety is by far the most common. This is eminently understandable; there can be remarkably few people who have flown without experiencing some feelings of anxiety; none, except the constitutionally fearless discussed by Symonds in his Croonian Lecture (8) could fail to experience them on an operational flight during the period of the author's observation. A mixture

of fatigue, cumulative anxiety, and an obsessive personality is another type of case to be expected in Group C.

Following the extreme stress which is the criterion for Group D cases the immediate reaction is most commonly emotional shock ; this may be followed either by recovery or by an anxiety state, profound depression or hysteria. Hysteria is, however, as rare in this group as its general uncommonness among aircrew as a whole would suggest. Gillespie has commented on this rarity and has advanced an explanation for it, linking it with the natural self-respect of the aircrew type, and with the pride fostered by technical accomplishment and difficult achievement.

APPLICATION OF THE GRAPH.

Re-examination of the graph (Fig. 1) illustrating the fluctuations in the morale of normal men fulfilling the duties of aircrew provides a possible explanation of the apparently arbitrary appearance of the four groups of cases revealed by the investigation and just described.

This conception when applied to each of the four groups in turn, will be found to correspond to a significant extent to the type of reaction, prognosis and indication for treatment already outlined.

This suggests that it is in fact valid. In every case seen by the writer, the relevant phase of the graph, as well as the particular reaction encountered, was of very great importance in designing treatment and assessing prognosis.

GROUP A.

The significant characteristic of these cases, whether they displayed anxiety reactions, hysteria, or frank reluctance to persist with operational duties, was their comparatively poor morale. They started with this disadvantage and it rapidly led to their undoing as aircrew. Faced with the realization of acute danger their morale follows the downward trend, but because its initial level and quality are low, their departure from their more resilient fellows is illustrated by the characteristically steep descent of their curve and its failure to rally before the critical level has been reached (see Fig. 2).

GROUP B.

The original graph (Fig. 1) showed the tendency of all flying men to go through a phase of lowered confidence between about their eighth and fourteenth trips. When this is accentuated either by temperamental or environmental factors, of which family responsibilities provide a very understandable example, this difficult period may constitute a critical phase as shown in Fig. 3. Provided men can be helped through this phase the resurgent trend in morale will follow the general curve outlined at this stage in Fig. 1 and reproduced in Fig. 3. It is this conception that must underlie the efforts of the medical officer to help men whose cases fall into this group ; it is on this basis that he can honestly reassure them not only that the reaction is itself perfectly natural, but also that if they can hold on for a time, their confidence will recover.

The difficulties presented by cases on the border-line between Groups A and B have already been considered.

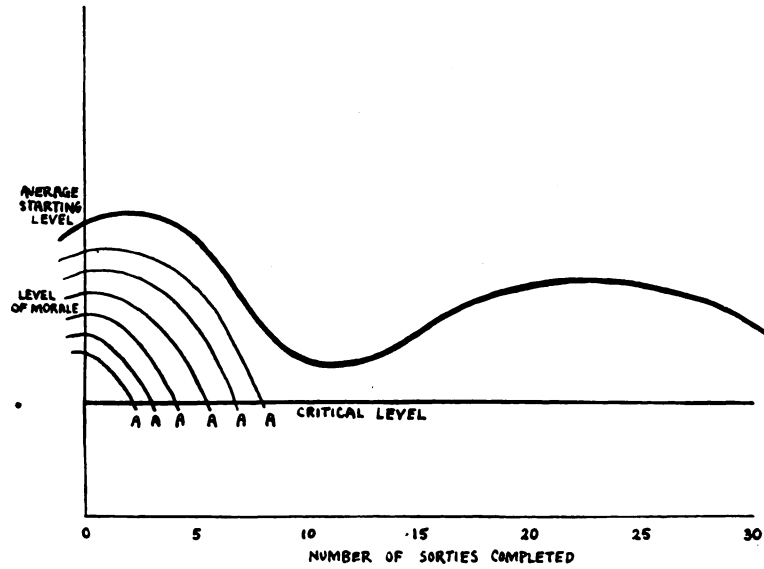


FIG. 2.

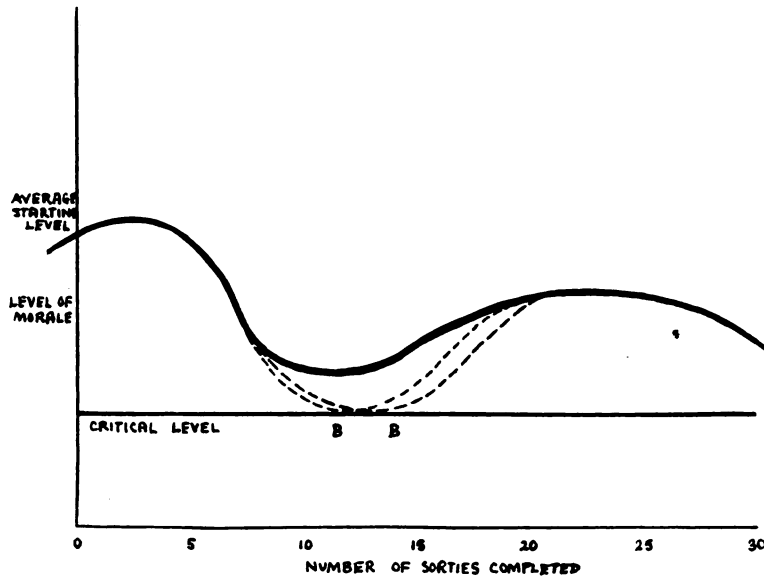


FIG. 3.

GROUP C.

In discussing the original graph the effect of cumulative stress and resulting fatigue, both emotional and physical, was mentioned as particularly significant from about the twenty-fifth trip onwards.

When this affects confidence in the manner shown in Fig. 4, cases will occur in Group C of anxiety or depression. True fatigue states, by definition "cases in which the outstanding complaint is of undue fatigability of mind and body

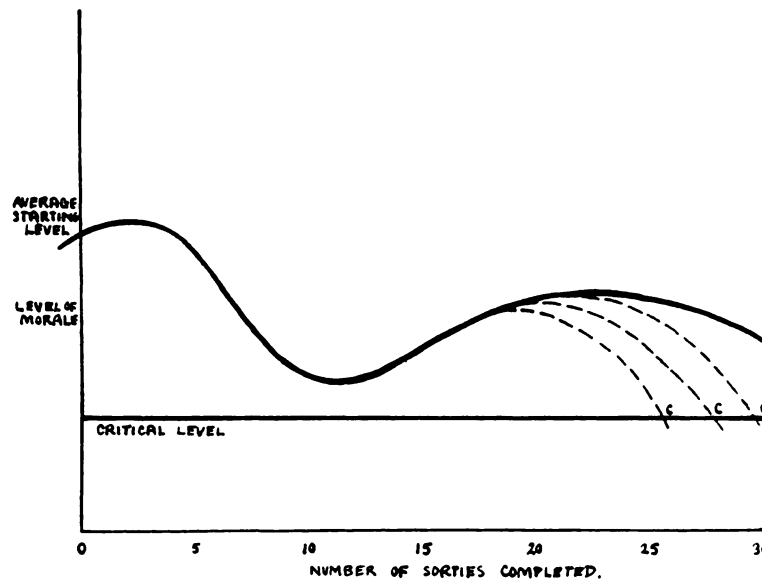


FIG. 4.

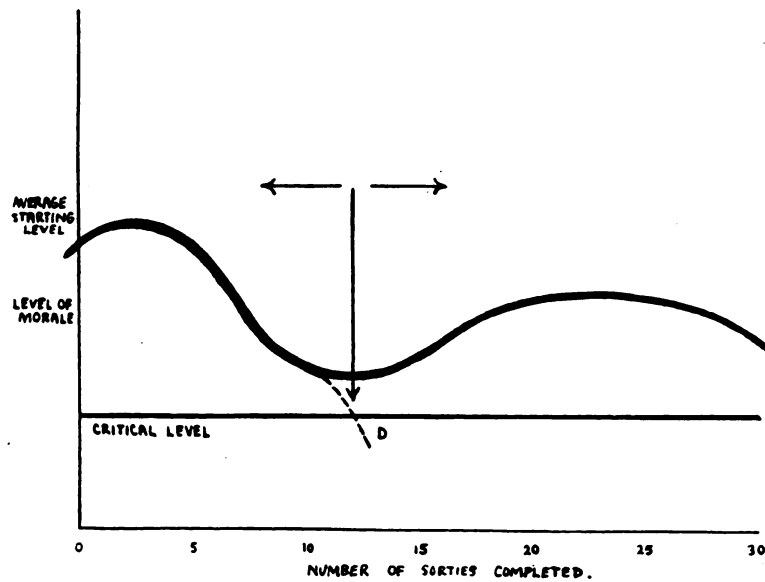


FIG. 5.

without adequate background of anxiety, depression, or obsessive compulsive reaction" (Symonds (10, 12)), are far less frequent in this group.

GROUP D.

Fig. 5 is simply a diagrammatic illustration on the basis of the graph of the tendency of an exceptional strain to precipitate collapse of morale in any of the types described in the previous three groups, as well as in otherwise

resilient aircrew. The exceptional strain is represented as a line of force driving down morale at the particular point at which it happens to operate. This, of course, may occur in training or at any stage of the operational tour.

In every one of these four figures corresponding to the four groups the curve of the original graph has been retained to illustrate the correlation existing between the groups, deduced empirically from observation of cases, and the conception of the fluctuations in morale by which they may be explained.

Such then were the effects of the stresses of operational flying in Bomber Command upon the men who encountered them ; stresses to which the majority proved themselves more than equal.

It has been the aim of this paper to illuminate an aspect of flying stress and the response it evoked from normal men ; this has in turn involved examining some of the manifestations of human courage. From whatever aspect it is examined, to whatever analysis it is submitted, courage emerges and remains an element which transcends the limitations of purely scientific observation. But it will always be a proper study.

SUMMARY.

This paper records an investigation into the morale, reactions to the stresses of flying, and incidence of neurosis in members of operational bomber aircrew. It is based on observations made over a period of four years by the author while a medical officer to a heavy conversion unit, and to four bomber squadrons. This involved responsibility for the medical care and supervision of over 4000 members of operation aircrew.

From the results of this investigation two main sets of deductions are drawn, leading to two inter-related conceptions ; one, a tendency for the majority of cases of neurosis or breakdown to occur at one of three stages during the operational tour, the other an appreciation of the fluctuations to which morale in normal aircrew is subjected by the stress of operational flying. This second conception is expressed in the form of a graph and provides a theoretical basis for the first whose empirical evolution has been described.

An account is given of the application of these related conceptions to the assessment of correct treatment, prognosis and disposal of men displaying an excessive reaction to the stresses of operational flying or training. Fear is accepted as the underlying factor in this reaction, whatever its outward form. This is a perfectly natural and almost universal emotion, but it is balanced by courage, confidence and resolution ; these make up morale.

The graph has been drawn to illustrate successive fluctuations in the morale of normal men during the course of an operational tour, starting from the final phases of training.

Although these fluctuations occurred to a varying extent in practically all normal men flying as aircrew in Bomber Command, in less than 5 per cent did they lead to breakdown, despite the intensity of the stresses involved.

I should like to acknowledge with gratitude the interest and constructive criticism of Sir Charles Symonds, C.B., K.B.E., D.M., F.R.C.P., and Dr.

Denis Williams, D.Sc., M.D., F.R.C.P., at the inception of this work in the Royal Air Force, also the later encouragement of Professor Aubrey Lewis, M.D., F.R.C.P., and the practical advice of Dr. Elliot Slater, M.D., F.R.C.P., concerning its presentation in its existing form.

APPENDIX OF CASE HISTORIES: HISTORIES OF THOSE CASES
SPECIFICALLY REFERRED TO IN THE TEXT.

CASE 9.—A sergeant rear-gunner, single, aged 21. This N.C.O. injured his left knee playing football while in the final stages of his training, and required a bilateral meniscectomy of the left knee joint. Clinical recovery appeared normal, but he failed to make satisfactory progress in rehabilitation and after some months the orthopaedic surgeon in charge of his case finally gave his opinion that no further orthopaedic treatment was indicated; he recommended that the patient be referred to a psychiatrist.

Seen on the station the patient displayed an ominously hysterical attitude towards his disability, which he stated categorically made further flying quite impossible, while it remained in its present condition. He maintained that he was unable either to enter or leave the rear turret of an aircraft owing to the limitation of flexion in his knee, and that he was "fed up with exercises and being messed about generally." It was pointed out that the object of the exercises was to enable him to recover full use of his knee, and that if he no longer wished to achieve this and was unwilling to attempt it, it was unreasonable for him to blame the accident for his continued absence from flying. His reply to this was that no one could make him fly if he was not fit to do so, and shortly afterwards he informed the squadron commander that he was finished with flying for good.

CASE 10.—An acting-sergeant air gunner, married, aged 27. This sergeant had completed a total of 40 flying hours with one operational sortie lasting 5½ hours. He had been involved in a minor crash in which no one was hurt, and a few days later he came complaining of vague dizziness and feelings of strangeness which he dated from the crash. This proved purely a conversational opening and in the course of the consultation he showed complete insight, saying—"I'm sorry, but I just don't want to fly any more. I want to go back to a ground job. I can't face any more operations." He responded to questions as to why his attitude should have altered so completely at the very outset of his operational career after one crash landing which had scarcely affected the rest of his crew by saying that he was married, felt he had his wife to consider, and had lost his three best friends in the unit when they had failed to return from a recent raid.

Both his family history and his personal history showed evidence of considerable pre-disposition to neurosis: he had three brothers, two of whom had had nervous breakdowns following trivial accidents, in one case necessitating treatment in hospital. His own motives for becoming an air gunner were difficult to discover; he seemed to have given very little thought to the matter before reaching his present situation.

His present condition was one of normal physical and mental health. Having made his pronouncement that he wanted to do no more flying he was no longer in the least disturbed and viewed the prospect of losing his rank and flying badge with complete equanimity. "A ground job is good enough for me" was his comment and summed up exactly his mental attitude. He was not a medical case and his disposal rested with the executive.

CASE 11.—A sergeant mid-upper gunner, aged 20, married. When just about to commence operations on four-engined heavy bombers, with 78 flying hours, but no operational experience whatsoever, this N.C.O. complained of pain in his back over the site of an old empyema scar. This pain was associated solely with flying; he never experienced it on the ground. From the outset this seemed likely to prove a functional manifestation, but after a careful clinical examination of his chest had revealed no abnormality he was X-rayed and the second opinion of a physician was obtained. The effect of this was to exclude the possibility of his pain having an organic basis and the psychogenic nature of the symptom was.

then explained to him, and he was invited to consider whether he had any particular misgivings about commencing operational flying, which he had not so far revealed. He then said that the trouble was that his wife was very much against him flying and he felt he ought to give it up for her sake. He was by now quite prepared to believe the pain of which he had complained did not in itself constitute a reason why he should not be passed fit to fly but he maintained that he had really no enthusiasm for flying at all and was rather sorry he had ever volunteered in the first place.

Prognosis for a successful approach to operational flying was clearly quite hopeless and the squadron commander was advised that the disposal of this case must rest with him.

CASE 12.—A sergeant navigator, aged 21, single. This man had completed 130 flying hours, including one operational sortie lasting 6½ hours. He reported sick, complaining of continuous severe occipital frontal headaches and a feeling of intense depression. He was extremely pale and said he wondered whether there was anything the matter with his eyes.

After the completion of his first operational mission he had developed coryza which had resulted in his being taken off flying for 48 hours. The next evening his crew, carrying a substitute observer, crashed on return from a cross country flight, and six of them, including the captain and the substitute who had gone in his place, were killed. A service funeral had been held for several members of this crew, which he had attended in the role of chief mourner, an experience which had depressed him considerably. At the time of the consultation he appeared to be developing an early anxiety syndrome.

On physical examination there was no detectable abnormality and an expert ophthalmological opinion excluded an ocular basis for his headaches. In his family history there was nothing of great significance, but he told me that immediately after the crash, in which most of his crew had been killed, his father had been taken seriously ill and he received news that he might be dying; this had naturally increased his distress. His personal history suggested a moderate degree of pre-disposition: he had a nervous breakdown lasting almost 18 months with headaches and insomnia when he was nine years old. He attributed this to excessive study: he had been spending three hours every day at music practice in addition to his normal school.

In view of his undoubtedly genuine distress and the stresses which his father's illness, his friends' death and his own purely fortuitous escape from inclusion in their accident had imposed upon him, an attempt was made to give him insight into the basis of his headaches, with as much encouragement as could reasonably be offered him. He responded fairly well to this, and it was then suggested that after taking part in a second operational sortie he should go on leave to see his father, the gravity of whose illness had apparently been slightly exaggerated in the first report. He did this and was then posted to another unit to pick up a new crew; but his recovery was short-lived for after one further operation with them he developed a full-blown anxiety state and had to be made permanently unfit for further flying.

It will be observed that his was one of the less common cases in this group where a genuine temperamental unsuitability did not prevent him trying unsuccessfully to achieve a standard of war service which was, in fact, beyond him, or from suffering in the attempt.

CASE 13.—A flight-sergeant pilot, single, aged 23. This patient, a flight-sergeant with no operational experience who was completing his course as a pilot on four-engined bombers, complained of headaches and disturbed vision since a crash he had had at his operational training unit. He had escaped unhurt and had flown again the same day.

Complete medical examination revealed no abnormality except a slight error of refraction for which corrective flying goggles were prescribed by the ophthalmologist. He then complained that his goggles were unsatisfactory, but a further ophthalmic opinion a month later pronounced them perfectly correct.

He persisted in complaints that he was unable to land his aircraft with or without the goggles. Accompanied by his medical officer on a flight he made moderately good landings despite protests that the goggles were useless to him.

Subsequently he refused to wear them at all and proclaimed himself unsafe to fly; to continue would not be fair to his crew he said.

He was considered to be a case of reluctance to fly with a very slight element of hysteria. Prognosis for operational flying was hopeless. His case, with a full report, was placed in the hands of the executive for disposal.

CASE 20.—A sergeant navigator, single, aged 25. Following his tenth trip this sergeant reported sick, having suffered from nausea and vomiting while in the air, which had prevented his aircraft from making a successful attack. He had not previously suffered from airsickness at any stage in his training, and had completed over 200 hours in the air, but after his fourth trip, when his aircraft had crash landed at a coastal aerodrome after being damaged by anti-aircraft fire over the target, he had developed an increasing apprehension during flight which he was soon able to see was directly related to the development of airsickness in his case.

There was no abnormality in history or on full physical examination. He reacted very well to the explanation offered him, coupling his airsickness with his natural apprehension following his earlier hazardous experience, and although provided with Chloretone capsules he discovered on resuming flying that he had no recurrence of nausea and did not need to take them. He showed every sign of having made complete recovery, but four trips later his aircraft was involved in a collision over England at night on returning from operations in which every member of the crew was killed.

CASE 21.—This case has been fully described in the text on p. 30.

CASE 22.—A pilot-officer, captain of aircraft, aged 24. This officer consulted me privately after completing twelve highly successful operations; he said he was afraid that he lacked "guts" and that he dreaded undertaking any more operational sorties. He could not sleep on a night when operations were in prospect nor could he eat much food during the day preceding them. On return from a mission he felt physically and mentally exhausted, but when he went to bed he would lie awake tossing and turning and wondering how he was going to face the next trip. He was a shy and solitary young man, and in the course of consultation it became evident that he had very little idea of the extent to which other men in the squadron, whom he admired, had been troubled by similar anxieties.

In his personal history there was little of significance except that he was an only child and that his mother had died when he was very young. He had great admiration for his father, who was a doctor, but feared that he was likely to bring disgrace upon the family name by an abject failure as an operational pilot. He had a pulse rate of 86, sweated freely during examination and his blood pressure was 140/80.

He was reassured about the normality of his reaction and greatly encouraged to learn that he was not unique in this respect. He was also able to see the reaction of this type would be perfectly intelligible to his father as a medical man, and was told that few people were in a better position than a doctor to understand the degree of courage and determination necessary for the task which he had set himself. He was promised that if he still desired to continue flying he could confidently expect a resurgence of his confidence and with it a very much happier state of mind about his job. He also saw readily that for him to give up flying at this stage would be the one certain way in which he would let down his crew and betray his self-respect.

He was given a simple tonic, allowed to resume flying at once, and seen nightly after his next two operations, when nembital gr. $1\frac{1}{2}$ was prescribed. After this he improved steadily and completed a full tour of operations with distinction.

CASE 23.—A sergeant rear gunner, aged 24, single. This sergeant sustained mild frostbite of his left hand following failure of his electrically heated gloves on his tenth trip, when the temperature at the altitude flown was minus 35 degrees. This disability resulted in his being taken off all flying for a week, during which time he began to become a prey to misgivings about his ability to resume flying when he should again be considered fit. He was an extremely mild case of anxiety reaction and responded perfectly to discussion and encouragement. He experienced no further trouble following resumption of his tour, and his case would probably

never have come to light had the enforced idleness due to his frostbite not provided him with an opportunity for brooding during a phase of his tour which has already been mentioned as probably the most critical through which a normal man has to pass.

CASE 31.—A sergeant wireless operator, married, aged 22. This N.C.O. had already completed a tour of operations comprising twenty-four sorties when he first came under my care. He had been posted with his crew to a station where new aircraft were delivered for allocation to operational squadrons, the duty of his crew during their rest period being to test these new machines before handing them over to operational crews. Since his arrival the patient had exhibited reluctance to fly, and had finally told the commanding officer that he was unable to face further flying for the time being. This was not easy for the commanding officer to understand, as the type of flying involved in this job was not at all strenuous or alarming; the man was accordingly told that if he wished to avoid all flying he must consult the medical officer about his reluctance. When first seen he was in a mood of truculent despair which gave place on kindly questioning to uncontrollable weeping. He said he had experienced a mounting sense of strain and tension from his twelfth trip onwards, but had told no one, hoping that he would get over it and determining at all costs to complete his tour without faltering. He now found any form of flying altogether too much for him, and supposed mistakenly that as a result he would be deprived of his rank and flying badge and lose all that he had striven so zealously to preserve and had so honourably achieved.

He was clearly in need of treatment and reassurance. After brief explanation and encouragement he was temporarily admitted to the ward, where he was given nembital gr. 3, repeated after eight hours, thereby ensuring him a considerable quantity of sleep following his admission.

On subsequent examination both his personal and family history were good, he had been successful at school, played football for the first eleven and won several prizes. He had had no childish fears except a slight fear of the dark and of the possibility of someone following behind him in dark corridors or when ascending stairs. He had no physical disability and the nervous symptoms he had developed during his tour had been confined to mild headaches, a slight stammer, and his nervousness in the air.

He said he had liked flying up to about halfway through his tour; he had throughout placed great confidence in his captain and in the rest of the crew. Their only particularly unpleasant trip had been their last, on which they had been attacked by a fighter on the way to the target, but had pressed on and bombed it successfully. He had been married six months before, and in the course of advising about his case I had an opportunity of interviewing his wife, who was an admirable type of Scots girl. Although naturally worried about his operational flying, she had never tried to dissuade him from it, but made it clear that she would support him completely in any decision he made about further flying, whether to persist or give up. A report from the commanding officer of the squadron in which he had served stated that he was above average in the performance of his duties and had shown great keenness and enthusiasm at all times. "On actual operations he was very reliable and on no occasion had it been known for him to exhibit any form of behaviour other than that required of a sound member of aircrew during most exacting circumstances."

It was considered that his present trouble had arisen because, having completed his tour he had very reasonably permitted himself a relaxation of the effort of will which had become necessary to sustain him for further flying. The ultimate prognosis for return to full flying duties was considered to be reasonably good but an immediate recommendation for two months' ground duty, during which he would have the opportunity of flying if he so desired, was made. This case is particularly interesting in that the patient set himself to conceal his emotional reaction until in his own estimation his duty had been honourably done; and in this he had succeeded.

CASE 32.—A pilot-officer, single, aged 24, captain of aircraft. This was a similar case to the one just described. This man had also completed a full tour of operations, but had been given a ground appointment for three months following the end of his tour, and had then been posted to a station to convert senior pupil

pilots from twin-engine to four-engine aircraft. After a month's instructional duty which had involved him 26 hours' flying, he complained of feeling extremely nervous while preparing to fly or in the air, his apprehension being characterized by a continuous fear that one of the engines would cut during take-off or landing: this would, of course, be a particularly disastrous hazard when the aircraft was being flown by comparatively inexperienced pilots. The patient was a brave and conscientious man and was perfectly well aware that an instructor who was himself nervous or apprehensive had an appallingly discouraging effect upon a pupil; moreover, if he displayed this reaction by an unwillingness or inability to leave the pupil to fly the aircraft entirely by himself, however inexpertly, he would make it quite impossible for the pupil to gain any confidence on the aircraft at all.

He was in fact suffering from the cumulative fatigue of his operational tour added to a very real dread of instructing, which in a proportion of otherwise admirable pilots is very difficult to overcome. Physically and mentally he appeared perfectly well. A period of leave with mist. sod. brom. $\frac{1}{2}$ oz. *t.d.s.* was advised and the commanding officer of the unit agreed to discuss this pilot's attitude to instructing with him sympathetically on his return. This treatment proved entirely successful and the patient later became a most valuable and sound instructor. Prognosis for a successful second tour was not considered to be affected by this episode.

CASE 33.—A flying-officer, navigator, single, aged 28. This officer consulted me after completing sixteen operational sorties because he felt he could no longer continue to fly. He was on the verge of tears throughout the entire interview and broke down twice. He said that he hated flying and that he had always hated it from the first time he ever went into the air. He had discovered this at once during his initial training but had hoped that if he persisted by an effort of will he might gradually become more accustomed to being in the air: this, however, had not been his experience.

After four cross-country flights at an Advanced Flying Unit he had reported his lack of confidence to his flight commander, but following encouragement had returned to persist with flying, despite his increasing dread of it. Eventually he reached a stage at which he could only tolerate flying at all if he confined his attention to his navigation instruments and worked out the mathematical problems involved while excluding from his mind as far as possible the awareness of being airborne. This, of course, involved a tremendous effort of concentration and, even so, was by no means the whole answer to his problem, because he was expected to include astronomical and sextant observations as a check upon his other navigational methods, and the ordeal for him of leaving his navigator's compartment and climbing to the astrodome to look out of the aeroplane was almost intolerable; after doing this he felt so sick and miserable, and trembled to such an extent, that he was unable to record his findings for several minutes, thereby impairing the accuracy of this form of navigational aid to a point where it was almost worthless.

Despite this enormous handicap he was considered to be one of the best navigators in the squadron; a remarkable testimony to the determination with which he tackled his disability. At his operational training unit he had joined a crew whose morale was low and whose captain, by most unfortunate coincidence, decided to abandon flying after his first mission. His second captain flew the aircraft into the ground through what appeared to be sheer careless flying after returning from the fourth operation. The crew escaped although the aircraft was burnt out; thereafter they refused to fly under this captain. By this time the patient was dreading every landing and every take-off; only by a continuous effort of will could he compel himself to fly at all. It is pertinent to remark at this point that for any man to experience in succession two such unnerving and discouraging examples of leadership is almost incredible in the Service: the proportion of captains of aircraft who are capable of so betraying the confidence of aircrews is undoubtedly minute; and for this patient to have had so unique and disastrous an experience added to his already intense personal difficulties in supporting the stress of flying must be considered an overwhelming and unforeseeable misfortune.

Nevertheless under his present captain the patient had forced himself to complete, in all, sixteen operations, although after every one of the last four he had decided he could not undertake another; a decision which on each separate

occasion he had reversed at the last moment rather than tell the crew, who had a great regard for him, that he could not accompany them.

His mood during consultation was one of utter dejection; he could neither smile nor laugh, and he was completely miserable at his final inability to overcome his mounting dread of flying, by day or night, operational or non-operational. Physically he was perfectly normal.

His was a most exceptional case; his reaction to the awareness of height in flying (see p. 31) was pathologically exaggerated from the start, and in the opinion of his medical officer there could be no suggestion that he could be blamed in any way for this, nor that he had failed to make every possible human effort to succeed in spite of it. It was not considered that leave or any form of treatment would be of the slightest help to him as long as he was expected to continue flying. His complete lack of confidence and dread of flying had taxed his reserve of courage and determination to the utmost during his flying career, and now that reserve was completely exhausted. He was, therefore, considered to be a case for disposal under the procedure suggested for Group C patients: his sixteen trips did not constitute a full operational tour, but his persistence in the face of innate fear of flying, which had never left him, deserved and received the sympathetic appreciation of the executive.

CASE 34.—A sergeant pilot, single, aged 28. This man was the captain of a twin-engine aircraft, one of whose engines began to fail immediately after taking off for an operational sortie loaded with a four thousand pound bomb; after circling the aerodrome for some 10 to 15 minutes trying unsuccessfully to gain height so that he could reach the sea or some wide open space to jettison his bomb before landing, his aircraft caught fire in the air from a blow-back from the exhaust of the affected engine and crashed in flames on the edge of the aerodrome. The crew fought their way out of the incandescent wreckage and ran for it. Within half a minute the bomb, whose casing had mercifully been split by the heat, exploded, but with reduced blast effect. Four members of the crew were seriously injured sustaining burns and fractures; one was killed. The captain escaped with a grazed nose. He was admitted to Sick Quarters for the night and given the routine treatment for emotional shock, after which he slept fairly well. He was allowed up the following afternoon, and had a full consultation with the medical officer before leaving the Sick Quarters.

This patient had completed twenty operational trips, and was in all respects an excellent type of captain. After his immediate emotional reaction had subsided and his physical condition was perfectly normal he said quietly and finally that he could do no more operational flying. Result of examination had suggested that he could not be justly considered a purely medical case, but by co-operation with his Squadron Commander he was recommended for an instructor's course. He failed this owing to jumpiness at the controls—a sign which in pupil pilots beginning their training is considered an absolute indication for rejection unless it is very rapidly mastered. He had shown no sign of this before. The prognosis for further flying was therefore considered to be very bad, but the extreme nature of the stress to which he had been exposed was given full consideration in the medical opinion submitted on his case and secured him a sympathetic and imaginative disposal.

CASE 35.—A sergeant wireless operator single, aged 24. This N.C.O. was a member of the crew of the aircraft whose fate has been described in the previous case. In escaping from the wreckage he pulled himself up through a hatch which was red-hot at the time, sustaining severe second degree burns of the face and hands. He was treated for his shock and burns at the Sick Quarters, and transferred to an R.A.F. Burns Centre within a few hours when his condition had sufficiently improved. He made an excellent physical recovery, but after his final medical board, at which his physical fitness for return to duty had been determined, his reluctance to resume operational flying remained too great for him to master. Flying prognosis in his case was estimated to be very poor indeed; as he said himself, "his nerve had completely gone." No further encouragement or psychotherapy directed towards the restoration of confidence in flying was considered to be of any value in his case, complete psychological recovery only being possible for him when the suggestion of further flying was finally excluded.

When seen several weeks after his permanent unfitness for future operational flying had been decided he had recovered his health and appetite and was ready and able to do a good job of work on the ground.

CASE 36.—A sergeant navigator, single, aged 23, also a member of the same crew. His injuries following the catastrophe above described were severe burns of the hands and shock, for which he received similar treatment to Case 35, with an equally good physical recovery. He came from one of the Dominions and was a very great friend of the wireless operator, who was a Scot, and who always invited him on leave to stay with his family in Scotland. These two men were inseparable companions on the station, and it was not surprising under the circumstances that the attitude of this patient to return to flying exactly paralleled that of his companion. The ordeal in all these cases had been the same, and though in the author's experience flying men have sustained comparable stresses and eventually returned to duty, prognosis in this case was the same as in the two previously described. No medical objection would have been raised to a return to flying had any of these patients proved eager or willing to do so; but as they did not the opinion was expressed that their complete psychological recovery was unlikely while the problem of a return to flying still confronted them.

CASE 37.—A sergeant wireless operator, married, aged 27. On his fourth trip returning from Berlin, where the fuel tanks had been pierced by fragments of high explosive shell, the aircraft of whose crew he was a member ran short of petrol and came down in the sea. The crew took to the dinghy, where they spent fifty-seven hours before drifting ashore off the coast of the Isle of Wight. They all required several days' treatment for exposure in a neighbouring hospital, and when this patient returned to his unit he still complained of paresthesiae in his hands and feet. On examination there were no residual signs of oedema or any other physical abnormality, and the distribution of the paresthesia was of the glove and stocking variety. During discussion the patient volunteered the opinion that he would never be fit to return to operational flying; when asked whether he thought this because he did not expect to recover fully from the physical effects of exposure, he replied quite frankly that it was not that, but rather the alteration which had occurred in his attitude to his job following his ordeal in the dinghy.

Physically and mentally he displayed no sign of abnormality apart from an increase in his natural reserve, and a quiet but rather desperate insistence that he could undertake no further operational flying. He had also gained the impression that another member of the crew (Case 38) who had completed ten sorties at the time of this experience in the dinghy would be automatically removed from further flying, an impression which was not in fact correct, and he said that although he had completed less than half the other man's total of operations, he felt that the stress had been so great in both cases that they should receive similar treatment.

It was explained to him that other members of the crew were in fact anxious to attempt further flying, and that they would be encouraged to do this; he replied by asking if he could have a medical board as he still sincerely believed that he was not in fact physically fit for operational flying, quite apart from any question of his willingness. His request was promptly granted, but the prognosis for his return to flying was not considered at all good whatever might be the verdict of the medical board as to his physical fitness.

The board considered that he was physically fit for full flying duties, but concurred with the opinion of the station medical officer with regard to his attitude towards further flying and the resultant prognosis. Following a full medical report embodying these opinions and directing attention to the stress to which he had been subjected, he was permanently removed from flying duties by the executive.

CASE 38.—A sergeant navigator, single, aged 26. This man was the navigator in the aircraft referred to in the previous case. He had completed 250 hours' flying, of which 72 hours had been made up by ten long operational trips. At his medical board convened to assess his fitness for return to operational flying he was noted as displaying an anxiety reaction due to the stress of his recent experience. Under the supervision of his station medical officer he made a gradual

improvement, was sleeping well and in good general health. During this time he had been given a medical category which permitted him to engage in non-operational flying only; an assistant medical officer flew with him on cross-country flights from time to time, and reported that although he was obviously doing his best he was far from happy in the air, particularly when the aircraft was flying over sea. The prognosis in his case was considered to be doubtful, but he still displayed evidence of a desire at least to try to regain confidence, and this opinion was expressed in a report to his next medical board, with a suggestion that he would probably require a further period of rehabilitation before a definite conclusion as to his correct disposal could be reached. Following this he was posted to a non-operational unit, and unfortunately it has proved impossible to follow up this case. Despite this somewhat unsatisfactory conclusion the case has been included as an example of the essential difference introduced into prognosis by the element of desire to continue despite the exceedingly severe strain which had been imposed.

CASE 39.—A sergeant rear-gunner, single, aged 22. This N.C.O. was rear gunner in a bomber, and was hit by cannon fire from a night-fighter on his tenth sortie. He sustained a gun-shot wound of the jaw, which was fractured, and of the left hand and lower third of the left leg.

He was treated successfully at a maxillo-facial unit and made a good recovery from all his injuries. After seven months he was considered fit to resume full flying duties, but at his final board he displayed symptoms of early anxiety neurosis and admitted that he dreaded a return to flying. He was given a period of two months' ground duty, during which he was encouraged to talk over his troubles with the medical officer, but it was clear that the shock to his morale of his particularly dangerous and unpleasant injuries suddenly incurred from an enemy he never saw had permanently impaired his confidence. My opinion, recorded privately at the time, was that he was finished for operational flying. His final medical board (nine months after the injury) confirmed this, making him permanently unfit for operational flying duties.

CASE 40.—The details of this man's ordeal have already been fully described in the preliminary description of Group D cases (p. 33). He had already had a hard time after the crash into the sea, developing slight functional epiphora, but after explanation and reassurance had overcome this to persist with the rest of the crew. This in itself proved him to be a trier. After this final disaster, during which he had vividly anticipated a violent death when the aircraft crashed on to German soil, he had become utterly miserable, feeling subjectively ill, completely disinclined for food, exercise, or interests of any kind, unable to sleep, and expressing himself in conversation as "sometimes wishing it was all over."

This then was a case of breakdown after very severe stress who had tried as hard as he possibly could to do his duty. Treatment away from his unit seemed to offer the only reasonable chance of recovery of fitness for flying. He was accordingly admitted to hospital, where with some months of rest and psycho-therapy directed to the evaluation of his symptoms and the restoration of his confidence in himself he recovered his health and spirits, after the decision finally to remove him from further flying had been made. He was encouraged to resume full non-flying duty in a job which interested him, and suffered no stigma in view of the severity of the stress to which he had been subjected. Seen again eight months later he was fit and well and had regained his self-respect and happiness.

CASE 41.—A flight-sergeant navigator, single, aged 21. This flight-sergeant was a navigator of the same crew whose experiences formed the background to the description of the previous case. He was in fact the member of the crew who discovered that his parachute had fallen out of the aircraft after he had received the order to bale out, thereby involuntarily imposing upon his captain the obligation of remaining at the controls and endeavouring to save the aircraft, although this had at first threatened to be impossible. Before the captain had succeeded in regaining control the patient's own extreme terror was mingled with feelings of intense remorse that another man should have to face almost certain death because he himself was unable to save his own life when ordered. Rightly or wrongly he blamed himself for having lost his parachute through the open hatch of the aircraft while the first two members of the crew were in the act of abandoning her.

Following their return to base he developed symptoms of acute anxiety with anorexia and insomnia. He was a very conscientious man, who had tried hard throughout his flying career. He had himself completed 430 hours of flying at this time, including twelve operations which totalled 70 hours. This extraordinarily harrowing experience had caught him in the middle of the phase which has already been indicated as providing the basis of temporary breakdown in the cases described under Group B. The cumulative effect of this experience upon the emotional strain from which he was already suffering had led to production of the symptoms of which he now complained.

Remembering the tendency of cases occurring in Group B to achieve a degree of spontaneous improvement and explanation and encouragement, an attempt was made in his case to ease his mind at least of the sense of guilt to which he still clung because he had been unable to bale out when his captain so ordered. He was reminded that this had perhaps indirectly saved the life of the rear gunner, and knowing very well the story of the gunner's escape from the turret and his discovery that he was not after all alone in the aircraft the patient was able to appreciate this, although, as he remarked, the story might have had a very different ending for all of them if the skipper had not been able to regain control. The captain himself took the greatest interest in his crew, and told me that he considered his navigator a very valuable man and would do anything in his power to help him. The patient appreciated this, but said that he did not think he could possibly stand up to further operational bombing missions, although he would like to try to serve successfully in a less exacting flying job, for example, in Ferry or Coastal Command.

Transference from an operational command in the middle of an uncompleted tour is normally never advised or countenanced in the service for obvious reasons; but in this case the opinion was expressed that if the man had proved completely unable to undertake flying of any kind the extenuating circumstances would have deserved the most careful attention; and as in fact there seemed at least a possibility that he might regain confidence sufficiently to perform a flying job of considerable value, in his particular case an exception should be made.

By way of rehabilitation he resumed non-operational flying below 15,000 ft.; a guarded prognosis for his eventual return to any form of responsible flying duty was given. He left the unit to undertake training for duties in another command, but a follow-up of his case revealed that he did not succeed in resuming his place in a crew and he eventually required complete removal from flying duties.

It is of particular interest to note that the captain and the remainder of the crew continued to persist with their tour until on their twenty-fifth trip they failed to return from an attack on a tactical target in occupied Europe. The example of courage and resilience which this captain had displayed had inspired not only his own crew but the squadron as a whole. He had demonstrated what has already been discussed—that a sufficient degree of enthusiasm, determination, and singleness of purpose can restore confidence in some men after experiences which have absolutely destroyed it in others. Rejoicing which attended his entirely unexpected reappearance with others of his crew some months later, having escaped both from the crash and from the attentions of the enemy, was his final contribution to the very high morale in his squadron.

CASE 42.—A sergeant navigator, single, aged 22. On his fourth sortie following return to this country fire broke out in the aircraft necessitating its abandonment by all the crew. He baled out with the rest, but for some reason his parachute failed to open when he pulled the ripcord; he continued his free fall in space, and estimated that he fell over eight thousand feet before his effort to tear his parachute pack open with his hands succeeded and the parachute eventually opened; all this happened at night. He damaged his left ankle on landing, but did not come under my care until six months after this occurrence, when his medical board had recommended that he return to non-operational flying for rehabilitation.

In consultation he continually protested that he wanted to return to flying as soon as he was fit, but that he knew perfectly well he had not regained sufficient confidence. It appeared that his declarations of eagerness to resume full flying were most energetic at his various medical boards, with the result that physicians composing them tended continually to refer him back to a station for some months to reconsider his case after rest and non-operational flying. By seeing him on the

unit and accompanying him on a cross-country flight the impression gained was that in fact he was extremely uneasy about all flying and was making very little progress.

A few weeks after his first consultation with me he burnt himself accidentally by splashing paraffin on to a stove in a dispersal hut. This apparently was a particularly clumsy and careless accident, and at the time it seemed within the bounds of possibility that this might represent a subconscious escape from recovery of full fitness for flying. This was purely a personal conjecture and was never mentioned to anybody else. However, after recovery from the superficial burns and the grant of a period of sick leave this sergeant's case was finally reviewed by the medical board who, on this occasion, made him permanently unfit for all flying duties, a decision which in the author's opinion was inevitable.

It is perhaps of interest to remark that in the course of five years' service with the Royal Air Force this is the only case of which the author has heard in which a parachute has failed to open normally.

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