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**A TIME SCALE IN MILITARY STRESS RESPONSE**

by

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## List of Contents

## Page

1.	Historical Review	1
2.	Introduction	28
3.	Methodology	30
4.	Case Material	36
5.	Environment	37
6.	Procedure	39
7.	Results	40
8.	Tests of Significance	51
9.	Conclusions	53
10.	Discussion	54
11.	Contemporary Work	58
12.	Bibliography	72
13.	Acknowledgements	76
14.	Classification	76
15.	Appendices A - M - separate list of contents	77 & 78
16.	Summary	attached separately

## Historical Review

W.C. Menninger Neuropsychiatric Consultant to the Surgeon General of the U S Army in World War II stated in 1942 "In combat psychiatry we deal mostly with normals in the abnormal situation; while in civilian psychiatry it is the reverse". (59)

While today the second conclusion may be disputable because of the broadening of the boundaries of the concept of norm in the intervening three decades, provoked by advances in drug therapy, insight and psychotherapeutic techniques, desensitisation and deconditioning procedures and a better appreciation of the multifactorial recent life stress impact in evaluation of the neuroses, the former still remains an acceptable verdict in contemporary military psychiatry.

Possibly a more apt reflection of British psychiatric thinking is the aphorism coined by Tredgold (97) "Whereas in previous wars the soldier generally had to adapt himself to discipline, today (1942) it seems he has to discipline himself to adaptability".

Both these comments embody the change of attitude which took place in the late 1930s just prior to World War II on both sides of the Atlantic in the approach to the non-organic military casualty. It was as if in anticipation of the type of conflict to come, both psychiatrists and military planners came together for the first time to attempt to deal with the common aim, the prevention, treatment and rehabilitation of the psychological battle casualty, which was to be a large drain on military manpower during the war period.

Out of this preparedness emerged a bibliography, at first in the early days of the war, mainly anecdotal in quality, but later of gradually

improving statistical merit (8, 15, 17, 19, 44, 48, 56, 65, 66, 81, 85, 92, 94, 97, 106) to form the foundation of research into military stress responses over the ensuing thirty five years of organised belligerence in the various world theatres. Semantics were tidied up; terms such as shell shock and battle neurosis which were over inclusive and under descriptive were replaced by specific psychiatric diagnostic categories eg. hysteria, anxiety state, depressive reaction, schizophrenic psychosis, obsessional neurosis etc. and in the process of this refinement "vulnerable" traits were elicited which when fed back through to manpower recruitment/selection improved the quality of the fighting force at least in terms of psychological casualty figures (1, 2, 9, 10, 21, 24, 25, 29, 45, 56, 52, 60, 99, 103).

The picture of the serviceman emerged as epitomised in different ways by Menninger and Tredgold as that of a normal personality (or as nearly so as the limits of selection would permit from the available population) faced with adaptation situations, sometimes of a swiftly changing nature, which were unfamiliar, stressful and potentially fatal. Because of the greater power and flexibility of modern weaponry, battle situations changed quickly, tended to be unsteretyped and less could be done in training to meet standard threats than in any previous known history. The need for the individual to act independently or in small groups on his own initiative could no longer be covered by rigid adherence to the instruction manual.

The quest for individual variation within the bounds of norm which would be predictive of future performance under stress began during

World War II and has continued since in various subsequent war theatres. What would cause one bomber pilot to complete 25 missions efficiently and without excessive fear and on the 26th opt out prematurely with an acute anxiety reaction? Why would a pilot similarly selected and processed break down after only 3 missions?

Stafford Clark (90) in 1949 published an account of his experiences with aircrew personnel in Bomber Command in World War II at unit medical officer level. This was a study of the stress reactions of highly trained and by today's standards moderately well selected aircrew over an eight to ten week period encompassing a 30 sorties tour of bomber operations over enemy territory. The stress was defined as the expectation of physical injury or death to 64% of the personnel commencing a tour of operations. A three group differential was elicited based on the time scale of expression of neurotic symptoms in the tour of duty.

Group A were poorly motivated, immediately adverse responders developing mainly hysterical symptoms at the commencement of the tour or within the first few sorties, whose prognosis was assumed to be poor and who were discarded from further aircrew duties at that point.

Group B were judged to be mostly mildly obsessional personalities manifesting fear reactions after eight or nine sorties and responding favourably after psychotherapeutic help to tour completion.

Group C were largely anxiety states coupled with emotional exhaustion occurring towards the end of tour of operations who were found to be best handled by premature completion of tour, but with this type of handling were able to return following an adequate interval.

An additional Group D was propounded to encompass gross stress, highly fearful reactions in response to severely traumatic minimal survival expectation experiences; tour interruption was usually advisable to allow return to employment as aircrew later in the war.

Stafford Clark's account appears historically to be the first reference in the military literature to a group stress separation on a time-scale with personality related implications. In criticism it could be said that the time duration of 10 weeks stress was excessively short and the number of patients (49 out of 4000 aircrew at risk) was excessively small; the prognostic decision to discard the Group A 'immediate' responders without further conditioning was a measure of wartime expediency. The author was impressively certain of his carefully described personality related diagnostic categories but did not pursue this concept to refinement on a grander scale.

The FPRC Memo No 412 g (Symonds and Williams) (106) provides a rough measure of the total wartime aircrew psychiatric incidence in the RAF over a large series of 1197 cases. Without justification but for purely speculative purpose taking anxiety with depression in this series as being equivalent to Stafford Clark's Group B, equating Group A with loss of confidence plus hysteria, and Group C with fatigue, gives figures of:

A	20.4%
B	74.9%
C	4.9%

which may have a meaningful relationship to the present study to be drawn later, Group B perhaps being the equivalent of Stafford Clark's middle obsessional group and of the obsessional somatic group of the

time-matrix scene.

Examining the significance of the nature of battle stress Apel and Beebe (1946) (7) noted that the onset of intensive combat considerably escalated the neuropsychiatric case incidence in World War I by 150% and in World War II by 300%. To some extent the differences between the two figures could be accounted for by the medical and psychiatric progress between the wars in better diagnostic and treatment facilities for the psychiatric patient with less emphasis on the purely organic approach in the second war. Morale of the American forces was also contributory, high volunteer level in the first war was replaced by a conscripted force with a more passive spirit in the second. But the battle situation itself appeared to be the most important factor in terms of quality, intensity, casualty rates, duration of bombardment, presence of a tangible enemy, opportunity for retaliation etc. World War I was a rigidly structured, direct confrontation with a stereotyped battle pattern; divisions were predictably rotated in and out of line and there was a continual identification with threat of the enemy. World War II was a fluid war with swiftly changing boundaries and unpredictable discovery of the enemy in direct combat. There were long periods of inactivity for large forces in difficult terrain and adverse climates but not continuously threatened by immediate hostility.

Intermittent combat with irregular threat presentation appeared to be the common factor in producing psychiatric case-rates. No comment was made in this study about a possible time relationship between combat and symptoms in individual cases. An important comment was made however that the highest psychiatric incidences of the American forces arose in

the South West Pacific area where personnel were living in circumscribed island environments and where duration of service irrespective of combat experience appeared to be the telling factor in breakdown ie. the longer the more likely, although no actual crucial time factor was quoted or sought.

A number of authors particularly using material from the North European campaign of World War II differentiated in-combat and post-combat neurosis as distinct entities. Swank (93) identified two groups of cases distinguished by a time scale of onset.

Group I were acutely overactive anxiety states occurring at the height of intensive battle.

Group II were apathetic, lethargic, exhausted states occurring under more prolonged less intense stress.

He found the crucial casualty rate productive of maximum psychiatric case incidence was 75% of the original fighting force, ie. the maximum psychiatric case incidence occurred in the remaining surviving personnel when a unit had been reduced to 25% of its strength in battle. The time scale distinguishing over-active and retarded states was this casualty rate in less than 20 days, or in more than 40 days.

Although Swank was somewhat overharnessed by pre-existing prejudice with a concept that all cases who broke down must have been premorbidly predisposed, he did grant that the consensus of opinion must be that the rate of psychiatric breakdown in combat troops under severe battle conditions was related almost entirely to the potency of the stress and little contribution was made by premorbid personality, although this became a factor as the potency of the danger lessened. Over the whole

campaign, taking high stress and low stress breakdown patients amounting to 2,200 men, the difference between predisposed and non-predisposed individuals was 30 and 36 days mean combat experience respectively, a non statistically significant difference. No age/rank evaluation was made but he observed that NCOs and Officers had a longer combat tolerance, average breakdown time 52 days, and came back to his concepts of pre-existing cushioning factors pre-stress.

This author went on to agree with Symonds' (94) findings of prior vulnerability in long term stress; flying personnel predisposed to neurotic breakdown withstood combat stress less well than others with no such history of predisposition. But he qualified immediately that the reason for early breakdown in unstable men cannot be traced to instability alone, since so many, by today's definition, "neurotic responders" remained in combat for very long periods without signalling psychiatric distress: furthermore a significant number of apparently stable men broke down inexplicably almost synchronous with presentation to the combat situation.

Unanimity among these workers was seen in their views on the quantity of stress at which average "normal" troops might be expected to show psychiatric breakdown, - in terms of comrade depletion in their units of the order of 64% (Stafford Clark) (90) 75% (Swank) (93), 65% (Apel and Beebe) (6); over periods of ten to twelve weeks, less than 20 days (Group I) and more than 40 days (Group II), and 90 days respectively in these three series. Emphasis remained essentially at this stage on the quality/quantity assessment of the stress rather than on a more critical look at the control of the time segment which varied from

20 days to three months in the above quotations, and surely implied great differences and fluctuations in the troops life style in these different situations.

The consensus of opinion in published work at the 1941/3 stage of the war was in favour of a pre-existing stigma in those who broke down under war stress. Epitomised by Sargent and Slater (85) "men of reasonably sound personality may break down if the strain is severe enough, but in-battle breakdowns include an excessive proportion of those who have suffered from pre-existing nervous troubles and the constitutional factor cannot be denied", and underlined by McClay and Whitby (56) who found evidence of pre-existing abnormality either neuroticism or personality disorder in 37 out of a 100 persistent civilian wartime neuroses. On the other hand Sheps and Coburn (1945) (87) in a controlled study of 58 non-psychiatric battle veterans wounded in action matched with 58 men selected as the best in their platoon, later expanded to 100 of each, found evidence in 27% of the non-wounded non-psychiatric controls of post battle nervousness going on in some cases for years in men who were neither adjudged to be psychiatrically ill nor to have a pre-existing psychological abnormality. Were these men subsequently to be labelled neurotic from that point in time?

Sheps and Coburn commented that much had been written about wartime induced neurotic responses, which have been termed, depending upon the euphemism of the time, shellshock, war neurosis or combat fatigue and suggested that refinement of these loosely clustered concepts into clear

cut psychiatric diagnostic compartments should be undertaken to allow cross comparison with civilian psychiatry.

In this context Ripley and Wolff (79) concerned with the fate of 341 schizophrenic patients arising during World War II in the South Pacific, followed up 156 by personal interview and the remainder by postal questionnaire and records, over an area of six and a half years. The conclusion reached, albeit in the pre drug era, was that acute battle psychosis differed in no way from schizophrenia occurring in other settings in civil life. The incidence of schizophrenia in their group was 13.6%, considerably higher than the normal civil population incidence globally, suggesting a specific military stress enhancement; the prognosis was overall no different from the general schizophrenic norm. Anderson and Lauterbach (4) on the other hand found no difference in schizophrenia between service and civilian populace incidences.

Rosenburg and Guttman (1940) (81) examined the effect of outbreak of war on an already in-treatment group of 96 chronic neurotics attending the Maudsley Hospital as outpatients. 56 were substantially unaffected: 25 were adversely affected: taking anxiety changes as a single parameter, as many were improved by the new national crisis as were upset thereby, leaving the overall anxiety constitution of the group unchanged.

Further light on the stress kaleidoscope of scene and situation was thrown by Neustatter (1946) (63) who compared the group reactions of 750 psychoneurotic patients in an Army hospital during a ten week time scale of "doodle bug" (syn: "VI") bombing. Small separate groups of apprehensive and oblivious patients were identified at the response extremes during bombing but the mean group, the group norm, consisted of only mildly apprehensive patients. Defining his selection criteria quite

well he found little difference in the incidence of pre-existing neurotic traits between the three groups, but was impressed by the constancy of the meticulous obsessional personality in all three. The conclusion was one of surprise at the minimal fear reaction of a group of personnel who had been selected out by their units as psychiatric casualties ostensibly on the basis of at least temporary service incompatibility and now 92.8% of whom appeared in a different intermittent stress situation to be able to handle themselves adequately.

Consistently Rudolf (1961) (84) found a gradual improvement in 16 of 35 neurotic soldiers treated in an RN hospital, in terms of their primary symptoms during a six month period of intensive damaging air-raids; particularly impressive was the reduction in fear in those for whom this was the primary admission symptom.

If the patients in these two groups had been correctly labelled neurotic ie. predisposed vulnerability to less life stress, their capacity to condition to a passive type of threat over periods of 10 weeks and six months respectively was surprisingly adept. Alternatively perhaps merely a longer period of acclimatisation and exposure in the preadmission battle zone would have had a similar effect in fear defervescence.

More than hypothesis, acclimatisation and early re-exposure after failure in the battle zone were the theme of many American papers later in World War II and post war. Raines and Kolb (1943) (75, 76) in an authoritative paper on the identification and treatment of the war neuroses, attempted to crystallise contemporary thinking of the time for the guidance of medical officers in the field and stated "the

psychological mechanisms associated with 'traumatic neurosis' are so fundamental as to be present in all men and are of concern only in determining the extent of the neurotic response not the content; the precipitating force lies in the personality's environment hence to some extent is controllable". Four arbitrary diagnostic criteria were laid down:

1. Stable personality
2. Credibly intense combat experience
3. Objective evidence of anxiety
4. Recoverability in sanctuary

These authors came out clearly in favour of a largely environmental cause for psychiatric illness in war and had obviously expanded the bounds of their concept of norm; for the first time a contribution from pre and post stress neuroticism was not a crucial factor in their thinking but they were still largely focussed on combat as the target stress factor. The other notable feature was their high expectation of the patient's return to duty which was at least an advance from the gloomier prognoses in previous work. That this was not purely an academic wind of change was shown by a U.S. War Department Circular letter (100) published about the same time describing the policy of forward rehabilitation of neuropsychiatric casualties ie. near the battle zone, instead of the previous universal practice of evacuation to base, quoting figures of 80% successful return to combat duty compared with the previous 5 - 10% expectation from rear areas. A further suggestion that anxiety cases and hysterical states had better short term prognosis than more complex conditions was accompanied by an invitation to conform to accepted civilian psychiatric nomenclature to permit more discriminative

sorting of better prognosis patients. Time had run out for the cliches shell shock, war neurosis, combat neurosis.

One year later Sharp's experiences (86) in the Ardennes following up 395 salvaged mild neuropsychiatric cases, arising in precombat training and returned to duty, emphasised the value of "sticking it out" mechanisms as well as the traditional preoccupation with avoidance mechanisms. Of these patients 87% had remained on duty through the battle phase without recurrence, demonstrating the practicality of containing psychiatric wastage at source.

At about the same time, Geller (23) reported the study of 400 psychiatric patients evacuated to a large Army psychiatric hospital in the United States through various intervening formations. The distribution was 54.2% officers and 45.8% enlisted men (British syn: other ranks). The implication was that these patients had been filtered back as being hard core serious cases and the separation rate ie. discharge to civil life, was 91%, tending to justify this view. In parenthesis the author mentioned that 42% of the cases emerged on evaluation as stable normals and although these patients had in the main recovered following treatment he did not feel certain enough of their stability on re-exposure to stress to attempt reprogramming towards combat - a demonstration of the antiproduktive doctrinaire approach still prevalent at that time, for lack of adequate predictive criteria.

Geller postulated a three tier stress structure in military service: primary, - induction and training equating with exposure to discipline and separation from family; secondary, - presentation with overseas service equating with cultural change; tertiary, - combat exposure equating with personal danger. He found interestingly enough in his

series that the secondary stress of overseas service constituted 50% aetiologically of his cases, - hence perhaps his diffidence about further exposure thereto. He concluded that officers required greater stress prior to breakdown but were less ready to rehabilitate after failure.

Hirschberg (42) sifted rehabilitation figures over a number of series in both major wars in an assessment of in-zone therapy versus base hospital treatment, and found over all diagnosis, excluding psychoses, a mean of 48% return to combatant duty on in-zone handling against only 27% return to combatant duty from base hospital series - an impressive victory for the "in-zone" protagonists believing in the wide spread of individual norm and basic human capacity for flexibility following stress.

In British literature at that stage only in encircled or besieged communities were there comparable findings. Hubert (1941) (44) with the British expeditionary force in France found evidence that pure anxiety states and frank hysterical cases could usefully be treated near the Front Line or in more sheltered non-combatant tasks immediately adjacent. Cooper and Sinclair (1942) (15) studying the closed community management of 207 Australian military psychiatric cases over a period of four months during the siege of Tobruk, reported a 60% return to duty of referrals. Of these, 85% of pure anxiety states and 77% of hysteria with conversion symptoms were returned to combat duty with minimal treatment, showing great similarity with the later U S figures (27, 35, 51, 89). It appeared that the British preoccupation with premorbid personality and neuroticism in the war neuroses was perhaps obscuring the capacity of the neuropsychiatric patients to rehabilitate in the short term in

the geographical area of breakdown - except where circumstances preventing evacuation to base enforced treatment in the area of trauma.

This cautious attitude however had its own side benefits in terms of detailed personality evaluation at the base psychiatric hospital leading to well documented studies such as that of Curran and Mallinson (17). Predictably a heavy "constitutional predisposition" emerged, 60% in a series of 88 depressive patients in a Royal Naval psychiatric hospital; 30% of the patients had personal disaster experience, mining, torpedoing, bombing, bereavement and domestic problems but none were injured physically. Personality evaluation showed a high incidence of obsessional types, over 50%. The presenting symptom was depression and there was an age group correlation, 46.5% of the patients being in the 35-45 year age range, only 12.5% being under 25, mean age - 36 years. Compared with a parallel series of 63 hysterical cases there was virtually an age curve reversal, mean age - 29 years, 43% under 25.

Interestingly early return to duty attributes were delineated as, young age, average or above intelligence, resilient temperament, less than six months illness and reactive mild symptoms; whereas neutral indicators were adverse family history, domestic misfortune, special war stress, somatic preoccupation. The underlined factors were in accord with the U S concept of discarding preservice history, and looking for a hopeful prognosis on the evidence of recent credible excessive life stress, but yet still being cautiously regarded in this series as being of neutral but not irrelevant value.

A most important implication of this study was the obsessional personality quality in more than 50% of patients, with older average

age group, presentation with depressive symptoms 100% and physical symptom accompaniments 23%. The duration of symptoms was not documented, the time-scale of onset not clear and the mean duration of hospital treatment not given. However the germination of a connection emerged between older age group, obsessional personality, and affective illness with physical accompaniments, which may loosely relate to the obsessional/psychosomatic parameter to be described later in the body of the study.

Tredgold (97) related previous personality to diagnosis in 273 cases; 32.5% of his cases were normals, ie. previous good personality, in the evaluation of the aetiology of whom, he observed that symptoms of equal severity to the acute battle neuroses, occurred following severe personal emotional trauma quite unconnected with the battle situation; in many of these cases a multitude of contributory factors had come together in adverse juxtaposition. This comment reaches out towards the development of the life style evaluation process of two decades later; more specifically it constitutes a movement away from the preoccupation with battle as the universal stress marker and connects with the comments of Geller (23) (secondary stress) and Curran and Mallinson (17) (domestic misfortune).

Sim (88) studied 627 British Army NCO admitted to a neuropsychiatric base hospital in the Middle East and found a correlation with higher rank, older age group and an increased failure to rehabilitate to the overseas zone. Whereas only 18% of Corporals were invalided from the Theatre, the rate rose with age and rank to 30% of Warrant Officers. 45% of anxiety states returned to previous duties, 62% of hysterics and 52% of depressions, high rehabilitation rates compared with other British figures of the decade. Only two cases of obsessional neurosis were diagnosed.

Ludwig and Ranson (55) and Hanson and Ranson (33) followed up patients

returned to full duty after treatment in a forward psychiatric centre in the Italian Theatre by questionnaire to commanding officers, one to three months later. Highest rehabilitation rates were achieved in conversion hysteria and no psychiatric disease categories, 68% and 67% respectively: the next highest effective rates were in neurosis prior to enlistment 51% and anxiety state with psychosomatic features 50%. These groups consistently also had the lowest rates of readmission to hospital under further stress. The authors rationalise these findings on the premise that individuals who have been accustomed to handle anxiety eg. psychosomatic and mild neurotic premorbid personalities are less likely to decompensate under battle stress. Distinct from other surveys, the majority of the patients (57.5%) were in the 21 - 30 year age group, but rank was consistent 76.5% in the rank of private, 19.7% NCO and 3.8% officer cadre. No age-rank correlation with level of rehabilitation was made and no time-scale of service in Theatre was available, the only peripheral comment being that 75% had spent less than 90 days in combat; it was noted however, that in divisions who had spent more than one year in Theatre of operations personnel tended to be evacuated with anxiety states on the grounds that their reactions were becoming "stereotyped", irrespective of the psychiatrist attitude to rehabilitation.

In a similar vein, Sutherland (92) graded 100 other ranks admitted to EMS hospital in terms of rank, age, marital status, intellect, family history and previous history. These patients were at that stage of the war 88% regular soldiers, remnants of the BEF ex France. 23% were NCO, the majority of these in the rank of Sergeant average age of this segment

36 years. The mean age of the whole group was 29 years, the greatest bulge 38% in the under 25 age group, and the majority, 58% married. Predictably, 36% had a previous psychoneurotic history, an almost classical finding in British studies and 53% had a relevant family history. Only 20% were of previous good stable personality. A cross-over connection with Curran and Mallinson work was the finding of 33% overconscientious obsessional personalities despite the overall younger age group of the material, more in keeping with Curran and Mallinson hysterical comparison group. No information was available about a possible correlation between age, rank and diagnostic category. The invaliding rate was high 72%, only 9 patients being returned to full duty.

In this last study it would have been satisfying to have known that the one third obsessional states were also the older age groups and the higher NCO ranks, and that this was perhaps the reason for the high discard rate to civilian life. Otherwise the results must be assumed to go against the tide of rehabilitation of the younger age groups seen elsewhere. Teicher (95) quoted other workers and confirmed a finding of two types of susceptible casualties; firstly the emotionally and intellectually immature under 18 years of age and secondly the fully matured independent older man over 38 years of age, neither of whom he felt were sound material for rehabilitation to duty. Henderson and Moore (35) in a study of 200 neuropsychiatric cases in a U S forces hospital in the South Pacific found 70% of cases to be in the 17 - 25 years age group. Looking at the timing of the breakdown against the time of individual arrival in the overseas zone, they found 35% in the first three weeks, a further 35% in the tenth to twelfth weeks and a

diminishing percentage after the twentieth week, suggesting an acclimatisation phenomenon following initial stress of presentation with the overseas environment. (Gellers second tier stress). Ripley and Wolf (79) in their evaluation of service schizophrenia noted that the large proportion broke down only after having been overseas for sometime and advised an arbitrary eighteen month duration of tour objective as a means of prophylaxis. Anderson and Lauterbach (4) evaluating 248 consecutive psychiatric admissions to the Walter Reed Hospital compared the parameters of age, rank and length of service with the parent service population. Their bald conclusion was that because of excessive numbers beyond expectation in the grade of Private, in hospital, this group were of less than average success as soldiers prehospitalisation. However, closer examination of their other statistics shows that the expected rate of breakdown was exceeded also in age groups 17 to 18 years, 33 - 36 years and over 41 years. Taking duration of service, the expected breakdown rate was exceeded in the first year, the 5 and 6 years, 11th and 12th, 15th to 16th and after the 17th year, suggesting a series of clustered stresses with intermediate acclimatisation in the referral troughs, common to all the ranks on a long service engagement.

Zeligs (105) described his experiences in a ten month period on a Pacific island with a mixed group of U S Marines and Navy Sappers separated below and above the age range of 30 years. Personnel were subjected to very high continuous noise levels, with intermittent enemy bombing as a sporadic threat. A chart of hospitalised psychiatric patients showed steps at the first, fourth, sixth and eighth months of island tour. The older supporting crews average age 35 years, showed a rise in psychosomatic symptoms in the fourth to sixth months of tour, whereas the younger marines

who had peaked earlier showed a reducing incidence. He quoted Hadfield's (31) experience that left in a danger zone most individuals acclimatized; for those who did not, removal to a place of safety short of base was advocated for best rehabilitation.

Out of these better documented reports emerged less preoccupation with the fact of battle stress and greater effort was to be devoted henceforth to the epidemiology of the psychiatric casualty. Premorbid personality rather than neurotic predisposition began to gain attention as a predictor of response. Criteria of prognostic value related to age, seniority, length of service and type of symptoms seemed to be worthy of further study. In the Pacific War, the island hopping conquest towards Japan, provided specially favourable situations for the study of closed community overseas stress responses. As yet in the literature no interest stirred on the question of a significance in the various time-scale observations in the papers quoted above.

Klein (51) in the battle of Iwo Jima found the now expected over 50% return to combat duties in a short turn around period of two to three weeks in previously good personalities following neuropsychiatric sickness, despite a "bloody massacre" type of casualty rate generally. Solomon (89) following neuropsychiatric casualties with the U S Marines through the whole of the Okinawa campaign undertook a partially controlled study, with some retrospective facets, and found minor differences, which he claimed were significant, between casualties and controls. Overall the controls were slightly older, more intelligent (assessed on school grading ) and a higher proportion were married. The mean length of total service for the cases was shorter than for the controls but the author rationalised that the cases had been overseas marginally longer and had seen

more concentrated battle experience, first engagement for 78% of controls and 56% of cases. These findings this author read as meaningful that the cases were younger, less stable and more stressed than the controls. Equally acceptable and simpler would be the explanation that they had been overseas in unfamiliar terrain longer viz previous authors.

Tureen and Linn (98) applying the inductive test (Cornell Selectee Index) to experienced troops in Pacific service found very high levels of latent anxiety in infantrymen who had spent 32 months overseas irrespective of their combat history, compared with similar troops who had spent only 12 months overseas. A particular observation was the high incidence of hypochondriacal somatic complaints. No particulars of age or personality correlation were available.

Ripley and Wolff (78) made an evaluation of the adaptation of 1800 patients in the isolated situation of a combat zone in New Guinea and the Phillipines. Only half the group had met enemy action; precipitating factors were ranked in order of reducing importance as combat exposure, marital difficulties, homesickness, prolonged period of overseas service. Those with stable pre-service adjustment in civil life were most likely to develop a reactive depression or anxiety state when they did decompensate, rather than a psychotic episode. This study which was thorough, revealed a very high incidence of life style disturbance in the background of these cases, for instance loss of a parent, divorced or separated, financial problems, family quarrels. The majority had a multiplicity of these factors; 215 cases of anxiety state showed 606/per thousand background life disturbances, and 265 cases of hysteria showed 646/per thousand disturbances.

As in previous studies depression was the prerogative of the over

25 age group, while other diagnoses, hysteria, anxiety state, psychopathy, schizophrenia were the lot of the under 30 age group with a 25-30 year intermediate area of overlap. Rank predominance was at the Private level but in this study there was a relatively high predominance of officers in the reactive depression and anxiety groups. In addition those from urban and city backgrounds were more likely to develop anxiety and reactive depressive disturbances than those from rural backgrounds who were more likely to develop psychoses.

Unfortunately once again in this well documented study there was no reference to a time-scale of onset either in total service or service in Theatre and no such ingredient was mooted, the tenour of the content being essentially dynamically oriented; despite the very obvious finding of pre-existing life style disturbance in many cases, no suggestion was made that this rather than the fact of battle experience might have been a crucial phenomenon in predetermining individual breakdown, bearing in mind that while battle experience was common to all, crucial life style difficulties were the experience of only some of the total troops at risk.

On conclusion of the Second World War there was a lull in both the availability of material and the drive towards minimisation of psychiatric wastage which had been of the order of 5 - 30% of various casualty series.

The forward psychiatric counselling programme of Glass et al (24, 25, 26) and Sharp (86) successful in converting the long stay base-hospital programme into a short term return to duty programme with the concentration of social welfare effort in zone of operation, was followed up in peacetime with albeit diminishing enthusiasm, but was reflected in a steady reduction of psychiatric separation (British syn: invaliding) in the years 1947-1960, apart from the peak of the Korean war 1951-53.

It was not until 1958 after the Korean war that the British Army issued in AMD Bulletin No 7 (3) a mirror instruction to that of the US WDCL 176 of 1943 (100) describing the early recognition and front line minimising of psychiatric battle casualties, recommending treatment and return to duty by the regimental medical officer within his own expertise.

In the Korean war, Robbins (80) reports an investigation of the emotional attitude to the war on their duties, using the Thematic Apperception Test, of 191 U S soldiers who were not psychiatric patients. The test was backed up by a physical examination and a psychosomatic search. The subjects were selected at random and were graded as having completed the 1st, 2nd, 3rd or 4th quartiles of their tour. The author found no differences between the quartile hostility responses and concluded these soldiers were unaffected by their tour of duty. Closer study of the findings shows a reduction of the hostility quotient in the 2nd quartile, with resurgence of hostility in the 4th quartile just prior to termination of tour of duty, suggestive of a time-scale of attitude response, ignored by the author. A possible reasonable explanation could be acclimatisation in the second quartile followed by pre-departure loosening of identification in the final quartile.

Two other papers are worthy of mention: Curran and Garmany (16) dealing with RN personnel showed that reduction of tempo following high level stress was as important in generating anxiety as the stress itself; Miller (61) also described delayed action anxiety symptoms in U S Army Air Force personnel, emerging about five months after completion of a hazardous series of 70 airborne missions in otherwise perfectly acceptable manner. He discussed the psychoanalytic concepts in vogue at the time but

observed that an obsessive compulsive element in the personality appeared to be operant in inducing these reactions which he hinted might be due to a phenomenon of too sudden reduction of alertness.

In this connection the "old Sergeant Syndrome" described in Southern European campaigns by Ludwig (54) shows some similarities; not confined exclusively to Sergeants but mainly occurring in NCOs who were distinguished as "old" only in the sense of having been in front line attrition for periods of greater than six months up to fourteen months. Important features were their basic sense of responsibility, very strong guilt feelings in their failure and a good rehabilitation to front line duties in reformed groups after a period of rest (94%). This author observed that those who worked in combat zones with psychiatric casualties were progressively less impressed with the importance of "predisposition", having frequently seen patients who had withstood eight to ten months of combat in spite of a history of severe pre-military neuroticism.

Comments such as these, of a clinical impression type in the field, led other workers such as Glass to re-examine most critically the pre-conceived doctrines of military psychological selection. Glass et al (26) examined the possibility that one or a cluster of the various components of the pre-enlistment military mental examination might be more accurate indicators of future unsatisfactory service than the test battery plus interview in toto.

The point was clearly made that this was a retrospective and subjective survey, among members of the service whose military performance to date was accurately known, whose induction psychiatric prediction was available and whose recapitulation of the historical and other questions being repeated at this time later in their service was essentially coloured by the intervening time lapse and service attitude.

Twelve parameters of family history were evaluated statistically; only two were found to be significant at  $X^2$  level of 0.5, namely, psychological abnormality in siblings, and severe economic difficulties existing for two or more years preservice. The classical components of parental deprivation, or parental mental abnormality etc. bore no relationship statistically to future military performance. Sibling position was also not significant but faulty adjustment within the family especially excessive dependence on parents had a small but significant effect on future efficiency.

Individual variables which were also significant in predicting military performance were a well integrated personality and a neurotic personality (ie. a tendency to psychosomatic reactions, immaturity or neurotic traits without history of incapacity) which did uniformly well, whereas psychopathic traits did less well (better in wartime than peacetime) and overt neurosis or psychosis did badly. Intelligence only became significant as an indicator of poor performance in the lowest borderline educable range. Prior school performance and impaired work record in terms of failure to accept authority or be consistent, was another indicator of poor future military history; a history of antisocial behaviour in general was also a predictive feature of bad future performance.

The features with the greatest predictive significance ( $X^2 = 0.001$ ) were abnormal personality, low intelligence, and poor social or family integration pre-service. The most important observation of all was the diminishing accuracy of these predictors of bad performance, with more than six months completed service behind the individual. In other words,

given a field trial continuing in a military environment increasing numbers of predictably poor performers gave satisfactory service, suggesting a better outcome in persistent conditioning, as opposed to impartial rejection.

The quality of this paper was sound, the concepts statistically tested, the approach original and enquiring. It formed the basis for a line of thinking opened up more thoroughly in the next decade by Arthur, Rahe, Rubin, Gunderson and Doll (20, 30, 43, 67, 68, 69, 70, 71, 72, 73, 74, 82, 83) on the prediction of future performance by assessment of recent life-style disturbance, giving for the first time a rational aetiology for apparently random failure under common stress in troops of equal merit.

Of other similar studies around this time, Levy (53) in a controlled study found low intellect a feature significantly loading psychiatric breakdown compared to normal controls. Davidoff (18) found a multifactorial series of life-style changes on enlistment (Gellers: primary induction disturbance (23) ) to be significant for only 5 - 10% of recruits who subsequently became psychiatric patients, the remainder being apparently unaffected by those self same changes, suggestive of other sources of stress already present preservice (perhaps analogous to the "predisposition" of British psychiatry) albeit none being found in this investigation.

Hamburg et al (32) in an attempt to sift effective selection and ab initio psychiatric screening techniques were impressed by the number of men who broke down later in military service. The groups were differentiated into those with less than 30 days and those with more than one years military service and individuals were randomly selected from

these groups. Significant differences ( $P < 0.01$ ) were found in mean age 20 years and 27 years, length of service 16 days and 6½ years, and recent similar illness 69% and 15% respectively, between immediate and late onset responders. The common factors in each group were the similar diagnostic spread and the equal historic incidence of death, divorce, or illness in a parent. Because of their orientation to induction/selection screening the authors focussed on their immediate breakdown group with its 88% separation to civil life, compared to 51% for the late onset group, and became involved in the prospective early breakdown cases, in keeping with the fashion of the era.

Two aspects which might have rewarded examination were ignored; firstly the widely disparate separation rates of the two groups despite similar diagnostic spread, suggested either the diagnostic criteria or the separation policies were inconsistent, most probably the latter; secondly the wide mean age differences correlating closely with wide length of service mean differences, between the two groups, implied that the next few years of service must be relatively breakdown-free, up to the six year mean. The authors certainly clearly described the cutting point for the late onset group at plus one years service. Therefore, did scrupulous return of inductee breakdowns to civil life ensure a more or less trouble-free six year future for the remainder?

Here again was evidence of a time-scale type of differential in stress manifestation with some similarities to the comments of both Geller (23) (three tier military stress phenomenon) and Henderson and Moore (35) (Clumps and lulls in a short time-scale experience with diminution as time progressed) but the material was left undeveloped by the authors.

This then was the state of military psychiatric thinking at the commencement of the decade during which the present thesis subject was undertaken. In Britain, a conservative commonsense view of the military psychiatric patient was still the doctrine of choice: having broken down he had shown himself to have a vulnerability, predisposition, personality weakness, or what have you, despite often the evidence of many years prior trouble free service in various types of environment, and worse, by the fact of breakdown, more or less selecting himself out of the running for future return to efficient soldiering. In the United States, despite harnessing to the analytic and behaviourist concepts of their civilian psychiatric training, a movement towards examination of multifactorial life style causes as the basis of the aetiology of temporary vulnerability was beginning.

In the USSR as far as can be ascertained at that time, the concept of the experimental neurosis of Pavlovian thinking had not only been fully accepted but had been extended aggressively for use as a preconditioning weapon in idealistic indoctrination of prisoners of war and captive civil populations.

Nowhere in the literature available was there evidence of interest in a time-scale in Military Stress Response, as a means of diagnostic, therapeutic or rehabilitative calibration. The possibility of a time-factor being the basic matrix against which the variables of age, rank, personality development, life style disturbance and subsequent illness experience would be measured, was yet to be considered and propositioned as a hypothesis.

And yet in the pre-Vietnam references, in the attached bibliography,

while only 9 papers (15, 17, 33, 35, 55, 71, 77, 88, 89) contained an Age/Rank relationship with Military Stress, 9 drew a Personality correlation (15, 17, 23, 33, 55, 92, 95, 97, 105) with stress manifestation, and 6 reached out towards a Life Style Disturbance issue (17, 26, 32, 35, 78, 97) as the primary aetiology, in no less than 14 (4, 7, 16, 32, 35, 54, 61, 79, 80, 89, 90, 93, 98, 105) there were not difficult to find, but uncharted, Time-Scale observations relevant to stress aetiology, which had been glossed over by the authors concerned, occurring in many shades and facets in widely varying geographical groups but with a common consistent message. It has been left to the present author to draw the threads into a conclusive knot.

### Introduction

In Aden in 1963, the author was tasked with establishing self contained psychiatric facilities for military personnel, their dependants and entitled civilian support organisations living in and around Aden base at the tip of the South Arabian peninsula (U.A.R. syn. "occupied South Yemen").

The British service catchment population at that time was 25,000 but was forecast to rise to 45,000 over five years as the base accepted the role of reinforcement cell for protection of the oil concessions in the Persian Gulf. The terrain was volcanic, the climate tropical and the elevation sea level and as the environment had been traditionally considered a source of privation for British troops over the previous three centuries of occupation, it was intelligently anticipated that psychiatric incidence rates would rise disproportionately with the increase in population density.

During the first nine months of the author's tour of duty, empirical evaluations were made to elicit beneficial and adverse environmental guide lines. At first sight, the new psychiatric caserate incidence appeared to bear no relationship to seasonal variations as might otherwise have been expected of an expatriate climate - sensitive U.K. based force; the usual picture of fewer cases in the cooler months of January to March and peaks in the stormy hot months of August and September as occurs in other subtropical and tropical stations abroad, was replaced by an erratic ebb and flow of cases throughout the nine-months period (Fig 1). Overall the figures gradually rose over the period but not disproportionate to the overall increase in manning, and indeed at the height of the humid summer heat were somewhat less in incidence per thousand than in the early part of the year.

Informed lay and medical executive opinion advanced myriad reasons for this seeming paradox, and each was taken and examined in turn, without an adequate beneficial cause emerging. It was therefore decided to look behind the pure monthly incidences in an attempt to clarify the flattening of the expected seasonal fluctuation.

An evaluation by diagnosis showed no value but when a separation was made by services, the Army incidence showed the interesting feature of a hefty peak six weeks after changeover of a Regiment on normal turnover and the arrival of an additional Regiment in reinforcement at about the same time. The time of arrival aspect was then applied to all cases and a graph prepared of incidence of psychiatric illness against time of arrival in the area (Fig II).

An interesting picture emerged showing a primary "reactive" peak within the first three months of exposure to the environment and then

a number of subsidiary peaks tailing off markedly in the second year of experience. When the diagnostic evaluation was co-ordinated with this picture an even more interesting correlation emerged. (Fig III).

The diagnostic predominance in the first peak was anxiety hysteria, anxiety depressive, heat fatigue syndromes and mostly adverse environmental response conditions, which could be classified as maladaptive. The later peaks appeared to contain a high proportion of obsessional labels, phobic/anxiety syndromes, hypochondriacal and psychosomatic states; the loose term fatigue state also occurred in this group.

Taking the broadest possible view, it seemed to emerge that the normal environmental responses such as seasonal climatic change of incidence had been superceded by a more potent environmental survival response, which could loosely be divided into maladaptive immediate and delayed fatigue types. As these graph bulges were related to the time of arrival of the patients in the area, it was the random change of personnel in and out of Aden base to which the monthly incidence graph was responding and this could be taken as the key stress marker.

As this data was retrospective, showed a wide-range of diagnoses some of which were clinically descriptive but statistically untidy, and lacked information on other important co-ordinates, it was decided to set up a prospective study, to give more accurate weight to these observations.

### Methodology

The objective of the study was to be a critical examination of these members of a military community in a tropical area who responded adversely to the point of requiring specialist psychiatric advice during their tour of duty. The assumption was made that the moment of arrival

in the area was the main common factor of stress, although it was anticipated that the ordinary processes of life would throw up others in a multi-factorial way which for some personnel would be more provocative.

The essential nettle to grasp in this study was the fact the servicemen at risk were members of an all-regular force (National Service engagements by then being time expired): they had been individually screened for fitness to serve physically and psychologically in a tropical zone; their medical history record was free from previous psychiatric material and they constituted a previously stable by definition non-neurotic population group. It was important to exclude wives and children and civilian auxiliaries who had not been so screened, to maintain the purity of the sample. Having done so, the population for study fulfilled the definition of a specially selected stable group about to be subjected to above average stress.

The parameters for examination were identified as follows:

- 1) Rank
- 2) Age
- 3) Length of service
- 4) Length of service in theatre at referral
- 5) Whether previously experienced in theatre
- 6) Marital status
- 7) Accompanied by family (at time of referral)
- 8) Attitude to continuation in the theatre
- 9) Number of visits for treatment (Out Patients)
- 10) Period of non-effectiveness (In Patients)
- 11) Eventual disposal (ie. to a form of duty or to U.K.)
- 12) Diagnosis

The patients were taken as consecutive referrals to the psychiatric Out-Patient department of the Royal Air Force Hospital at Steamer Point. No hierarchical exclusion was undertaken. The patients were drawn from the Army, Royal Air Force and Royal Marine Commando stationed in and around Aden base. Personnel from up country hill stations and from other units in the Persian Gulf area were excluded as being unrepresentative of

the homogeneity of the postulated stress. The proportions of the various services were represented in the catchment in the ratio of 5;4;0.25 for Army, RAF and Royal Marines respectively.

With time-scale as a major parameter, a critical look at the methodology of time-evaluation was undertaken. Date of arrival in the Middle-East Command was concretely available from each patient's medical and service records. Date of first reporting sick for medical advice at unit level was usually well documented, but the accuracy of unit documentation varied among the three services, which influenced an accurate evaluation of the duration of symptoms prior to reporting sick. There were often disparities between the stated duration of symptoms on the referral notes from the unit medical officer, the patients estimate of duration of symptoms at first psychiatric interview and his statements on subsequent interviews, and after completion of treatment programmes. The date of referral by the unit medical officer requesting psychiatric opinion was always available and seemed on consideration of the pros and cons to be a more consistent parameter from which to measure illness as a marker, than for instance the date of first psychiatric interview which could add a time-lag of up to three weeks depending upon factors such as hospital waiting lists, degree of urgency expressed by the doctor, the patient or the executive, the degree of non-effectiveness occasioned by psychiatric symptoms and the distance of the unit from the centre. Unit doctors seemed to be constant in their referral habits both in timing and type of cases and as there were many of them, from many units, any possible factor of bias was minimised by selecting date of request of psychiatric advice as the parameter of choice.

The units and the medical officers concerned were not informed that

a study was in progress and their referral habits were not contaminated by advance knowledge.

Refining and simplifying the diagnostic categories which had shown a tendency to sprout in the retrospective study was not difficult when allied to the primary presenting psychiatric symptom. The diagnostic criteria were drawn in accordance with a clinically based description of symptom presentation and personality qualities. The advantage of this method was its simplicity. The various quantitative rating scales described in the literature were not used; it was not the intention to incorporate detailed comparisons at an individual patient level nor to become involved in treatment schedule evaluations. Initially one in five patients were submitted to an M.M.P.I. questionnaire, but it was accepted that if there was a disparity between psychometric and clinical pictures, the clinical assessment would be taken as overriding for the purpose of treatment. The diagnostic compartments were delineated as follows; apart from psychosomatic syndromes, they were originally selected to correspond with peaks beyond the cuff in one or more parameters of the M.M.P.I., the appropriate symbols for which are in parenthesis.

1. Hysteria or hysterical reaction (Hy, Pd.)

A superficial, always theatrically presented set of symptoms, without organic depth or the aura of clinical reality. Usually in a setting of gain, often with a peripheral picture of observer censure or rejection, the patient showing suggestibility, little attempt at concrete problem identification or problem solution and a desire to remain mysteriously aloof, elusive and bland in psychiatric evaluation, yet with a basic expressed "demand" requirement eg. always asking "what's happening then?" with an expectation of action, perhaps towards invaliding

home.

## 2. Anxiety Depressive Syndrome (A, D)

Patients without "hysterical material" who showed signs of either physiological or physical anxiety coupled with expressed anxiety feelings at a psychological level but excluding patients with organised or encapsulated phobic/compulsive symptoms, feelings and ideas of derealisation or depersonalisation who were incorporated in 3.

Patients also who showed signs of depression, sadness ideas of self deprecation or blame who were subject to overt bouts of weeping, but not patients whose "complaint of depression" equated with boredom or frustration on detailed enquiry.

All patients in this group were required to have disturbance in two or more of the "appetites" for sleep, food, sex, enjoyment and living. Most patients showed both anxiety plus depression in varying degrees and were treated as an entity.

## 3. Obsessional State (A, Pt)

Patients in this group presented with encapsulated or deflected anxiety, a composed countenance, with a tendency to minimise their symptoms, and showed forms of phobic/compulsive/ruminative anxiety in varying combinations. All patients were required to show consistent tidymindedness as a character trait, and the majority responded positively to the adjectives meticulous, perfectionist, fastidious in a self rating.

Some of these patients showed depressive symptoms on evaluation but were differentiated from the second group by the intense ruminative quality of their anxiety and by the personality assessment, neither of which were shakeable in interview.

#### 4. Psychosomatic Syndrome (A, Pt, Si)

This group although originally not conceded was incorporated in the full study because of the numbers of pure physical presentations with little overt anxiety in the beginning but without the unconcern, unreality of diffidence of the hysterical group. The majority of these cases were referred through other hospital departments for prior organic assessment, before psychiatric opinion, the time scale of which was therefore belated in relation to referral of pure affective disorders. In the group, came non-ulcer dyspepsia, non-prolapsed "P.I.D.", pseudo-parietic migraine, persistent low grade symptomatology in ophthalmic, facial and vestibular areas, and ill defined syncopal states. The chronic headache syndrome of civilian life was in this series always accompanied by overt anxiety and insight and was included in group 2 for these reasons.

Also in this group came alcoholism and psychosexual disorder where these were the major and presenting features of the case.

This was really an anxiety aetiology group with reduced insight and deflected anxiety outlet, where the delineation from hysteria was in levels of concern and reality appreciation of disability.

#### 5. Psychotic States (Sc, Ma)

This group consisted of schizophrenia, manic-depression, endogenous depressive cases and toxic hallucinosis.

#### 6. Diagnostic overlap

In a few cases diagnostic compartmentation was not straight forward. There were obsessional states with overlapping anxiety depressive reactions and obsessional states with psychosomatic syndromes in addition, leading to a small surplus of diagnosis over patients.

Case Material

371 consecutive male military psychiatric patients referred to the Psychiatric Out-Patient Department of the Royal Air Force Hospital in Aden, Middle East Command, between October 1963 and June 1965 formed the basis for the prospective study of a possible time-scale determinant in adverse stress reactions taking the date of arrival in Aden as the stress marker.

The Royal Air Force Medical Services were provided for all three services jointly in Middle East Command on the basis of global inter-service mutuality and all psychiatric cases were channelled through the RAF psychiatric department. The actual catchment of the department included cover for units as far afield as Swaziland in South Africa, Kenya in East Africa and Bahrein and the Trucial Onan states to the North and East of the Arabian peninsula. Only patients arising in and serving their time in Aden base itself including units on the edge of the desert at Sheik Othman, Bir Fukum and Little Aden across the bay, were included in the study for environmental homogeneity.

Wives and children and civilian auxiliaries were excluded from the sample. No other exclusions were anticipated and senior rank was not a reason for removal from the sample. However, in the latter part of the study, a Ministry of Defence policy decision based on the difficulty of keeping married accommodation apace with demand in this expanding peace-time station, modified the tour length to one year for new arrivals who elected to serve unaccompanied, and to keep the time-scale constant it was decided not to include patients in this category.

Therefore although the patients in the study commenced tour on different dates, the constant factor of expectation of a time-scale of

two years was preserved.

Selection had been undertaken at least twice prior to arrival in Aden. All personnel had been medically examined for initial enlistment into the Armed Forces. A further medical examination was undertaken during recruit training on airmen and a Pulheems grading awarded. A special screening examination for fitness to serve in a tropical climate had been undertaken within three months of posting date on all personnel, the opportunity taken to pursue treatment and correction of mild non-disabling conditions such as low grade skin or ear conditions prior to posting; and protective inoculations given as appropriate. Historical events between these examinations were on medical record and were weighed in assessing fitness for tropical posting, any evidence or history of psychiatric material being grounds for declared unfitness or for specialist opinion prior to sanctioning posting. In addition, certain age related periodic screening examinations would have been carried out at prescribed intervals on older NCO's and officers and aircrew.

It would therefore be fair comment to assume that the military population at the point of posting had been adequately sifted for pre-existing neurotic illness.

### Environment

The colony of Aden, its topography and geographical location, formed the elemental stress. For three centuries a coaling station at the conjunction of the Red Sea and Indian Ocean, it had been regarded as a punitive posting on the Indian Army circuit for those who incurred the displeasure of their commander and was usually a one year tenure of post. On the British withdrawal from East Africa as the various

Commonwealth states gained independence, Aden assumed strategic significance as the reinforcement base for the Persian Gulf protectorates and their important oil investment. The tour of duty by that time had become standardised at two years duration. From 1959 onwards there was a gradual buildup of personnel, units, logistics and auxiliary facilities which reached a crescendo of expansion in 1964. The U.K. based expatriate population increased fivefold and with this population came the compounded problems of overcrowding, health, and morale which considerable expenditure on the most modern amenities could not mitigate more than moderately.

The terrain was volcanic, the site at sea level oppressive, the relative humidity high (above 90% six months of the year) the ambient temperatures tropical (seasonal range 24°C to 51°C) and the relief ventilation by wind accompanied by the ubiquitous sand. Aden colony was built in three parts on the point of the Arabian peninsula around the base of the dominant volcanic rocks; Little Aden across the horseshoe bay was less intensely populated but similarly dominated by volcanic peaks; the two were linked by road ribbon around the bay through desert, scrub, two small oases and innumerable Arab shanty towns. The effect of the rocks was to radiate intense heat after sundown so that evening became the most oppressive part of the day in contradistinction to the usual pattern of tropical life.

Probably the least privations areas climatically were the senior officers married quarters and the RAF Hospital at Steamer Point on the promontory at the entrance to the bay, largely because of the generous colonial dimensions incorporated in their building. The Khormaksar beach area at the Eastern throat of the isthmus was less oppressed by the volcanic formation but was sited on the edge of the desert, although relieved somewhat by the prevalent eastern breeze. The married accom-

modation in the old town of Crater in the East and the high density high rise blocks of flats on the reclaimed land of Ma'alla creek at the West were the most trying circumstances environmentally.

The main leisure outlets were sunbathing, sailing, photography. Swimming, surfing and water skiing were restricted by the shark infested waters. More vigorous sports were curtailed by the high diurnal ambient temperatures and the hard baked nature of the ground. The opportunities for outdoor life were restricted by the climate but the artificial man-made enjoyments of theatres, cinemas, clubs etc., promoted by the availability of duty-free spirits also became restricted or at least inhibited by the terrorist phase in mid 1964. There was a short phase when the South Arabian government permitted the opening of night clubs although the versatility of the entertainment was strictly controlled but these became deserted when the curfew became operative. Latterly the South Arabian Broadcasting Service introduced local television which again had a largely (75%) Arab content incomprehensible to the British viewer.

### Procedure

From January, 371 soldiers, airmen and marines serving in Aden Base who were referred for psychiatric specialist care were the subjects of a study of various personal, life situation and diagnostic parameters.

The period of the study ran from October 1963 to June 1965, 21 months in all. Consecutive patients were taken unless excluded by failure to satisfy the geographical catchment criteria; patients serving in Aden Base who had been continuously away from base for more than three months of the tour were also excluded.

Neither the referring doctors nor the patients were aware that a

study was in progress. No special questionnaire was raised for the patient to complete, all parameters being elicited and checked during psychiatric interview: which was of the semi-structured type.

The parameters of rank, age, length of service to date, length of service in theatre, marital status, were later checked against the unit service records. The previous medical history was checked against the medical history envelope (F Med 4). The disciplinary record was checked against the individual conduct record.

The diagnostic criteria were as described under methodology and had broad equivalence to some parameters of the Minnesota Multiphasic Personality Inventory. There was equivalence with appropriate categories in the Nomenclature of Disease.

### Results

375 servicemen completed the study. Because of the system peculiar to the Royal Air Force medical branch whereby the specialty of Neuropsychiatry embraces both psychiatric and neurological cases, care had to be taken during the study to exclude pure neurological referrals. In the event, four patients originally presenting with presumed psychosomatic symptoms were shown on investigation and followup to have organic aetiology. When these were excluded the final figure was 371.

Breakdown of these 371 cases by services showed 198 Army, 164 RAF and 9 R.M. The incidence figures over the series by services were 13.7 per thousand, 13.9 per thousand and 12.3 per thousand respectively. The relevant case rate figures were 7.8, 7.9, and 7.0 per thousand per annum respectively. An examination of the twelve recorded parameters of each case and their correlations within the series was undertaken, measured

with the time of referral by their unit doctor as the marker.

### Rank

There was a broad spectrum of hierarchical rank representation in the cases of the two major services, the Army and the Royal Air Force, from Private to Lieutenant Colonel and from Aircraftman to Wing Commander. Because of the smaller number involved it is probably unwise to draw conclusions about the absence of officer referrals from the Royal Marines - although they themselves would be the first to seize such a competitive point.

The preponderance of cases in all three services was in the junior ranks 88.89% and again there was close similarity in the individual strength-related incidences. The majority of cases occurred below the rank of Sergeant in all services, ie. Corporal and below in the Army and RAF, (ordinary ranks only in the R.M.); the percentages were 91.44% Army, 84.21% RAF., 88.88% R.M. The same comparison applied at the officer grade, the breakdown rate of Major and below accounting for 81.81% of the Army figures and of Flight Lieutenants and below for 83.33% of the RAF figures.

These figures corresponded closely to the representative strengths of these groups in the hierarchical pyramid; taking the individual rank compartments alone the only unexpected finding was the higher than average incidence in RAF Sergeants and Flight Lieutenants, and in the Army in the rank of Captain, perhaps suggestive of special stress or responsibility pressures at these executive levels. When the officer grades of the services are equated and combined the peak at Captain/Flight Lieutenant level is enhanced at 52.1% of all officer referrals. On the other hand the apparent high incidence of Sergeant referrals 69.3% of senior N.C.O.'s can be explained if the rank is interpreted as the most

junior of the senior non-commissioned ranks, differentiating for all services between junior and senior N.C.O.'s at the Corporal/Sergeant division.

The complexity of RAF technician rank structure makes intergroup cross comparisons unfruitful especially in the junior grades. And there were certain anomalies related to the fact of overseas service which tended to eliminate the lowest ranks who should be serving only in the United Kingdom gaining their promotion on completion of training and then becoming eligible for world-wide service. The isolated referral in the A.C. grade is therefore not surprising as the basic rank in Aden was LAC/SAC depending on trade and quality.

#### Age (Table II)

The age range of patients was 18-53 years with a mean of 23.4 years. The majority of patients (65.29%) were in the range 18-25 years and the minority in the range 45+ years (3%) which correlates equably with the strengths of these groups in the community. There were also relationships with rank and length of service for those with a normal career structure and average prospects.

When the lowest age range was divided at 21 years there were slight inter service differences, the Army and Royal Marines showing curvilinear decrement in incidence with age, while the RAF showed a peak in the 21-25 age group. This was thought to be a function of the tradesman element in producing more personnel in the above 21 age group in the RAF at that time: this age bulge correlated with the higher numerical incidence of cases in the SAC rank as opposed to ranks immediately above and below eg. LAC and Junior Technician.

Overall the Army presented as a younger community both in the concentration of patients in the younger age groups and in the earlier age

at which higher rank was held. The raw figures in the 30-40 age groups were almost identical, which with a 5:4 personnel ratio, gave a higher RAF incidence per thousand in this age range. In the over 40 age group the RAF had over double the number of cases and three times the case incidence, reflecting to some extent the broad difference between the static and active roles of these two forces.

Taking the rank of Sergeants, the subject of previous comparisons, the average age of Army patients was 34.8 while that of the RAF was 38.4. Therefore, certain dissimilarities in the age and rank composition between the services emerged which may affect the homogeneity of further results.

#### Length of service (Table III)

The range of length of service was from 6 months to 33 years. The mean was 5 years 4 months. 46.6% of patients had less than 3 years service experience. The length of service correlated positively with age and rank but previous service abroad in tropical climates was not an absolute protective factor, 106 personnel having done so without breakdown previously (28.6%) but became patients in this series. Nor did shortness of service emerge as a particularly provocative factor in itself, the incidence per thousand in the youngest age group not being especially high.

#### Length of service in theatre at referral (Table IV)

Using this parameter, the highest referral rate occurred in the first three months of individual service in the theatre and peaked at the 10th week of service. While 38.8% of psychiatric responses appeared in the first three months of the tour of duty, taking subsequent three months period throughout the individual two year tour, there was a steady decremental reduction; 24.4% in the second three months, 18.9% in the third three

months, falling to 9.2% in the fourth quarter of experience. This was still more than in the whole of the second year which amounted to only 9.4%. Taking the focus finer down to individual months of tour, there were four particular months of increased individual tour susceptibility. The third month showed the highest case-rate, almost a 50% increase in referral rates over the months on either side. The ninth month also showed this feature. Subsidiary peaks of less dramatic height occurred at six and twelve months. In the second year there was no determinable pattern in the material available although at the eighteenth month of tour, there was a relative rise of small dimensions showing up against an otherwise flat backdrop. Had the point of tour commencement borne no relationship to the referral patterns, cases would have occurred randomly around the mean incidence of 15.4 cases per month over the two years individual stage of tour parameter. In the study there was a fourfold incidence of 64 cases in the third month of tour over this base rate; in the 1st, 2nd, 4th, 6th and 9th months rates at least twofold above the base-rate occurred and in the 5th and 7th months, rates one and a half times the base rate.

In all 82.1% of case material arose in the first year of the two year tour, and of that 20% occurred in the third month alone. Therefore of patients requiring psychiatric opinion, there was a 4 to one chance they would be concentrated in the first year of experience and a one in four chance they would manifest in the third month of that twelve.

Examining the contributory incidences in the component services there are as close similarities of pattern as in the gross incidences. The Royal Marine cases were included with the Army for this purpose, in view

of their very small number. The initial three month peaks were similar although the Army showed a slightly greater first month response rate. The moderate tail-down in 4th and 5th months was seen in both, followed by the short 6 month peak similarly followed by recession and then the 9th month peak and the lower 12th month peak. Thereafter the incidences were so low that individual component evaluation was unjustified.

If anything perhaps the Army pattern was more spiky than the RAF which was a slightly smoother graph, but it was equally demonstrable that the swings and patterns were not due to referrals from any one source or service at any one time.

#### Diagnostic categories

As the study progressed it proved difficult to maintain the purity of the diagnostic categories which had been delineated in advance and the confident prospective compartmentation into five diagnostic groups namely:-

- (1) Hysteria
- (2) Anxiety Depression Syndrome
- (3) Obsessional State
- (4) Psychosomatic Syndrome
- (5) Psychotic States

had to be amplified by the additional category of

- (6 ) Personality Disorder

to cater for the group of cases who showed admitted disturbance by the environment but rather than showing submissive, passive, or sublimated symptoms were actively pursuing a course of behaviour sometimes aggressive, often carefully calculatedly provocative, short of transgressing service regulations but generally creating uncertainty in their associates by loud huffing and puffing, threats and dark hints, with the object of removal

therefrom. It was a matter of individual psychiatric judgement whether such cases constituted any degree of material disability for duty; but as some responded above the cuff in the Pd scale of the M.M.P.I. and it was the expressed principle that conformity with the Nomenclature of Diseases should be preserved, the diagnosis of personality disorder was emphatically invoked for consistency.

There was a surplus of diagnosis over patients of the order of 26, all involving either a primary diagnosis of anxiety depression syndrome or obsessional state, with psychosomatic syndrome as an equally impressive second component clinically, making a total of 397 diagnoses; the synthesis was as follows:-

	<u>Diagnosis</u>	<u>Patients</u>	<u>% Diagnosis</u>	<u>Excess</u> <u>Diagnosis</u>
a. Hysteria	44	44	11.1%	-
b. A.D.S.	131	122	33.0%	9
c. Psychosomatic Syndrome	87	70	21.9%	17
d. Personality Disorder	39	39	9.8%	-
e. Psychotic	11	11	2.8%	-
	<hr/> 397 <hr/>	<hr/> 371 <hr/>	<hr/> 100 % <hr/>	<hr/> +26 <hr/>

Plotting diagnoses against time-scale, as diagnostic categories per month of tour, confirmed the impression in the pilot study that the hysterical and mixed anxiety depression states - the reactive group - predominated in the early months of tour duration.

The shorter the period from Day One of tour the higher the incidence of the Reactive Group, 62.5% of all diagnoses in the first three months, 42.4% in the second three months, levelling out at 31.4% and 31.6% at the third and fourth three month period and falling sharply to less than 10% over the second year. The intensity of concentration of this group

in the first six months of tour was impressive and appeared to vindicate the hypothesis of stress reaction to the environment, accounting for 54.3% of all diagnosis in the first six months, which was  $33\frac{1}{3}\%$  of all diagnoses for the series. After mid-tour this group had receded to 19.6% of diagnoses in the second year and 2.2% of diagnoses for the whole series.

The time scale of manifestation of both the obsessional states and the psychosomatic group were integrally similar and meritted clumping as the obsessional-somatic group, ascending to a combined peak at the sixth month of individual tour, but unlike the reactive group continuing to manifest persistently in the second year of tour. Whereas this obsessional somatic group accounted for only  $33\frac{1}{3}\%$  of diagnoses in the first six months of tour (Reactive Group 54.3%) and for that time only 20% of diagnoses in the series (Reactive Group 33.3%) nevertheless in the second year of tour the obsessional group reached a level of 67% of diagnostic categories (Reactive Group less than 10%) and 9.8% of diagnosis in the series (Reactive Group 2.2%).

Bearing in mind the interesting feature that over the series both of these diagnostic groupings accounted for equivalent proportions of the diagnostic numbers (Reactive Group 44%, Obsessional Somatic Group 43%) their broad separation on differing time-scales, the first group acutely in the early months, extinguishing in the second year, the second group rising very gradually in the first quartile but continuing to manifest right up to the end of tour, suggests that they represent two different stress fractions of the service population. Despite the main pattern of differential peaks there remained an area of overlap in the

second quartile of tour when both groups were occurring with considerable frequency, the one beginning to tail down, the other continuing to rise. The areas of crucial differentiation of these fractions were therefore the first three months and after the sixth month of tour.

As in all attempts at rigid human compartmentation the addition of the fifth category of Personality Disorder, to include malcontents and purposive disgruntlement, while satisfying the clinical criteria of a group on its own, provided a link in time-scale between the Reactive Groups on one hand and the Obsessional Somatic on the other. Amounting to 39 cases, approximately 10% of the total diagnostic series, its pattern of expression showed a less intense early reactive incidence and a less persistent continuum into the second year, a finding which might equate with a less spontaneous more purposive patient group, but overall at a low background level.

The sixth psychotic group was small, 11 cases, but does demonstrate the potent effect of stress on a psychiatrically screened closed military community to inducing "out of the blue" psychotic illness.

Summarising this important section, it seemed that the parameter of individual tour length separated immediate and delayed response clinical groups, that the periods of greatest discrimination were the first eighth and the last half of tour, using the time of identification of psychiatric illness as the marker, and that the second eighth of tour showed little discrimination between these groups. Furthermore, although the first eighth of tour produced more material than the whole of the last three quarters, (38.8% and 36.6% respectively) the diagnostic predominance in the first eighth was three to one on immediate reactive conditions. The

diagnostic predominance in the last half of tour was quite the reverse, eight to one on delayed response obsessional somatic conditions; even the second quarter of tour showed a five to three predominance in favour of obsessional somatic versus reactive conditions. In general clinical terms, it appeared that a patient who had not yet completed three months of tour would be a reactive state, reactive to the point of tour commencement, and a patient who had completed more than six months tour would present with obsessional ruminant, phobic compulsive or psychosomatic symptoms.

#### Correlation of Diagnosis with other Parameters

Correlation with the parameters of age, rank, length of service were positive for young age, junior rank and short service for the Reactive Group of conditions, and with older, more senior rank, and longer service for the obsessional somatic group. The separation points were 26 years of age, below Sergeant rank and 6 years service.

It was important to observe that the Reactive Group consisting mainly of young junior personnel and the obsessional group consisting of older more senior experienced personnel represented almost equal diagnostic proportions in the survey (although slightly fewer personnel in the latter group due to diagnostic excess) the principal separation being on the time-scale of presentation.

#### Non-effectiveness and Disposal rates (Table VII)

80 RAF cases (48.7%) and 103 Army patients (50%) were treated as hospital admissions. Only one patient was admitted twice during the survey. A total of 3,785 hospital bed days involved the 183 patients in an average bed occupation of 20.7 days which was not significantly

different for either major service.

14.0% of RAF cases and 7.2% of Army cases were returned to U.K.  
2 RAF and 2 Army patients were not considered fit to return to their original posted duties in the environment and returned to modified or lighter tasks. 3 RAF patients and one Army patient required modification of their medical fitness employment standards in the environment.

All others returned to the duties and environment in which they originally developed symptoms.

81% of RAF patients were followed up as Out-Patients in the area as were 87% of Army patients. Only 30% of RAF cases and 20% of Army cases required more than two followup supportive interviews during rehabilitation.

Correlation with other parameters

Analysis of the 38 patients removed from the environment on psychiatric grounds, by diagnosis, age, rank, length of service and duration of tour showed that 16 (42.1%) were under 26 years and 21 (55.3%) were of Corporal rank and below. The diagnostic synthesis was:-

	Col I		Col II	
Psychotic	11 cases	(28.9%)		
Obsessional Somatic	17 cases	(44.7%)	17	(63%)
Reactive Group	8 cases	(21.1%)	8	(30%)
Personality Disorder	2 cases	(5.3%)	2	(7%)
	38 cases	100%	27	100

Apart from the fact of small numbers for valid conclusions and eliminating the essential evacuations of psychotic cases, the Obsessional-somatic group actually constituted as much as 63% (Col II) of those whose tour of duty had to be aborted because of failure of psychiatric rehabili-

tation in situ. Reactive Groups (30%) and Personality Disorder (7%) were very much in the minority by comparison. Bearing in mind that the Reactive Group and the Obsessional Somatic Group were represented almost in equal proportions in the diagnostic survey, it would appear that the principal psychiatric fallout of this selected military group in a closed community stress situation, was borne by the older more senior personnel, who were otherwise in the minority in the military pyramid.

The mean tour length for evacuation was 6.5 months and the majority of personnel were in the Obsessional Somatic Group.

#### Marital Accompanied Status

Apart from the strong correlation with the older age group and senior rank, married accompanied status in the environment had a neutral influence on case presentation. What was more surprising was the lack of overall effect of married unaccompanied status on the rehabilitation of cases into the environment, despite the obvious precipitant effect of this parameter in the psychopathology of presenting individual cases and the amount of welfare activity generated by the marital separation situation in general.

#### Tests of Significance

Using the Bayesian null hypothesis, a high probability of connection between age, rank and length of service was established for the military pyramid (P 0.001).

#### Highly significant results at the P 0.01 level were:

1. The incidence (38.8%) of over one third of the case material of the study in the first octile of individual tour duration.
2. The incidence (20%) of one fifth of the total case material in

the 3rd month of time in environment.

3. The very high incidence (82%) of cases in the first year of tour.
4. The high incidence of Reactive Group diagnoses in the under 25 age group.
5. The high incidence of Reactive Group Diagnoses in junior ranks.

Of lesser significance at the P 0.02 level were:

1. The high incidence (62.5%) of case material in the first octile of tour which was diagnostically grouped as Reactive ie. hysteria or mixed anxiety depressive states.
2. The low incidence (19.6%) of case material grouped as Reactive diagnoses in the second half of tour.
3. The higher incidence of the Obsessional-Somatic diagnostic group in the over 30 age group.
4. The higher incidence of the Obsessional-Somatic diagnostic group in the senior ranks.

Significant at the P 0.05 level were:

1. The higher incidence (67%) of the Obsessional-Somatic Group in the second year of tour.
2. The higher incidence of cases in the rank of Sergeant relative to their absolute numbers in the catchment.
3. The combination of older age, more senior rank, and obsessional somatic diagnosis, in correlation with a higher level of invaliding from the theatre after post-treatment trial and failure.

Of neutral significance were:

1. Marital status
2. Previous experience of overseas service.

3. Senior Corporal or equivalent status, age 26 years, 6 years total service and second octile of tour.

### Conclusions

371 soldiers, airmen and marines serving in a stressful fixed tour tropical area who were referred for psychiatric opinion, were the subject of this study of parameters of personality, diagnosis and prognosis. The conclusions based on the time-scale of individual tour length were:

- 1) Early breakdown equated well with good resettlement following treatment in the same environment.
- 2) Late breakdown did not, and was best handled by removal to base.
- 3) Early stage of tour breakdown correlated with young age group, (below 26 years), junior rank, (Corporal and below), and short service, (less than 6 years).
- 4) Late stage of tour breakdown correlated with older age group, (26 years +), more senior rank, (Sergeant and above), and longer service, (6 years +).
- 5) Classification by diagnosis showed a preponderance of reactive states at the beginning of the tour of duty abroad, and a preponderance of obsessional-somatic conditions later in the fixed expectation of duty tour.
- 6) The changeover from reactive to obsessional-somatic predominance occurred during the second octile of tour duration, before and after which there were good odds on a case presenting as either the former or the latter respectively.
- 7) The reactive group correlated with sub-paras 1) and 3).
- 8) The obsessional-somatic group correlated with sub-paras 2) and 4).

- 9) Despite the internally integrated nature of these two groups, separated by age, rank, length of service, diagnosis, time-scale of expression, response to treatment and prognosis for resettlement in the adverse environment, the numbers of each group in the diagnostic evaluation were almost identical, reactive group - 44%, obsessional-somatic - 43%.
- 10) It was concluded that each group was showing a response to a common adverse experience, which was modified by personality/maturity factors in a spectrum of individual time-scale experience.
- 11) The older servicemen, being a smaller absolute number in the military catchment, showed a higher incidence per thousand of psychiatric disorder than his younger counter-part; the rank of Sergeant in all three services was a special example.
- 12) Using commencement of tour (time in environment) as a time marker, the converse was equally true that cases arising early or late in tour could be predicted to be either:
  - a. young age group - reactive state - good prognosis.
  - b. older age group - obsessional or somatic state - limited prognosis.

### Discussion

The statistical separation of these two groups (early and late breakdown) appear acceptably valid. The author concludes therefore that personnel who overreact in the first octile of adverse experience are most likely, if adequately treated and sensibly rehabilitated, to be the hard dependable corps of the fourth quartile of experience. Those whose responsibilities, inhibitions or previous experience are partially

protective, but who throw symptoms in the third and fourth quartiles, are the group of the greatest concern, whose powers of intra-environment recuperation are most limited and who are most likely to benefit from invaliding from the theatre of operation as a manpower saving measure. There is a motley group in the second octile of time-scale whose destiny may be best handled in either compartment but who tend to layer prognostically given time.

Material of a similar nature separating military stress response groups by age, rank, personality, length of service and diagnosis, occurs casually in a wide range of references (4, 7, 15, 16, 17, 23, 32, 33, 35, 54, 55, 61, 77, 79, 80, 88, 89, 90, 92, 93, 95, 98, 105).

An interesting difference in the present results is the higher relative incidence of cases in older personnel, which may merely be a feature of contrast between wartime and peacetime service pyramids. There is some precedent however in the literature eg. the "old Sergeant Syndrome" (54) the personnel of which did rehabilitate quite readily and reformed military groups. The Aden study showed nearly as many cases in the older group as in the younger group separated by consonant parameters of length of service, age, time in environment, total service experience etc; but the younger group represented a dominance of 10:1 against the older group in the Aden military pyramid. As married accompanied or unaccompanied status was not a discriminative parameter, it may be reasonably inferred, that the tropical environment itself was for the older man, as for his younger less experienced colleague, the major stress per se.

The unexpectedly limited ability of the older N.C.O. to rehabilitate in the environment was seen in the higher invaliding rate from the theatre

in this group. The disposal differences between the older and younger groups was only statistically significant at the P 0.05 level when diagnosis was also taken into consideration, due to the small numbers involved.

Taking the comparative military literature over the previous thirty years, the findings of Stafford Clark (90), Symonds (94), Curran and Mallinson (17) showed obsessional personality facets in older patients breaking down, some settling in situ with treatment and others (17) showing high invaliding rates. Henderson and Moore (35) and Zeligs (105) in closed island community studies found peaks and lulls in psychiatric sickness tailing down as time in the environment progressed. Some of the older patients peaking later than the young, did not settle well into the local environment. Anderson and Lauterbach (4) recording psychiatric illness against the broader parameter of years of total service found a stepwise decrement with certain years of higher intensity common to all ranks, diminishing with time.

On balance, comparing these studies with the present work, it seems fair to say that the older man who breaks down, is likely to show belated symptoms relative to time in environment, these are more likely to be obsessional (ruminative or phobic), depressive, or psychosomatic, and his capacity for reacceptance of stress locally is also going to be less than his younger colleague.

The paradox, as can be seen, is that the predestined executive selection procedure in fact favours the obsessional process personality. This quality is cultivated in training and selection to senior rank. It is therefore very important that the handling of this group should be thoroughly understood; stress breakdown when it occurs in this group

should involve early removal from the provocative area, despite protestation by the patient which is scrupulously constant. Equally important would seem to be the need for change from traditional disposal attitudes towards the younger serviceman of short service experience who breaks down early in tour; as confirmed in previous studies (24, 25, 42, 77, 86) return to duty following treatment and psychiatric assistance in the same environment, given time and encouragement by his employer, is of the order of 80-90%. A more indulgent attitude by the military employer is meritted.

A time-scale concept in case sorting is a useful yardstick for psychiatrists, social workers and unit medical officers faced with requests on prognosis for return to duty by relatives, commanding officers and other interested parties who usually manage to colour their queries with a strong flavour of lay prejudgement. It is reassuring on these occasions to be able to relate the outlook to a time-matrix against which age, rank, personality, diagnosis and prognosis, layer coherently as a basis for confident pronouncement.

It is the feeling of this study that due regard should be given to the time-scale element in monitoring the effectiveness of a given military force in conditions of privation. The author postulates a T.I.E. factor (time in environment) for generic use in these circumstances.

Provided the necessary parameters can be determined, eg. the timing of change of job, change of residence, change of marital status, etc., there is no reason why a similar concept could not be applied to civilian microcultural situations, either in individual life-style evaluation or in the prediction of close community responses.

The immediate main application of this paper is in the military scene,

where now that training of the modern mobile technologically competent service craftsman is costed in thousands of pounds, the fact of personnel wastage is crucial. An objective of this study is to pin-point the message that all of the time some of these personnel are going to be found wanting ie. temporarily psychologically inept, but that as time moves on, so do the individuals composing this fraction change. With sound selection process and sound psychiatric treatment programmes, while the temporary morbidity remains situation - constant, the eventual translation to personnel wastage can be minimal, provided the above time-scale concepts are allowed freedom to operate.

### Contemporary Work

The picture of the national differences in the approach to military stress phenomena, at the beginning of the decade in which the present study was undertaken has been described in the Historical preamble. To put the present work in its contemporary perspective, it has to be set against the published material being undertaken concurrently in other countries, principally in the U.K. and the U.S.A. in the attempted prediction and analysis of military stress responsiveness.

Such work can never be undertaken in an academic vacuum and has to be energised or modified by the views and needs of the military employer of the time. Since World War II some psychiatrists and psychologists have sought refuge behind the requirement for the executive, the military employer, to stand up and declare the personality profile of the ideal recruit, given which a scientific internally valid psychometric test battery can be designed to exclude non-qualifying traits with reasonable certainty. Naturally the executive of today being a product of yesterday's

service training are loathe to be committed in detail to the individual ideal traits of the serviceman of 20 years hence - if anyone is clairvoyant enough to declare this far ahead - to which today's selection should be directed.

For officers and aircrew some test batteries do exist and operate in selection, and show proven validity in reducing stress susceptibility overall. But of necessity, the restriction on recruitable numbers from those applying to enlist in a wholly voluntary force, were these criteria applied generally, makes the exercise prohibitive. Non-commissioned ranks are therefore a physically fit, cross-section of civilian volunteers, with no admitted personal neurotic traits on recruitment, no gross family psychiatric history and a satisfactory conditioning history in initial training and acceptance. The base of the services hierarchical pyramid is a disease-free cross section of the British cultural norm, and no more than that. Nevertheless, there remains a tradition in service thinking oriented wishfully towards a doctrine that personality differences exist in this normal population, watershedding into the consistently strong in all situations and the consistently weak in all situations, leaving no room for the concept of a constant flux in psychological competence, with the ebb and flow of individual life change.

A compelling observation in conditions of steady morale, steady national employment and stable civil scene, is the steady background incidence of military psychiatric illness which can be predicted in raw figures on knowing the catchment size. Surprisingly enough, a similar consistence was apparent in the Aden figures which bred true in the two main services present in the catchment in incidence per thousand, despite

differences in recruit standards, at intellect educational and civilian attainment levels between the services, and differing processes of training for widely different combat roles - but conditioning out comparably in the same stress environment.

Considerable effort has gone into examining psychiatric wastage in the Royal Air Force in the late nineteen sixties; since National Service had become a thing of the past we were dealing with an all Regular Force composed wholly of volunteers.

The degree of "voluntariness" had been questioned by a small number of service personnel whose circumstances had changed during their service contract and who had found that the conditions of the contract were invariable, except for the reasons of disciplinary unsuitability, serious domestic compassionate grounds or medical disablement. As in wartime, the psychiatric channel had been the most popular avenue of exploration for disgruntled airmen seeking discharge, and with the higher standard of the service intake and the greater dissemination of medical and psychological knowledge, the feigned syndromes had become more sophisticated and difficult to evaluate. This gainful exercise fluctuated with the standards of service pay and prospects, and with the stringency of the regulations for premature release.

The work on psychiatric wastage by Anthony (5) and his colleagues at P.S.R.A.F. Hospital, Wroughton, during the years 1966 - 1970, in a peacetime Royal Air Force catchment in the United Kingdom, covered large numbers of such cases, and established a norm for this group, at that time. He found that 80% of the airmen referred were under 25 years of age, 57% being classifiable in the "Reactive Group" (Depressive Reaction

plus Anxiety State) and 35.6% classifiable in the Personality Disorder Group (Personality Disorder plus Sociopathic Personality). There is no reference to the finding of an Obsessional-somatic grouping in the referrals, although reference is made to an increased incidence of Morbid Anxiety in the senior non-commissioned ranks ie. the older age groups. Taking the airmen referrals alone, a six-month follow-up showed that of the original 294, 203 (69%) had been invalided to civilian life in that time, and these constituted an incidence per thousand of the catchment population of as much as 5.5/thousand.

It must be said that the hospital at Wroughton constitutes the central collecting and screening agency for psychiatric cases for the Royal Air Force as a whole, and presumably only maintains high stability standards in the service by applying fine mesh screening and high rejection rates. Comparing the above figures with the Aden study however, the striking difference is the high Wroughton rejection rate of 69% in six months in non stress U.K. environment, against the 14.6% Aden return rate to U.K. from an accepted stressful environment, over a two year period, at a referral rate of 6.5 per thousand, taking airmen cases alone for adequate cross comparison.

It could be said that the comparatively low Aden figures were a function of the pre-overseas screening process. The further outstanding difference, the high incidence of N.C.O. referrals suggests that this was not so, and is further borne out by the low incidence of Personality Disorder Group (10%) - Wroughton study 35.6% ie. if Anthony's conclusions are wholly valid that disgruntlement increases with stress then the stress response mirrored by the N.C.O. cadre should be reflected in at least as high a level of airmen stress and a comparable level of incidence of

Personality Disorder to the U.K. Personality Disorder Group. In fact the six months invaliding rate for airmen was 2.5%, of which only two cases were in the disgruntlement category, as against the 69% of the Wroughton figures.

It would seem possible then that too immediate a decision on non usefulness in a case presenting with some features of disenchantment, may pre-empt the rehabilitation of airmen who in the short term may well settle to a change of attitude. Where there is a determinable time-scale this may give firm doctrinaire grounds for a period of extended and expectant supervision, as in the present study where such methods demonstrated the flexibility of the younger age groups to settle down in situ, despite continued exposure to the presenting stress.

Here the separate works of Glass et al (24, 25, 26) and Anthony (5) come into accord with the present author's findings of high expectation of return to duty in cases arising early in stress commitment, of better prospects of rehabilitation in anxiety and hysteria cases, and of better therapeutic response in younger age groups under 25/26 years of age, while remaining in the environment. Glass and Anthony both advocated forward counselling ie. a psychiatric service provided on the unit in the field, as distinct from the traditional British approach, certainly in the Royal Air Force, of a central psychiatric service in the base hospital, as the key to the improvement of psychiatric wastage figures in forward areas. There were differences in approach however even in the method of implementing forward counselling; Glass in the U.S. Army advocated non-medically qualified, psychotherapists, working and living in close quarters with the troops almost as a form of morale monitoring; Anthony envisaged a fully

medically qualified psychiatrist visiting a group of units on a rotating basis to assist unit medical officers in the week to week handling of difficult patients with an emphasis on job remodelling and a positive shift of emphasis on case responsibility to the unit commander. In a way this is an elegant form of environmental remodelling.

Over the intervening years since first publication, enthusiasm for Glass' work has fluctuated because of failure to contain wastage by this method in both Korea and Vietnam. The outcome long term of Anthony's proposals are awaited. The present author feels that the common factors cited above in all three studies are inherent in the case material itself and that any system giving the patient more time to express his natural progress will show improved figures, over a rigidly applied sorting and discard programme.

Overall there is a need to grasp the concept of 'change of life pace' as the crucial sorting mesh in promoting psychiatric breakdown. The important prediction is not so much which personnel are going to break down at a particular stage of life process, although most psychiatric selection is directed at this point, but how many, for how long and at what stage of tour. In an all Regular Force, expensively trained, designed to be mobile, there is no more place for 'passengers' than in the past but the value of each individual tends to increase cost-effectively as the quality of training and experience rise. If the application of a time-scale evaluation to the individual case preserves personnel from becoming psychiatric wastage, the benefit to service efficiency could be worthwhile.

Some American work in military psychiatry moves towards this view

but veers away from a prophylactic time evaluation before deriving a conclusion at a prognostic level. The U.S. contemporary preoccupation with the enlisted (non-commissioned) serviceman may have been the driving force. At the San Diego U.S. Navy Neuropsychiatric Research Unit workers including Arthur, Doll, Gunderson, Rahe and Rubin variously, (20, 30, 43, 67, 68, 69, 70, 71, 72, 73, 74, 82, 83) have published work over the years 1966 - 1971 relating to closed military communities at sea, under battle and non-battle change pressures, and the illness patterns observed.

The methodology was initially to evolve a self-answering questionnaire which was loaded with weighted scores to provide a comparative scoring of the life importance of environmental events, labelled Life Change Units, giving a read off index of life stress over a selected period: in a series of linked papers, these indices were applied variously to a very large intake of U.S. Navy personnel enlisted from civil life, to the complements of individual ships on and off battle station and to a group of three U.S. Navy cruisers on different geographical stations at the same time.

The concept was behaviourist and consequential in that total life experience was charted against total illness experience, the illness experience being rated as a life experience where further L.C.U. ensued as a result.

The interlinked papers commenced with Rahe et al (69, 70) a retrospective study of the health records of 50 Navy and Marine personnel who were disabled or discharged from the service for psychiatric illness, selected at random, to examine certain parameters of life change and illness pattern. A longitudinal analysis of their total illness experience

was compared with similar documentation of illness patterns of American industry. (Hinkle et al (37, 38, 39, 40, 41)). A similar analysis of changes in life pattern as recorded in medical record and psychiatric social history during each year of active duty, was scaled and summarised and compared with life illness experience. Both life changes and illnesses were seen to cluster in certain years. In general, a cluster year of life-changes was seen to occur immediately prior to an illness or to a clustering of illnesses; the more severe illnesses were preceded by cluster years of higher life-change magnitude than years prior to minor illness.

In a broader study of 3000 U.S. Navy recruits, the demographic characteristics of whom had already been documented by Plag and Goffman (64) consisting of both enlisted men and officers, Rahe and Arthur (68) extended the horizon of the method to include "controls" ie. comparison of life change patterns in subjects with recent illness with those of reputedly healthy subjects. The results drew quite marked differences between the high L.C.U. of recently ill subjects and the low L.C.U. of non-ill. There was also an interesting memory effect in that although recent life changes were better remembered than more distant, in all groups recent life examination showed higher L.C.U. than distant.

The authors explain this as the result of the turbulence of service recruitment and are convinced that the method adopted of chronological matching of controls (recently ill patients with healthy of the same era) eliminated memory bias. There was no attempt to tackle the possibility of the halo effects of optimism in healthy subjects minimising alertness to L.C. significance, and even more likely the pessimistic view of unwell or depressed subjects in maximising recent life trauma. The moderately

significant differences found between groups of well, illness prone and occasionally unwell subjects must therefore be considered somewhat suspect, particularly in view of the authors' second corollary which goes on to describe the post illness syndrome of proneness to life crisis, a discovery which they cite as a link between the opposing theorists of causal and consequential life change summation. At this stage of development of this theme, Rahe and Arthur veer away progressively from psychiatric material and plot a course through the psychosomatic towards an all-inclusive psychobiological concept of sickness incidence. A time-scale element could have been retained in this material; in fact the temporal quality gradually fades from the further researches of this group, which had greatly refined at this stage the earlier observations of Glass et al (26, 27), Ripley and Wolf (78, 79), Tredgold (97) and Hamburg (32).

The next three or four papers in order of research become more oriented towards a pursuance of the magic of the S.R.E. questionnaire and with this weapon emerges a mission to prove a global psycho-social truth.

Chronologically there then followed a prospective study using 2,500 personnel (both enlisted men and officers) distributed as the crew of three U.S. Navy cruisers (Rahe et al (72)). 'L.C.U.' scores were obtained in advance of seagoing and predictions were made as to predeliction of personnel for manifest illness during the voyage on the basis of these scores. Two of the cruisers were deployed on tactical support off the coast of Vietnam: the third proceeded to a peace time station in the Mediterranean. The duration of the commission was six months in two cases; the second Vietnam cruiser remained on station for eight months. Predictions

were then checked against actual health change data at the end of the commission. The situational similarities between this and the Aden study are obvious in terms of a captive service population under stress scrutiny. The approach to stress measurement is different in the two series and the time-scale involved is shorter in the U.S. Navy study. There were other differences of detail tabulated at table IX but on the whole the studies have superficial common features to warrant comparison.

Rahe's criteria included the identification of high and low at risk groups prospectively and an examination of the time-scale of sickness reporting during the ships tours relative to state of action readiness. A subsequent analysis also graded health change incidents into system frequencies, demonstrated demographic and racial differences in frequency of illness reporting under stress, using methods evaluated for civil life stress measurement described by Hinkle (37, 40).

His findings, were that as distinct from the recruit group, the prior L.C.U.s of these ships complements were very low, certainly for the significant precruise six month period examined: secondly the illness levels throughout the observation period were low also and mainly minor. Thirdly the age group of minor illness proclivity was the 17 - 19 year group which naturally correlated with service inexperience; low paid rank and to some extent with hazardous tasks; in one cruiser, 74% of the total illness was attributable to a nucleus of 28% of the personnel, confirming an observation by Hinkle (37) that in a large population, the majority of sickness is occurring in a constant small group.

Conclusions which he did not emphasise but which are described in his work are relevant to the comparative evaluation. Presumably because

of the low prior L.C.U. average scores, the commencement of voyage was a comparative stress to which there was an early peak of minor illness in the first month; thereafter there was a fairly steady baseline with minor peaks following belligerent action or periods of readiness; in the last month of the voyage when homeward bound there was a further clustering of illness, which was not as high as the initial peak but higher than the on-line or in-port levels; at this stage, near tourexpiry certain personnel, the number not clear, were evacuated prematurely home; the parallel with the Aden study is inescapable, but is only seen clearly if all three cruiser experience is summated ie. with a sufficiently large sample; the limited sample of less than 1000 men in each ship does not clearly show "beginning or end" stress peaks because of the tendency of distraction in the small horizon setting to rationalisations with good or bad morale, greater or less activity, more or less hazardous duties and to excessive weighting following in-port periods by peaks of inter-current disease of social origin.

A total illness report rate of 326 incidents in 2684 personnel over a period of six months reflects the basic healthy, disease resistant quality of the ships complements. In this study, a separate figure for psychiatric disturbances was not available but it is assumed to have been negligible as most other categories were classified under five organ systems (respiratory, gastrointestinal, genitourinary, dermal, musculoskeletal). The overall incidence of 121 per thousand per annum for all sickness compares favourably with the Aden figures of 7.5 per thousand per annum for psychiatric cases alone. A parenthetical comment in (74) indicates however that malingerers were excluded from the study

whereas in some centres such cases might have been classified as overt psychiatric material, as indeed became inescapable in the Aden study. The heavy somatic bias of the study is emphasised thereby.

If the studies have comparative value, the conclusion must be reached that a hostile tropical environment into which the individual is imported for a fixed period of time is a much greater psychiatric threat than the importation into tropical environments while living and operating still within a protected and controlled culturally familiar segment. The infinitesimal proportions of the U.S. Navy psychiatric referrals shipboard in a tropical environment compares very favourably with the incidence of psychiatric material in a British force living and working in a tropical base. Unless one propounds gross cultural stress resistance differences, or widely different indoctrination and morale values, any or all of which would suggest prejudice, one is left with the possible concept of a time-scale anomaly: a tour duration of less than 6 months being psychiatrically non-critical for a U.S. Navy force protected in shipboard life and more than 12 months being critical for a British force in an unleavened tropical role, if the present findings could be applied meaningfully at a rate of 7.5 cases per thousand.

In replication studies on board a U.S.N. battleship and an attack carrier both on Vietnam mission, various authors from the U.S.N. San Diego centre, Rubin et al (82, 83) Rahe et al (73), applied the standard questionnaire of recent life experience prospectively to the ships complements. It appeared that while the standard L.C.U. still predicted reasonably well for non-rated personnel (ie. other ranks) it did not discriminate adequately for N.C.O.s. By stepwise multiple regression analysis, a more refined military evaluation test was evolved which did discriminate at the

very significant level of 50%, between high and low risk groups during the voyages. Once again appears the comment that between the junior personnel and more senior ranks in the Services exist response differences which are not generally measurable on pre-existing techniques adopted unmodified from civil experience, as the S.R.E. scale was. (Hinkle (39,40)).

Overall comparing and contrasting the U.S.N. and Aden studies the differences appear more striking than the similarities. Possibly due to the lack of threat in the U.S.N. environment there are virtually no reported psychiatric illnesses; the time-scale of mission is short; the cushioning by the artificial shipboard cultural subsegment is impressive; the study of significance is obviously hampered by the lack of spontaneous stress-based clinical material; even over a series of five large capital ships the total catchment does not begin to bear relevance to the size of the Aden situation.

The similarity lies in the closed community situation but again consonance is broken by the Aden continuous reinforcement, the frequent irregular movement of personnel in and out, but on a fixed individual tour expectation, giving a fluidity not present in the U.S.N. ecological unit.

The U.S. Navy work has taken the inclusive concept of total illness experience, and applied it variously in similar closed community situations as a total stress measure. A reasonable degree of accuracy has been achieved in demarcating valid prediction scores for a limited homogeneous military community, to be used in improved screening of personnel at risk, based on evaluation of their recent life experience, and expected illness pattern. Further work on refinement in this area is necessary and is proceeding. A number of American papers using a similar life-style

approach in the civil community area have emerged recently of which Myers et al (62) is typical.

The tri-service Aden study has been essentially an in-stress morbidity assessment upon psychiatric cases only, using a large 'captive' service population, but seeking valid predictors of diagnosis and prognosis with a time-scale filter. There is no doubt a place for both approaches in military screening, the U.S. work providing a prophylactic filter, a test battery of future vulnerability, and the Aden study eluting time-scale principles for the outlook, once vulnerability has become fact in a field trial. Once the essential time-parameters can be seen, a case separation on the basis of early and late responders appears to occur naturally and provides a differential for diagnosis and prognosis.

The feeling of this study is therefore that due consideration must be given to time-scale in considering the continuity of effectiveness of a given military force under conditions of privation; the degree of accuracy of response and recovery prediction, varies directly with the severity of the stress. Replication must await the opportunity of a similar island circumstance with equivalent population size and parameters.

In the meantime in other clearly delineated circumstances of major life-change, either job change, change of residence, or change of marital status, the author has found in both military and civil populations, an appropriate use for these time-scale principles in less closely knit communities in other geographical areas. In the broadest sense, Rahe's study and the present one come together in examining the recent life style disturbance as a point of forward measurement in subsequent illness assessment. While the former is based on continuous change, the latter measures time-in-environment reactions following major single change. The

overall distinction is in degree, multiple multifactorial stress versus single major change stress. It is considered that utilisation of both concepts should provide a base broad enough to cover the psychiatric evaluation of most human stress situations today.

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#### Classification

The case-material, incidence figures, strengths and other military observations implied and stated in this thesis are now declassified on time-expiry and have become free for unrestricted release wef 1973.

The comments and opinions expressed therein are entirely those of the author and are in no way binding on the Ministry of Defence.

The work has been undertaken wholly and completely during the author's regular course of duties as a Consultant in Neuropsychiatry in the Royal Air Force and has not been the subject of external study, or leave of absence, special allowances or educational assistance.

The contents of the bibliography are also unrestricted for release.

Appendices A - M

List of contents

Appendix

1.	Figure I	Retrospective Study	A
		Table of New Patients per month	
2.	Figure II	Retrospective Study	B
		Analysis of Cases by Stage Tour at Time of Referral	
3.	Figure III	Retrospective Study	C
		Analysis of Diagnosis by Stage of Tour at Referral	
4.	Figure IV	Prospective Study	D
		Analysis of New Cases, 1963-65 by Octiles of Time in the Environment	
5.	Figure V	Prospective Study	E
		Analysis of cases by months of Time in the Environment: for comparison with Figure II (Retrospective Study)	
6.	Figure VI	Prospective Study	F
		Analysis of Diagnoses by Octiles of Time in the Environment: for comparison with Figure III (Retrospective Study)	
7.	Table I	Analysis of Cases by Age	G
8.	Table II	Comparator of Majority and Minority Groups in Age Range	G
9.	Table III	Analysis of Duration of Total Military Service at Referral	H
10.	Table IV	Analysis of Diagnoses against months in Environment at Referral	J
11.	Table V	Morbidity Analysis	K
12.	Table VI	Analysis of Non effectiveness	K

13.	Table VII	Analysis of Disposal Rate to U.K.	K
14.	Table VIII	Analysis of Cases by Rank	L
15.	Table IX	Comparison of U.S. Navy and Aden Triservice Studies	M

Appendix A

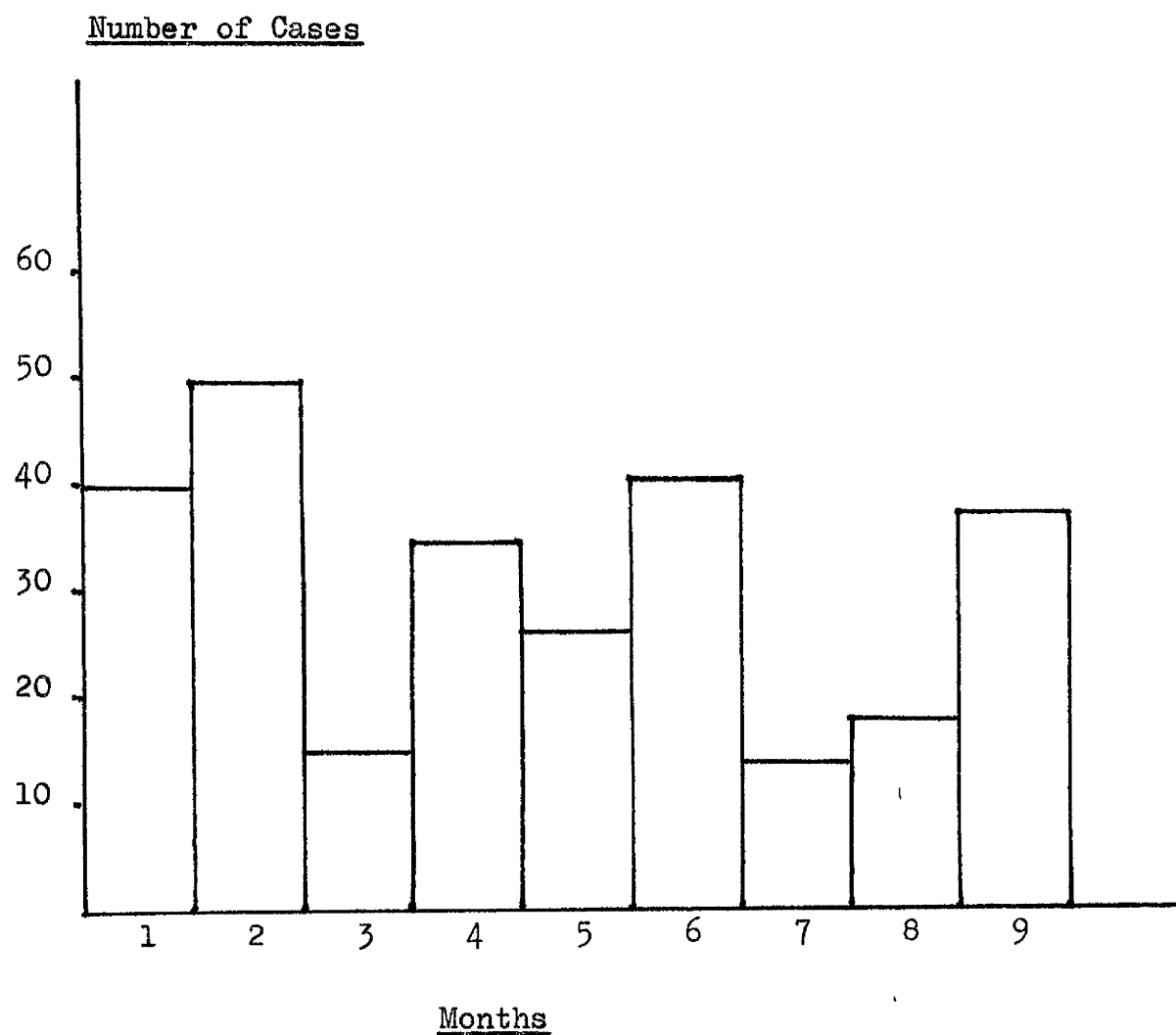


Figure I

Retrospective Study.

Table of New Patients per Month,  
January to September 1963.

Appendix B

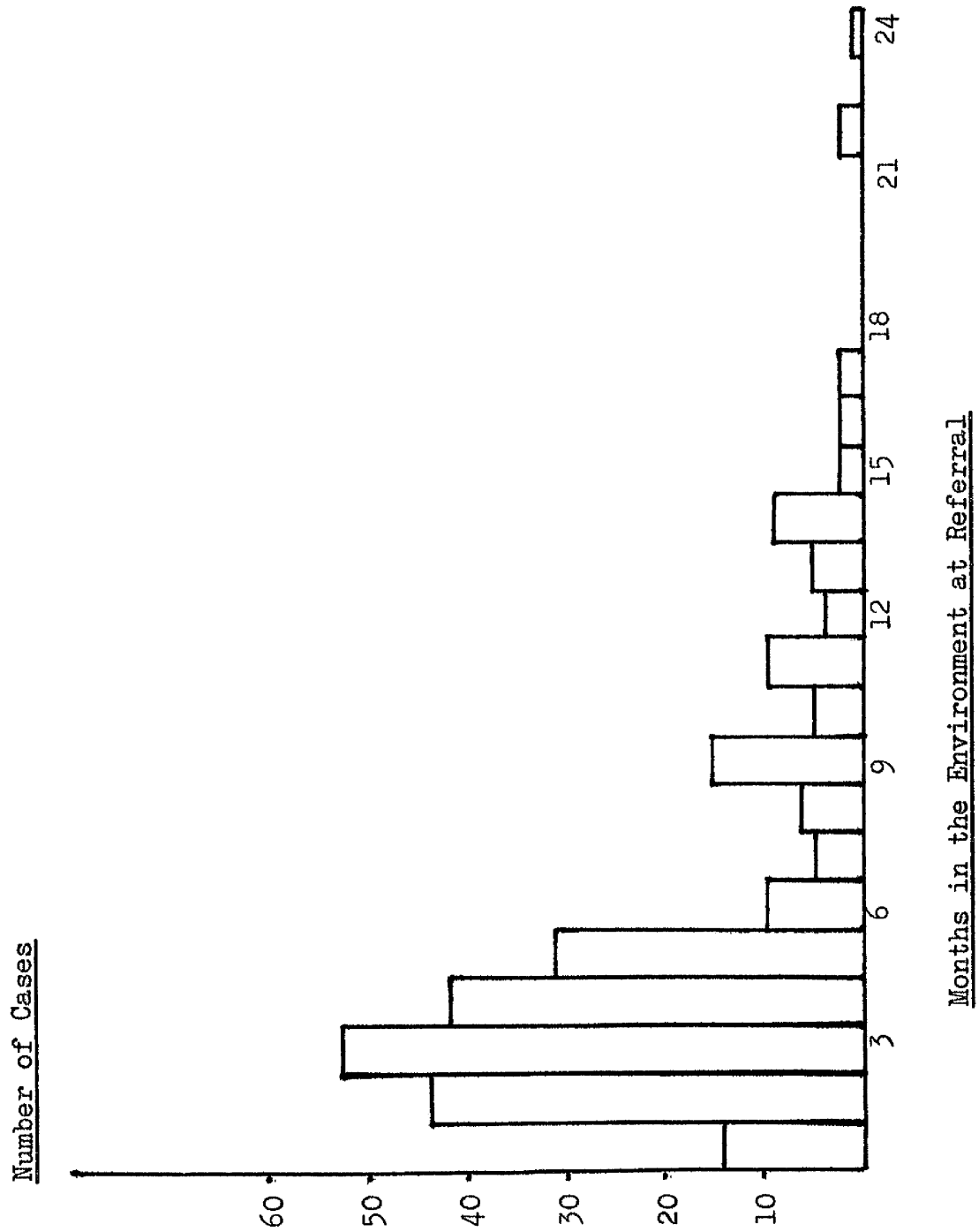


Figure II Retrospective Study.  
Analysis of Cases by Stage of  
Tour at the Time of Referral.

Appendix C

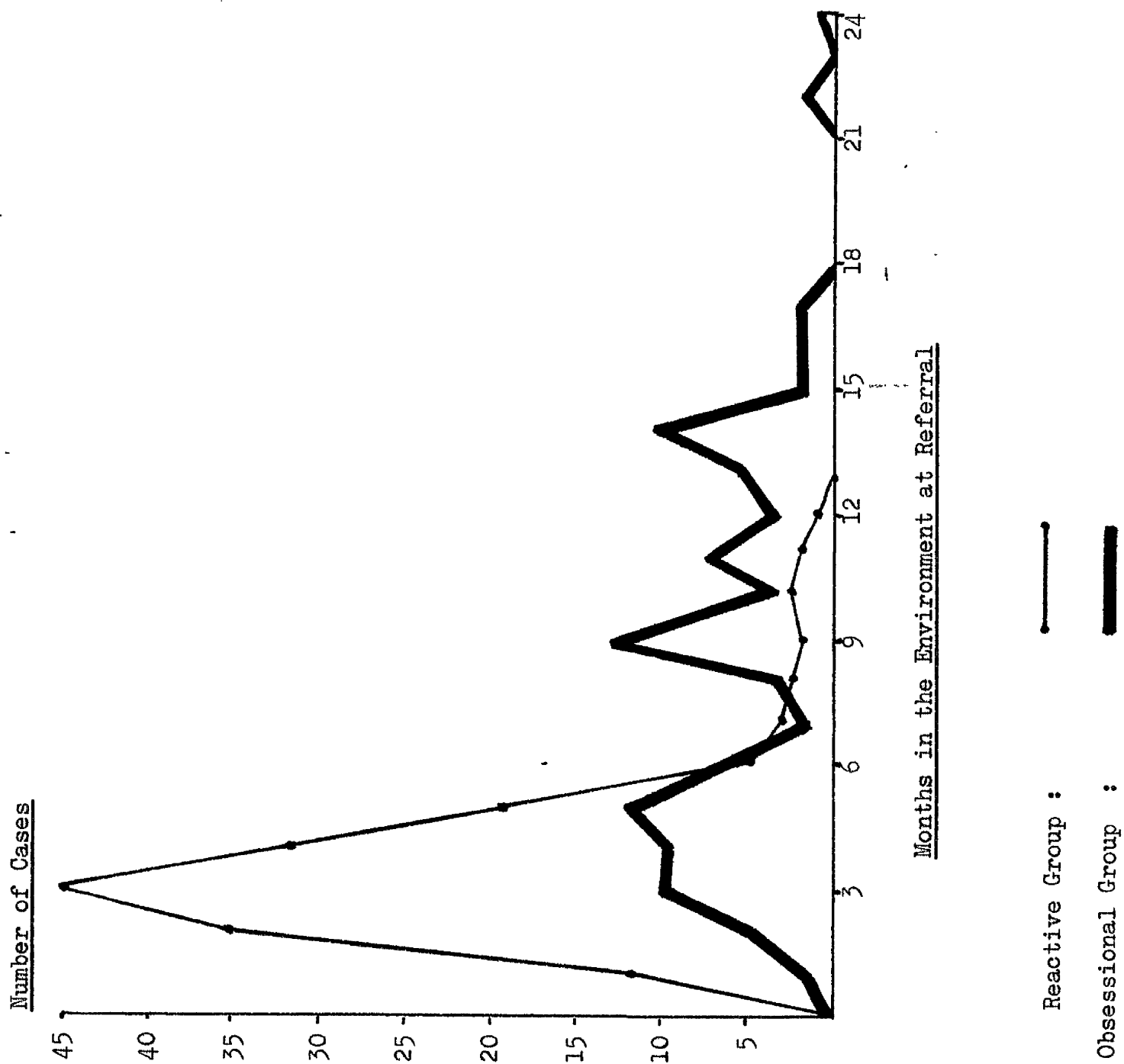


Figure III Retrospective Study.  
Analysis of Diagnosis by Stage of  
Tour at the time of Referral.

Appendix D

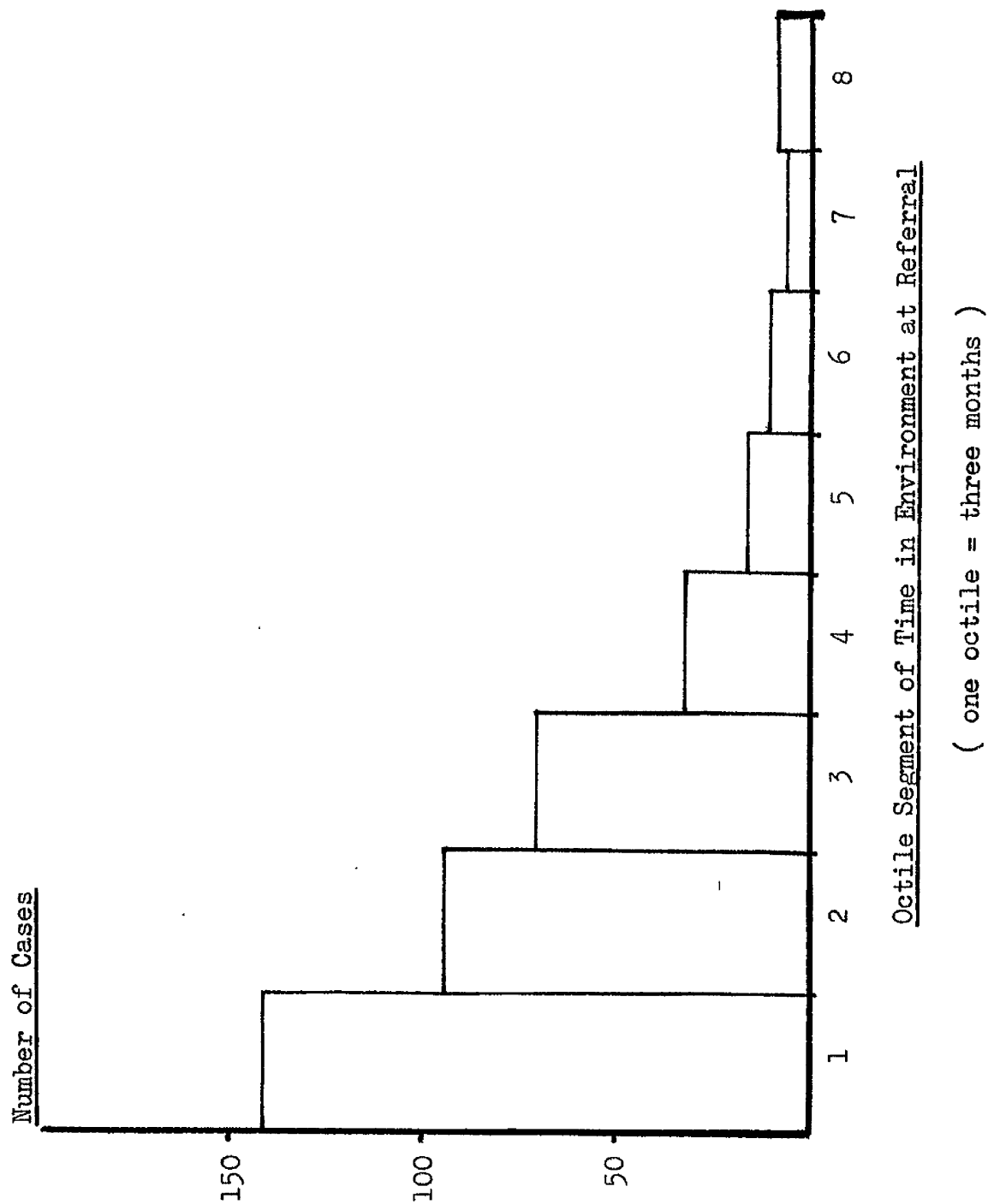


Figure IV

Prospective Study.

Analysis of New Cases, 1963-1965,

by Octiles of Time in the Environment

Appendix E

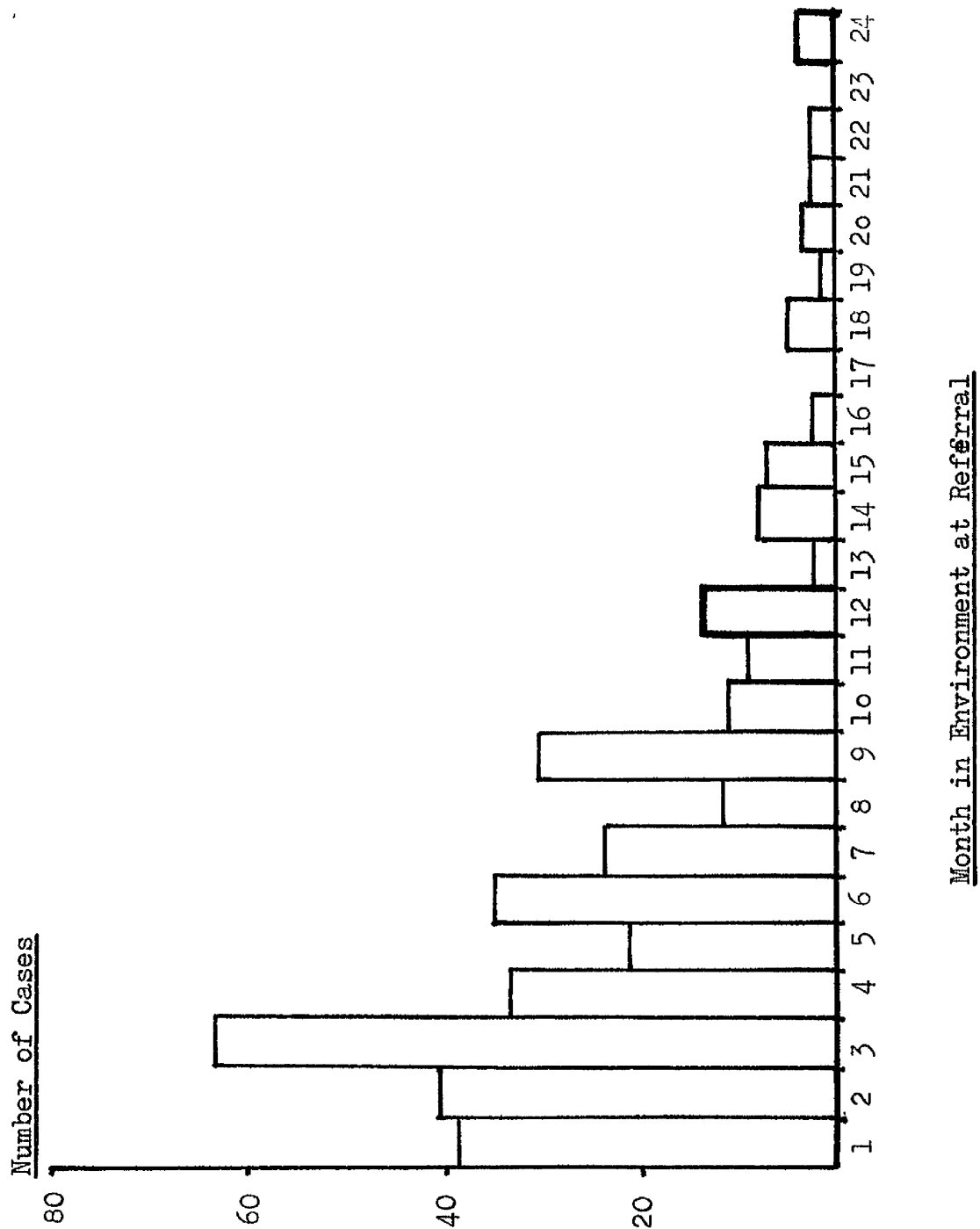


Figure V

Prospective Study.

Analysis of Cases by Months of Time in the Environment, for comparison with the Retrospective Study. ( Fig. II ).

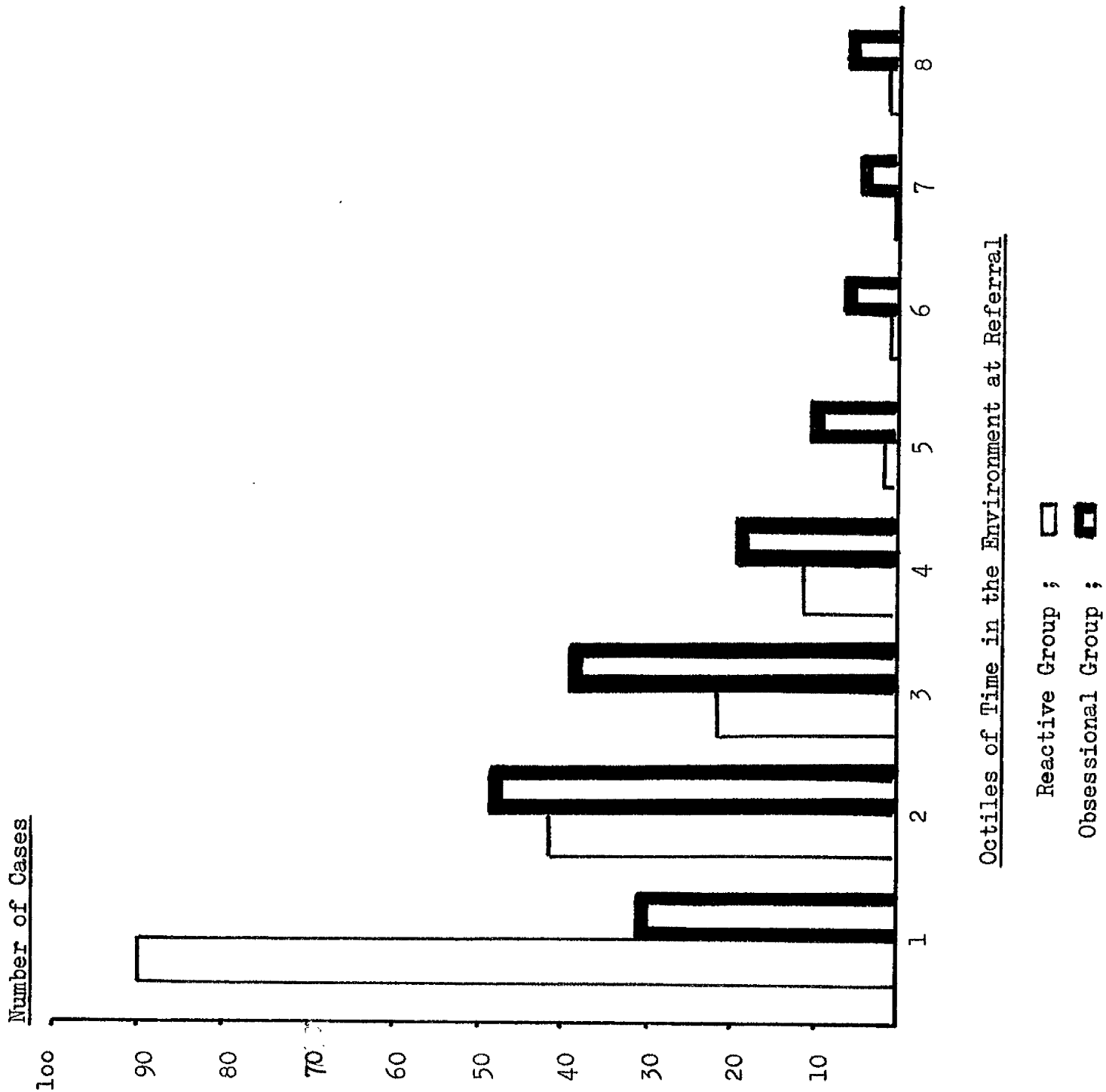


Figure VI

Prospective Study.

Analysis of Diagnosis by Octiles of Time in the Environment; for comparison with Figure III ( Retrospective Study ).

Appendix G

Age Groups	17-20	21-25	26-30	31-35	36-40	41-45	45+	Total
Royal Air Force	47	52	21	17	9	10	8	164
Army	71	64	28	17	10	5	3	198
Royal Marines	5	3	-	-	1	-	-	9
Total	123	119	49	34	20	15	11	371

Table I      Analysis of Cases by Age. ( N = 371 ).  
Mean Age = 23.4yrs.

Age Groups	Majority 17-25yrs.	Minority 41+	17-25yrs. % of Total	41+ % of Total
Royal Air Force	99	18	60%	11%
Army	135	8	67%	4%
Royal Marines	8	-	88%	-
Total	242	26	64%	7%

Table II      Comparison of Majority Groups ( 17-25yrs.)  
and Minority Groups ( 41+ ) in Age Table.

Appendix H

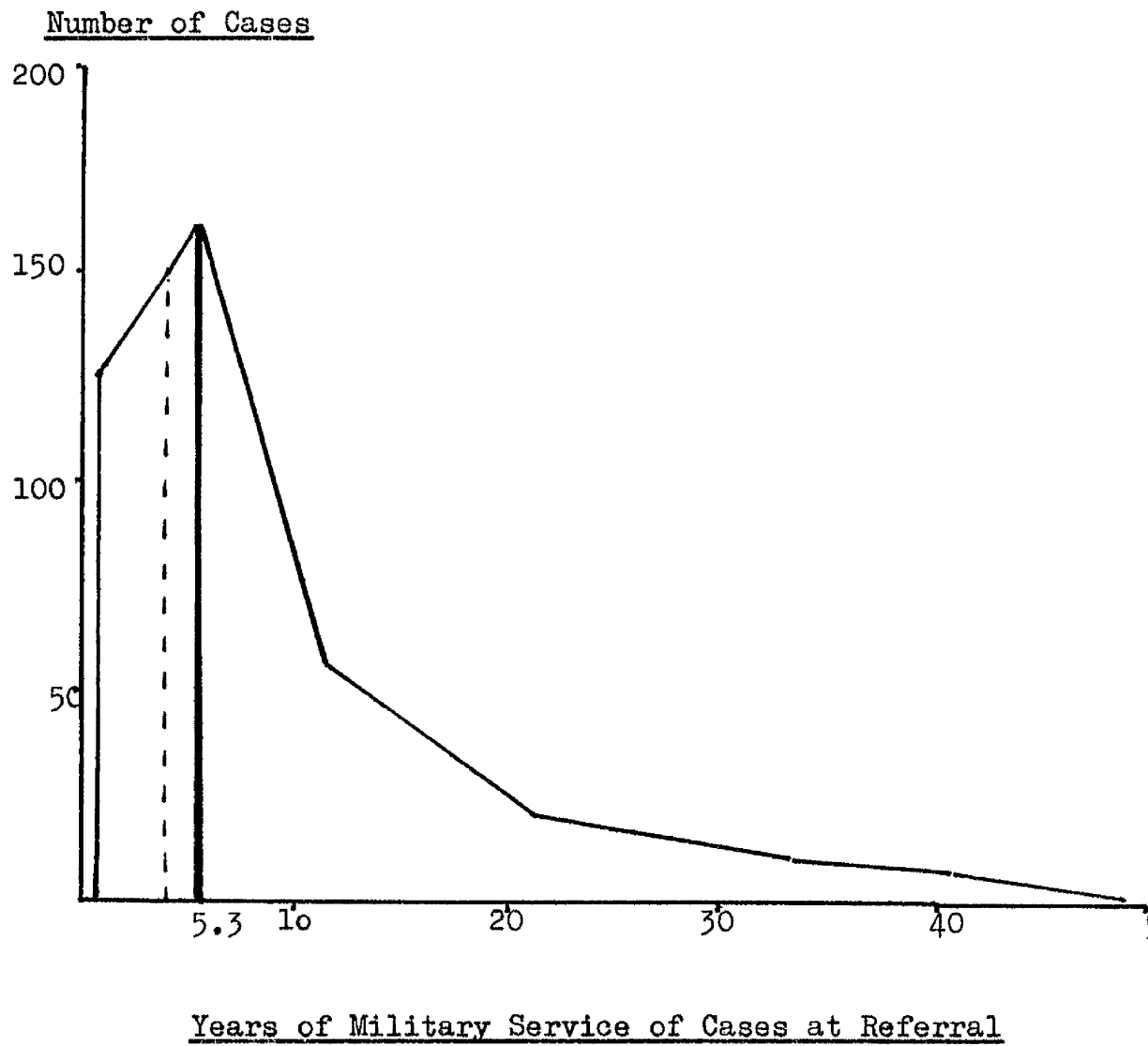


Table III

Analysis of Duration of Total Military Service at Referral.

Mean Duration = 5.3yrs.

Majority Group = less than 3yrs. total service.

No. of Months	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T	%
Hysteria	4	6	9	6	4	7	-	1	2	-	1	2	-	-	-	1	-	-	-	-	-	1	-	-	44	11
Anxiety & Depression	23	21	27	11	3	11	7	3	9	5	3	1	1	1	-	-	-	1	-	1	1	-	-	2	131	33
Psycho- Somatic	3	5	13	7	7	12	5	3	11	4	3	2	-	3	1	1	-	3	1	1	-	-	1	1	87	22
Obsession- al States	3	3	5	9	5	9	12	2	7	2	3	6	1	4	3	-	-	4	-	1	1	1	1	3	85	21
Personality Disorder	5	3	7	3	4	1	3	3	2	1	1	3	1	1	-	-	-	1	-	-	-	-	-	-	39	10
Psychosis	1	3	3	-	-	-	-	-	-	1	-	-	-	-	-	-	-	2	-	1	-	-	-	-	11	3
Total Diagnoses	39	41	64	36	23	40	27	12	31	13	11	14	3	9	4	2	-	11	1	4	2	2	2	6	397	-
Excess Diagnoses	-	-	-	2	2	4	3	-	-	2	2	-	1	1	1	-	-	4	-	1	-	-	1	2	26	-

Table IV      Analysis of Diagnosis against Months in Environment  
at Referral.

Out-Patient Status	% treated as out-patients	number of O.P. visits -one-	number of O.P.visits -two-	number of O.P.visits -multiple-
Royal Air Force	81%	71	23	35
Army	87%	92	52	36
Total	84.3%	163	75	71

Table V  
Morbidity Ana

In-Patient Status	number of cases	% of In-Patient cases	number of bed-days	average bed-stay in days
Royal Air Force	80	48.7%	1640	20.5
Army	103	50.0%	2145	20.8
Total	183	49.3%	3785	20.7

Table VI  
Analysis of N  
effectiveness

	Returned to U.K.	% of Total cases in study	Totals no. & %
Royal Air Force	23	14%	38
Army	15	7.2%	10.2%

Table VII  
Analysis of Dispos  
Rate to U.K.

Appendix L

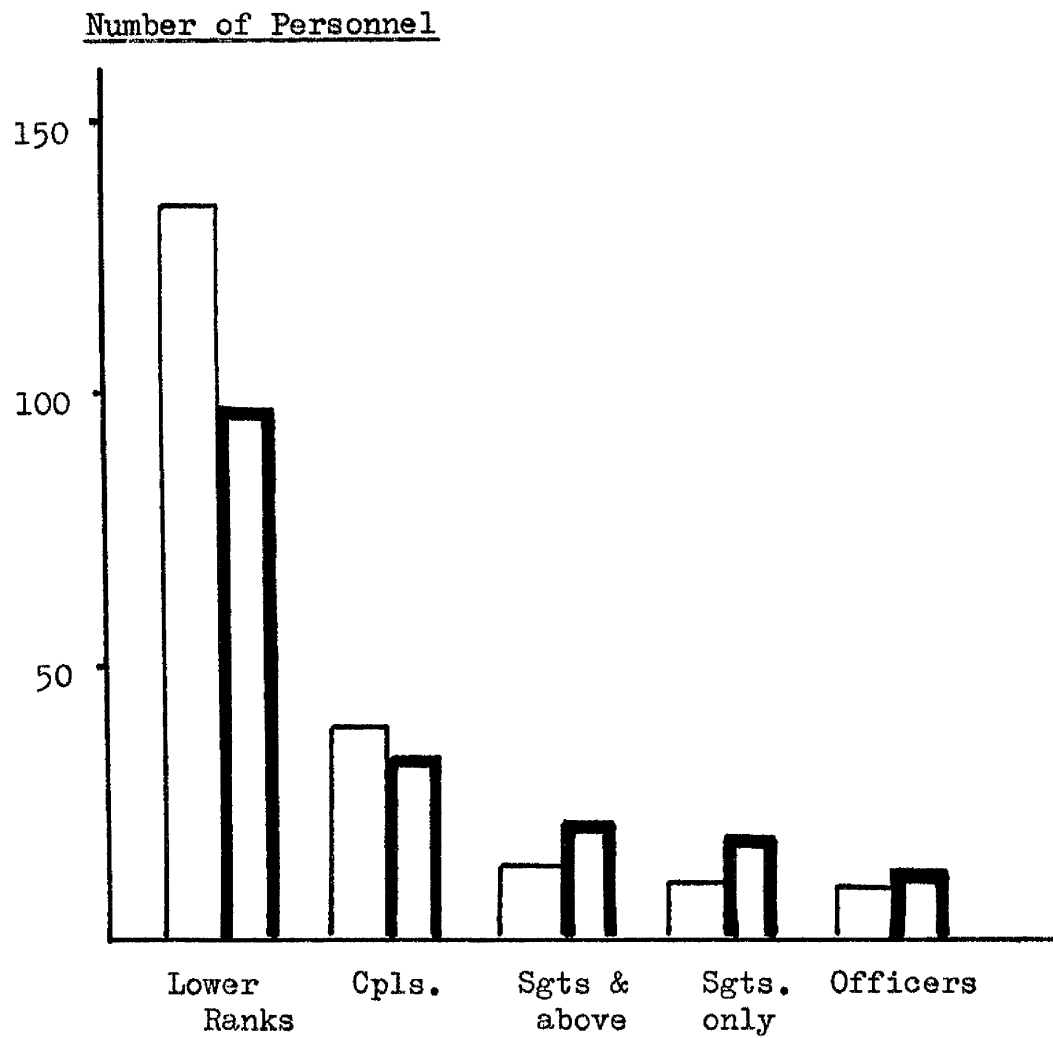




Table VIII      Analysis of Cases by Rank at Referral.

( Army and Royal Air Force only )

Army ;        
Royal Air Force ;      

Appendix M

Table IX Comparison of Criteria - U.S. Navy and Aden Tri-service Studies.

U.S. Navy (Rahe et al)

Aden Tri-service (Hepburn)

- |                                                                                                            |                                                                                                                      |
|------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| 1. U.S.N. personnel only.                                                                                  | 1. British Army, Royal Air Force and Royal Marine personnel.                                                         |
| 2. Physically fit at tour commencement.                                                                    | 2. Physically fit at tour commencement.                                                                              |
| 3. Psychologically screened by Life Change Questionnaire.                                                  | 3. Free from clinical psychiatric material at tour commencement.                                                     |
| 4. Length of tour variable within narrow limits.                                                           | 4. Length of tour expectation fixed at arrival.                                                                      |
| 5. Fixed ecological group.                                                                                 | 5. Continuous reinforcement program.                                                                                 |
| 6. Familiar semi-protected cultural segment.                                                               | 6. Unfamiliar hostile environment.                                                                                   |
| 7. All sickness reports recorded.                                                                          | 7. Psychiatric referral taken as illness point.                                                                      |
| 8. Total illness experience summated.                                                                      | 8. Psychiatric incidents analysed by time in environment.                                                            |
| 9. Pre and post illness stress experience examined.                                                        | 9. Life disturbance of tour commencement taken as the continuing main relevant stress.                               |
| 10. Results show very small stress peaks, at tour commencement pre battle activity and at homeward voyage. | 10. Results show initial high stress reactive psychiatric sickness tailing down to nil with time in the environment. |

L50 SH  
H/4/72  
My

UNIVERSITY OF GLASGOW

FORM OF APPLICATION FOR DEGREE OF M.D.

**TITLE OF THESIS:** A Time Scale in Military Stress Response

**SURNAME:** HEPBURN

**OTHER NAMES:** WILLIAM DOUGLAS STEWART

**ADDRESS:** RAF HOSPITAL WEGBERG, B.F.P.O. 40, W. GERMANY

**DATE OF BIRTH:** 7.10.27 **DATE OF GRADUATION AS M.B.,Ch.B. (GLASGOW)** 1952

OTHER QUALIFICATIONS	AWARDING INSTITUTION	DATE OF AWARD
----------------------	----------------------	---------------

MRC.Psych.....	Royal College of Psychiatrists	....1971....
----------------	--------------------------------	--------------

DPM.....	Conjoint Examining Board London	....1962....
----------	---------------------------------	--------------

**MEDICAL APPOINTMENTS HELD SINCE GRADUATION**

Designation of Post	where held	from	to
Registrar in Psych.	Stobhill Hosp., Glasgow N.	1952....	1953..
Clinical Assistant	Maudsly Hosp. S.E.5.	1960	1961
RAF Consultant	.....	1963....	.....
Spec. in Neuropsych.	London, Aden, Lincoln, Germ.	1963	date

**NAME AND ADDRESS OF GENERAL PRACTICE, HOSPITAL, DEPARTMENT, LABORATORY OR OTHER INSTITUTION WHERE WORK FOR THIS THESIS WAS UNDERTAKEN**

RAF Hospital Steamer Point, Aden, South Arabia.  
.....

**DECLARATION** I declare that the work has been done and the thesis composed by myself, and that the books and papers cited were all consulted by me personally, unless it is otherwise stated.

**(NOTE:** where material based on work undertaken in collaboration with others is included in the thesis a further and separate statement must be submitted clearly defining the candidate's individual contribution)

**DATE:** 10.3.72

**SIGNED:**

*William Douglas Stewart*

**CERTIFICATION:**

I hereby certify that the above named candidate for the degree of M.D. has been engaged since graduation for at least one year either in scientific work bearing directly on his profession or in the practice of Medicine.

**PERIOD CERTIFIED:** 20 years

**SIGNED:**

**DATE:**

10 Mar 1972

**ADDRESS:**

**POSITION:**

*RAF Hospital Wegberg*  
*Officer Commanding*

Submission of Thesis for Degree of M.D.

<u>Title</u>	A Time-scale in Military Stress Response
<u>Author</u>	Wing Commander W D S Hepburn MB ChB MRC Psych DPM RAF
<u>Bibliography</u>	106 references
<u>Appendices</u>	12 appendices
	6 graphs
	9 tables

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## Summary

371 soldiers, airmen and marines serving in a stressful fixed-tour tropical area who were referred for psychiatric opinion, were the subject of this prospective study of parameters of personality, diagnosis and prognosis. The conclusions based on the time-scale of individual tour length at referral were:

- 1) Early breakdown equated well with good resettlement following treatment in the same environment.
- 2) Late breakdown did not, and was best handled by removal to base.
- 3) Early stage of tour breakdown correlated with young age group, (below 26 years), junior rank, (Corporal and below), and short service, (less than 6 years).
- 4) Late stage of tour breakdown correlated with older age group, (26 years +), more senior rank, (Sergeant and above), and longer service, (6 years +).
- 5) Classification by diagnosis showed a preponderance of reactive states at the beginning of the tour of duty abroad, and a preponderance of obsessional-somatic conditions later in the fixed expectation of duty tour.
- 6) The changeover from reactive to obsessional-somatic predominance occurred during the second octile of tour duration, before and after which there were good odds on a case presenting as either the former or the latter respectively.
- 7) The reactive group correlated with sub-paras 1) and 3).
- 8) The obsessional-somatic group correlated with sub-paras 2) and 4).
- 9) Despite the internally integrated nature of these two groups, separated by age, rank, length of service, diagnosis, time-scale

of expression, response to treatment and prognosis for resettlement in the adverse environment, the numbers of each group in the diagnosis evaluation were almost identical, reactive group - 44%, obsessional-somatic - 43%.

- 10) It was concluded that each group was showing an equal response to a common adverse experience, which was modified by personality/maturity factors in a spectrum of individual time-scale experience.
- 11) The older serviceman, being a smaller absolute number in the military catchment, showed a relatively higher incidence of psychiatric disorder than his younger colleague.
- 12) Using commencement of tour as a time-scale marker, cases could be reasonably well predicted as:
  - a. Young age group - reactive - good prognosis.
  - b. Older age group - obsessional with psychosomatic symptoms - limited prognosis.

An extensive historical review of military literature over three decades, threw up 14 previously unrecorded casual references to a time-scale connection in military stress response.

Following statistical evaluation, the author concluded that personnel who overreact in the first octile of adverse experience are most likely if adequately treated and sensibly rehabilitated to be the hard dependable corps of the fourth quartile of experience. Those whose responsibilities, inhibitions or previous experience are partially protective, but who throw symptoms in the third and fourth quartiles, are the group of the greatest concern whose powers of intra-environment recuperation are most limited and who are most likely to benefit from invaliding from the theatre of

operation as a manpower saving measure. There is a motley group in the second octile of time-scale whose destiny may be best handled in either compartment but who tend to layer prognostically with time.

This thesis coordinates with the work of Glass, and of Anthony in examining unnecessary military personnel wastage through psychiatric channels. Pre-existing fixed and traditional attitudes are critically examined and some are refuted when seen against a time-scale matrix. A common ground is found with the work of Rahe et al in San Diego in research into recent life style disturbance as a point of forward measurement in subsequent illness assessment. While this thesis on the one hand provides an understanding of and a basis for measurement of time-in-environment reactions following single major life change, Rahe's work provides on the other hand a predictive measure for continuous minor change or clumps thereof, a matter of isolated crucial stress versus multifactorial summated stress.

It is considered that utilisation of both concepts should provide a base broad enough to cover the psychiatric evaluation of most human stress situations today.