soldiers living under various conditions but not reporting sick on account of dental disease.

1. Number of visits made to dental officers in a certain area during a period of one month ... 9,380
 Number of men treated (approximately) ... 7,000
 Number of cases of acute ulcerative gingivitis 46
 Percentage incidence, 0.65.

2. The mouths of 889 men from various units in the army were inspected. These included:

- (a) Men returning after a four days' tour in the trenches. Samples taken from each company of six battalions.

Positive acute ulcerative gingivitis	2 = 0.76 per cent.
Dirty mouths	31 = 11.4 "
Moderately clean mouths	76 = 25.7 "
Clean mouths	157 = 57.1 "
Men wearing dentures	13 = 4.8 "
Total	279

- (b) Troops in back areas—A.S.C. workshops and M.T. companies.

Positive acute ulcerative gingivitis	1 = 0.35 per cent.
Dirty mouths	49 = 15.8 "
Moderately clean mouths	68 = 22 "
Clean mouths	159 = 51.8 "
Men wearing dentures	32 = 10 "
Total	339

- (c) Reinforcements from the base.

Positive acute ulcerative gingivitis	1 = 0.33 per cent.
Dirty mouths	51 = 17 "
Moderately clean mouths	67 = 22.2 "
Clean mouths	154 = 51.1 "
Wearing dentures	28 = 9.3 "
Total	301

The above figures, although not large, appear to show that acute ulcerative gingivitis is present in approximately 0.3 per cent. of men behind the line, and in 0.7 per cent. of those returning from the trenches. None of the cases found at inspection were severe, but all had definite sloughing of the interdental papillae.

Certain other points noted at inspection are of interest. On the whole the condition of the teeth is fair. Of the infantry only a small proportion clean their teeth at all, but in spite of this there is a higher percentage of clean mouths among them than in other branches of the service. This is in all probability due to difference in the diet. Certainly not more than 30 per cent. of the men use their toothbrushes for the proper purpose, although at least 90 per cent. have them for "kit inspection." Of the men (70 per cent.) who do not brush their teeth, 30 per cent. use their brushes for cleaning buttons, while the remainder keep the brushes for inspection purposes only. Caries is present in the majority of the men, and could be largely prevented if more dental officers were available. It would then be possible to inspect troops regularly and fill the cavities while they are still small.

Simple gingivitis is present in a large number of the men who do not keep their teeth clean, and periodontal disease is common amongst the older men and those who have always neglected their teeth.

SUMMARY.

From the foregoing report the information obtained can be briefly summarized as follows:

Severe cases of acute ulcerative gingivitis represent 0.65 per cent. of all men reporting sick on account of their teeth.

Only a small proportion of men suffering from the condition report sick until the pain becomes severe, and there is considerable ulceration.

Significant points affecting the army in connexion with this disease are its contagious nature, the disability produced, and the subsequent loss of teeth unless treated early.

The average duration of treatment in first attacks is ten days, provided treatment is rigorous.

Relapses are common, and probably chiefly due to inefficient treatment or too early discharge.

The treatment is laborious, and personal daily treatment by a dental officer is required for each case.

I am indebted to Major-General H. N. Thompson, C.B., C.M.G., D.S.O., Director of Medical Services, for affording me special facilities in connexion with this and other dental work, and to Major J. W. McNee, D.S.O., Assistant Adviser in Pathology, for many valuable suggestions and help in laboratory work.

ON THE AMINO-ACID CONTENT OF NUTRIENT MEDIA.

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(Report to the Medical Research Committee.)

THE preparation of nutrient media for bacteriological purposes was considerably enhanced by the adoption of Eyre's scale of acidity.¹ A further advance was made when the reaction was adjusted to $P_H = 7.35$ with phenol-sulphonephthalein as the indicator.³ Another stage is gradually being evolved by a more generally recognized necessity for the provision of substances associated specifically with parasitic metabolism.

The ultimate objects of the production of nutrient media are, however, not concerned solely with the compounding of material for exhibiting the growth of bacteria from the visual standpoint. They include also a conception of the biochemical activities of the micro-organism, and envisage the possibility of developing the varying antigenic capacities and agglutinable properties which are manifested during the course of an infection.³ They may even foreshadow the reproduction *in vitro* of the various factors which confront the bacterium when seeking its food in living animal tissues. Media intended for isolation purposes only might be considered, therefore, as a blend of specific amino-acids and other compounds habitually used by the parasite, dissolved, or constituted, under those physical conditions best suited for its enzymic actions; while media devised for the purposes of immunity might be expected to incite bacterial growth under conditions approximating to the lytic and physical changes which accompany vital response to an irritant.

Towards some of these aims our work on the purification of peptones was directed.⁴ Its continuance was prevented by the onset of routine military work; but the introduction of numerous new media designed to meet restricted food supplies has opened up a number of complexities. It seemed worth while, therefore, to make an attempt to consider these from the standpoint of the gross amino content, leaving the previously proposed examination of particular amino-acids to a later investigation.

One of the reasons which led Cole and Onslow to adopt the casein preparation known as "laitproto" as a base for the production of a nutrient medium was the fact that it yielded regularly a rich and fairly equable supply of amino-acids in a tryptic digest.² Dorothy Lloyd, when using the same medium, observed that meningococcal growth increased in relation to the number of hours of digestion, and that as the percentage of amino-acids was raised the necessity for the addition of catalysing or vitaminic influences was decreased.⁵ Rettger, Berman, and Sturges suggested that, unless free amino-acids are present in a sufficient amount, the development of the enzymes necessary for the cleavage of such simple bodies as peptones and proteoses does not take place.⁶ As a practical application of these findings, Glynn, among others, prior to undertaking his extensive work on dysentery bacilli, determined the amino-acid content of several peptones and selected one which yielded a satisfactory formaldehyde figure.¹¹

In the preparation of nutrient media, therefore, it is essential to ensure that there is an adequate content of free amino-acids of low molecular weight. Hence we proceeded to estimate the amino content of ordinary and special media and to determine the minimal percentage necessary for effective growth.

The Formaldehyde Figures for Nutrient Media.

The estimation of the approximate amino-acid content may be carried out in a few minutes by the simple method described in Plimmer's handbook of biochemistry.⁷ It enables the results to be recorded in terms of N/10 alkali per 100 c.cm. of medium. Our findings are incorporated in Table I.

TABLE I.—*Amino-acid Content of Nutrient Media (Formaldehyde Figures).*

	N/10 Alkali per 100 c.cm.
1. Blood serum prepared for Loeffler's medium ...	22.5
2. Various commercial peptones:	
(a) 1 per cent. solution ...	5.0
(b) 1 per cent. " ...	6.0
(c) 1 per cent. " ...	8.75
(d) 1 per cent. " ...	14.0
(e) 1 per cent. " ...	25.75
3. Various beef extracts:	
(a) 1 per cent. solution ...	5.0
(b) 1 per cent. " ...	6.0
(c) 1 per cent. " ...	9.0
4. Various meat substitutes (yeast derivatives):	
(a) 1 per cent. solution ...	8.0
(b) 1 per cent. " ...	11.0
5. Vegetable broth:	
Potatoes 300 gm., carrots 150 gm., turnips 150 gm., water 1,000 c.cm. ...	2.5
Ditto, plus 30 gm. yeast, grown for 24 hours...	10.0
Ditto, plus 60 gm. yeast, grown for 24 hours...	18.0
6. Tryp-agar (500 gm. heart, water 1,000 c.cm., digested 3 hours):	
Digest 1 ...	29.0
Digest 2 ...	27.5
Digest 3 ...	25.0
7. Laitproto media (casein No. 6, 100 gm., water 1,000 c.cm., digested 15 days) diluted 1 in 3:	
Digest 1 ...	47.0
Digest 2 ...	53.0
Digest 3 ...	43.0
Digest 4 ...	48.6
Digest 5 ...	54.0
8. Soy-bean media (beans 100 gm., water 1,000 c.cm., digested 15 days) ...	55.5
9. Oat media (uncrushed oats 100 gm., water 1,000 c.cm., digested 15 days) ...	0.0
10. Maize media (uncrushed maize 100 gm., water 1,000 c.cm., digested 15 days) ...	0.0
11. Nasgar media with peanuts replacing nutrose, diluted 1 in 3 ...	36.0

Taking the contents of ox blood serum diluted for coagulation as Loeffler's medium, we may compare the figures of various composite media and of their several components. The differences in the amino contents of the several peptones are striking, and indicate the need for adjustment in the amount required for peptone water. It would be worth the while of commercial houses to guarantee a definite percentage of amino-acids and proteins in their products.

There is a similarity between the content of beef extract and yeast extract, although the amino percentage of each is inconstant. At its present low price the latter is the more economical. It cannot, however, be employed indiscriminately. From Table III it may be inferred that when used in quantities which are necessary for the early growth of bacteria in cultures, an inhibitory factor appears and growth is checked. The cause of this inhibition has not yet been fully worked out, but it is possible that an excess of potassium phosphate plays a part. These extracts seem to be useful as accessory constituents, but in view of other combinations of amino-acids which are free from their drawbacks, they may be regarded as emergency rations only.

The various formulae which have been suggested recently for vegetable broths have not yielded satisfactory media. Their authors have lessened an apparent cheapness by adding 1 or 2 per cent. of expensive peptone powder. We attempted to increase their amino values by the addition of varying quantities of baker's yeast, allowing growth to take place for a day, then heating the mixture for a few hours and finally digesting it with our own pancreatic extract for three weeks. The results were not encouraging. The ultimate amino content was increased, but the intestinal organisms alone grew easily in the medium. Antirax even gave a modified growth, owing apparently to the presence of some adverse cleavage substance.

The trypt-agar medium gives a small yield for the amount of muscle material employed.⁸ It is probable that the digest should be continued for a longer period. At the present time and in its present form it is one of the most expensive of our media, and yet requires the addition of a catalyser or vitamin to render it useful for those bacteria which grow with difficulty on artificial media.

The laitproto medium contains a high percentage of amino-acids and is economical.² Different digests are not constant, but the amino contents can be adjusted easily. Nasgar, in which peanut powder replaces the nutrose, as suggested by Wallis, has a good amino content, and is an improvement upon the ordinary nutrose nasgar.⁹

With the digests of oats and maize soups we have not yet been successful. Other proteolytic ferments are perhaps necessary. But from soy beans we have obtained a useful extract which promises well. Not only does it yield a high amino content and furnishes a cheap medium for routine work, but it appears to provide dysentery bacilli with some specific nutrient. Sown with the strains of Shiga and Flexner which we possess, such a profuse growth appeared that it seemed possible to think of it as an enrichment medium for these bacilli. As a useful addition to the brilliant green method of isolating pathogenic intestinal organisms it calls for trial, as it occasions peculiar and distinctive colonies also with typhoid and the paratyphoid bacilli. These preliminary statements may perhaps tempt others to test our findings with their own strains. The following example may be of interest:

To an emulsion of one of the stools under examination for dysentery bacilli there was added a loopful of a twenty-four hours' growth of Shiga bacilli in a fluid medium; to another emulsion of the same faeces a similar quantity of Flexner bacilli was added. A standard loopful of the faecal mixture was then transferred to 1 in 1,000 brilliant green media. After incubation for twenty-four hours the usual quantitative plating was carried out. The figures were as follows:

TABLE II.

Brilliant Green 1 in 1,000.	Amino- acid Content.	Shiga: No. of Colonies.	Flexner: No. of Colonies.
In laitproto ...	36	6	0
In 2 per cent. peptone water ...	6	1	0
In soy bean broth ...	55	41	2
In soy broth plus alcoholic extract soy beans	55	68	20
In soy broth plus watery extract soy beans	55	41	20

The soy bean vitamins appear therefore to act vigorously with regard to growth stimulation. They are considered in a later section.

The Percentage of Amino-acids Necessary for Bacterial Growths.

In order to ascertain more closely the part played by amino-acids in nutrient media—namely, whether they form the main food of the bacterium, or constitute only an easily assimilated nutrient ensuring a sufficiency of metabolism for the formation of substances capable of breaking down proteoses or proteins—it is necessary to determine the minimal and maximal quantities of amino-acid required by the various pathogenic organisms. The quality of the amino-acids is, of course, an important factor, but we are compelled to leave this for the moment; the fringe of the question which we touched upon in the previous work on Silk peptones opened up problems too large for discussion at present. The use of single or grouped amino compounds produced so many alterations in the usual sugar and other reactions that it is better for the time being to keep to the general standpoint.

The results of the growth of non-proteolytic bacteria in solutions of varying amino-acid density are recorded in Table III. The relation of amino to albumin content in the media for the proteolytic types is not yet defined.

In these observations certain empirical figures are employed to denote the number, size, opacity, etc., of the colonies upon solid media when compared with those yielded by the media we are accustomed to in our daily routine work. The inseminations were made by using a standard loopful of a twenty-four hours' culture standardized according to the methods employed in agglutination work. The estimations of the growths were made after twenty-four and forty-eight hours. The media were all filtered repeatedly through dense paper, in order, so far as possible, to remove the vitamins. Dilutions of the resultant extracts were made, and the formaldehyde figure determined for each solution. It was recognized that simple calculations would not exclude the varying solubilities of the

different amino-acids, and that it would be more precise to add an exact amount of each amino-acid to the solutions. We have not yet, however, reached the stage when the isolation of the individual amino-acids has become a matter of practical application.

TABLE III.—*Bacterial Growth in Media Varying in Amino Content.*

Medium.	Amino-Acids.	COCCI.			BACTERIA.						
		Meningo.	Strepto.	Pneumo.	Coll.	Typhoid.	Para A.	Para B.	Shiga.	Flexner.	Anthrax.
Vegetable broth ...	2.5	0	2	0	3	1	0	1	0	1	2
Ditto, plus 1 oz. yeast	10	0	2	2	5	1	1	1	1	1	0.5
Ditto, plus 2 oz. yeast	18	0	2	2	6	2	1	1.5	1	2	0.5
Yeast extract—1 per cent.	8	0	2	2	6	2	3	1	2	4	2
4 per cent.	32	0	0	0	5	3	2	4	0	4	3
6 per cent.	48	0	0	0	4	3	1	4	0	4	2
Tryp-agar ...	27.5	3.5	5	4	5	5	5	5	5	5	4
Nut nasgar—(a) ...	36	4	7	3	5	5	5	5	5	5	5
(b) ...	18	0.5	1.5	2	4	4	4	4	3	4	4
(c) ...	13.5	0	0.5	0.5	3	4	2	4	3	4	3
(d) ...	9.5	0	0	0.1	2	2.5	1.5	3	1	3.5	2
Laitproto—1 ...	48.6	5	4.5	4	5	5	5	5	5	5	5
2 ...	36	4	3.5	4	4	5	4	5	3	4	4
3 ...	26.5	2	2	1	3	4	4	5	3	4	3
4 ...	17.5	0	1	1	2	3	2	4	1	2	2
5 ...	14.5	0	0.25	0.5	2	2	1	4	0.5	2	2
Soy bean—(a) ...	55.5	2	5	2.5	6	4	3	6	8	6	7
(b) ...	31	0	2	2	5	4	3	5	6	5	6
(c) ...	25	0	1	0	4	4	2	4	5	4	5
(d) ...	12.5	0	0.25	0	3	3	1	3	4	3	3
Oat broth ...	—	0	0	0	5	0	1	2	0	1	0
Maize broth...	—	0	0	0	5	0	1	1	0	0	0

A glance at the findings summarized in Table III will reveal the fact that the meningococcus fails to grow upon any medium which contains less than the amino content represented by the formaldehyde figure of 25, while streptococci are able to multiply at a lower percentage. It seems, therefore, that the formaldehyde figure designed for the Gram-negative cocci and for the pneumococci and streptococci need not be more than 40 and should not be less than that amount. The intestinal organisms, on the other hand, are habituated hereditarily to the scantiest of fare, but even they require a minimum of 20 for the production of representative colonies and reactions.

It seems a feasible proposition for a provisional standard to take these two figures and to adjust our media thereto. Such a procedure would simplify methods of preparation, in that, once a concentration of 40 was obtained, it would be the easiest of proceedings to add the necessary dilution of sterile melted agar or normal saline.

The Influence of Vitamines on the Amino-acid Content.

The addition of accessory factors to nutrient media has passed into general use. It has assisted materially in the profuseness of primary cultures, but has introduced some difficulties and not a few contaminations. How far the increased growths are due to these super-nutrient substances is a question asking for solution, and one which affects somewhat the institution of any amino standard. To deal with the matter from the quantitative standpoint is far from easy, but an attempt has been made to add roughly similar amounts of various vitamines to the media used in the experiments.

For the preparation of the vitamines 20 grams of egg yolk, oats, pea-flour, or ascitic fluid were added to 100 c.cm. of 80 per

cent. ethyl alcohol and extracted at 37° C. for four days. The supernatant fluid was then decanted. Calculated amounts were added to each medium at the time the plate was poured. In some instances the alcoholic extract was added directly; in others the alcohol was evaporated to dryness at 37° C. and the residue taken up in sterile water. Examples of the results attained are given in Table IV.

TABLE IV.—*The Relation of Amino Content and Vitamines.*

(Vitamines prepared by adding 20 grams of powdered substance to 100 c.cm. 80 per cent. alcohol, extracting at 37° C. for four days and decanting the supernatant fluid.)

Medium.	Amino-Acids N/10 Alkali.	No Vitamine.	0.25 % Egg Yolk.	0.25 % Pea Flour.	0.25 % Oat Flour.	0.25 % Ascitic Fluid.
MENINGOCOCCUS.						
Laitproto ...	35	4	6	6	4.5	6
" " ...	26.5	2	4	4	3	5
" " ...	17.5	0	0	0	0	0
" " ...	14.5	0	0	0	0	0
Yeast extract ...	8	0	3	3	3	2
" " ...	32	0	0	0	0	0.5
" " ...	48	0	0	0	0	0.5
PNEUMOCOCCUS.						
Laitproto ...	35	4	0.5 % Egg Yolk.	0.5 % Pea Flour.	0.5 % Oat Flour.	0.5 % Ascitic Fluid.
Yeast extract ...	8	2	4	4	4	4
Vegetable broth and yeast	17	2	2	2	1	2
STREPTOCOCCUS.						
Laitproto ...	35	4	5	5	5	5
Yeast extract ...	8	2	6	5	4	4
Vegetable broth and yeast	17	2	1	1	1	1

In the case of the meningococcus, it was evident that on laitproto growth appeared so long as the amino content did not fall below 20, but that when that percentage was not reached the stimulating factors failed to act. On yeast extract media, however, the vitamines induced growth when the amino content was lower. An explanation of this may, perhaps, be found in the large amount of nucleic derivatives present in yeast mixtures.

With pneumococcus and streptococcus the presence of vitamines was similarly associated with an increased growth, although for these organisms a lesser density of amino-acids suffices.

The source of the vitamines seemed to be immaterial, within limits. Those obtained from soy bean, however, appeared to exert some specific action upon dysentery bacilli. When 2 per cent. peptone water, laitproto broth, and soy bean broth were quantitatively sown with dysentery bacilli and alcoholic or watery soy extracts added, the results appended in Table V were given.

TABLE V.—*Soy Bean Vitamines and Dysentery Bacilli.*

(20 grams soy bean powder, 100 c.cm. 80 per cent. alcohol, extracted at 37° C. for four days; extract decanted off.)

Medium.	Amino N/10 Alkali.	No Vitamine.	Plus Alcoholic Extract 1 %.	Plus Watery Extract 1 %.
SHIGA.				
Soy bean ...	55	1	10	8
Peptone water 2 %	12	0	3	0
Laitproto ...	45	2	4	2
FLEXNER.				
Soy bean ...	55	2	10	8
Peptone water 2 %	12	1	5	3
Laitproto ...	45	2	4	2

Although an acceleration of growth became evident in all the media, the most marked increase was evident in the soy broth. This observation led to the inclusion of

soy bean vitamine in the brilliant green soy broth previously employed for the isolation of dysentery bacilli from faeces. The cultures appeared free from turbidity, but, upon plating, an adequate growth of dysentery bacilli followed. Both the alcoholic and the watery extracts were effective, although the alcoholic appeared to act best. The observation will be applied more fully during the coming autumn work.

REMARKS.

We venture to submit that a proposal for the general adoption of a uniform amino-acid standard content for nutrient media may be supported by the following considerations:

(a) Teaching would be simplified, in that the student would be less confused by differences in size, contour, opacity, etc., of colonies grown on media of varying contents.

(b) A standard of nutrition would increase the comparative value of work carried out in different laboratories.

(c) The action of bacteria upon secondary substances, such as starch, sugars, alcohols, etc., would be more precisely estimated when adequate free amino-acids were invariably available. Troubles with late lactose fermenters, poor indol producers, mutations, etc., might be lessened.

(d) For use in vaccines and for antiserum production the antigenic properties might be less variable.

(e) In the preparation of emulsions for purposes of agglutination there might be a more equally agglutinable type of bacillus.

(f) A considerable economy in material, time, and labour would be effected, and a wastage of superfluous nutrition prevented.

The suggestions embodied in (c) and (d) have been prompted by the indications of some preliminary work which is now in hand. They seem to bear a particular application to the Gram-negative cocci.

We are aware that the proposition does not envisage any standardization of the vitamine fraction. The addition of vitamin is rather an art than a science at present, and fortunately it is less necessary when the amino-acids are in excess.⁵ We may also deplore that it does not attempt to construct a medium which reproduces the physical changes which occur in infected tissue, or take into account the action of the secondary products of bacterial action. When Sasaki and his co-workers have developed this side of the problem more fully we may be led to consider the provocation of prophylactic immunity on more strictly physico-chemical lines.¹⁰ Nevertheless, working always with a standard measure of nutriment, we may obtain more concordance in our cultures and perhaps gain a broader insight into the mutations of bacterial action during latent or active infections.

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AN ANALYSIS OF CAUSES OF BREAKDOWN IN FLYING.

WITH NOTES ON THE NERVOUS MECHANISM OF
THE FLYING MAN.

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For this analysis one hundred consecutive cases were taken. Nothing was done in the way of selection of cases, which all came under review by the Royal Air Force Special Medical Board, E.E.F.

Breakdown is the term I have chosen to describe those patients who were rejected by the Board as "permanently unfit," for permanent cannot be looked on as other than a relative term. None can say how far many of these rejects may ultimately recover, but I can safely assert that

none will be fit to fly for six months, most not for years, and some (in the case of those breaking down under training, probably many) never.

A. Categories Examined.

Qualified pilots ...	33
Qualified observers ...	3
Qualified balloon officer ...	1
Total qualified flyers ...	37
Pilots under instruction ...	61
Observers under instruction ...	2
Total pupils ...	63
	100

B. Causes of Failure.

1. Psychological or subjective—"Nerves," loss of confidence, or general nervous breakdown:

Qualified pilots ...	20
Pupil pilots ...	44
Qualified observers ...	2
Balloon officer ...	1
Total ...	67

2. Objective nervous conditions:

Epilepsy and fainting fits ...	4
Giddiness, nausea, vomiting in air ...	11
Total ...	15

These are closely allied to Group 1. The total failures in "Nerves" group = 82 per cent.

3. Physical complications:

Visual troubles, mostly bad landings ...	4
Heart disease ...	4
Crash injuries (direct) ...	2
Tubercle ...	3
Asthma ...	1
Various ...	4
Total ...	18

C. Points Reported on.

The following are the chief points recorded in the nervous subjective group (67 cases), which is that specially selected for this article:

Nervous family history ...	18 = 27 per cent.
Nervous personal history ...	27 = 40 "
History of previous nervous breakdown ...	20 = 29.8 "
Bad dreams, nightmare, or somnambulism—	
In infancy ...	14 = 20.9 "
In adult life ...	37 = 55.2 "
History of concussion or shell shock ...	25 = 37.3 "
Evidence in higher cerebral centres—that is, impairment of memory, concentration, judgement, temper ...	35 = 52.2 "
Malaria ...	24 = 28 "
Reflexes—	
Normal ...	11 = 16.8 "
Exaggerated + ...	20
" ++ ...	26 = 82.2 "
" +++ ...	9
Absent (syphilis? tabes) ...	1 = 1.5 "
Tremor + or ++ ...	49 = 73.1 "

Of the 67, only 2 could not be placed under one or more of these headings: one was a qualified observer who, being shot down, had no further confidence in the pilots; the other, who had had a crash, was congenitally stupid and dull. Of the 24 malarial cases 17 occurred in officers who had been on service and whose mentality was manifestly affected thereby.

D. Effects of Crashes.

Of the 67 who lost their nerve a considerable number had to be rejected after crashes, either very recent or somewhat more remote. Many of these cases occurred amongst observers returning from service to qualify as pilots. These men invariably claimed that they had got over their crash, but this was found by experience not to be the case.

Loss of nerve after crashes—	
Qualified pilots ...	13
Pupils ...	18
Total ...	31
Loss of nerve, no crash ...	36
Grand total ...	67

Of the twenty qualified flyers who lost their nerve the history is:

After aerial fight ...	2
Stress of service ...	6
Stress of service in German East Africa (a malarial country) ...	2
Crashes ...	9
Crashes (alcoholic excess) ...	1
Total ...	20