treatment of rheumatoid arthritis by injection of non-specific proteins.

We have no precise knowledge of the actual mechanism of these focal reactions in the infected subject, though many hypotheses have been put forward. It is generally believed that the ultimate effect in any case is to produce a greater flow of blood through any indolent inflammatory foci that may be present, with the result that the normal cellular and humoral defences are allowed to come into play. Possibly it accomplishes for the unseen indolent lesion what the surgeon's bistoury does for the visible carbuncle.

Non-specific protein therapy has really a very long history if all the phenomena provisionally assigned to this category do rightly belong to it. We have the mutual interaction of concurrent infections with the ousting of the more chronic by the more acute as evidenced by observations on erysipelas supervening on more chronic processes. The use of Coley's fluid was an attempt to apply this principle to the treatment of sarcoma. The experimental induction of malaria for the amelioration or cure of general paralysis is another instance of prolonged and repeated protein shock therapy. So also is the Schiötz treatment for diphtheria carriers which would seem to depend for any attendant success on the inflammatory reaction produced by the staphylococci sprayed on the throat. Many other phenomena, such as the occasional dramatic effect of normal horse serum in septicaemias, the use of auto-serotherapy and of multiple bleedings, come probably into the same category.

I conclude, therefore, that so far as the early effects (euphoria, focal and general reactions, etc.) following an injection of vaccine are concerned, the action is entirely non-specific. There is no warrant for assuming that the organism, a vaccine of which happens to give a focal reaction in a particular case, is etiologically related to the case. One bacterial colloid can be more potent than another in the production of immediate physiological effects.

In many cases it is the action of the non-specific element of the vaccine that we wish to elicit with a view to cure. This is certainly so in the acute infections and in the more chronic infections (for example, the arthritic) also; we gather that the object now usually aimed at is to produce focal and general reactions by repeated administration of non-specific substances in appropriate dose.

Vaccine therapy, however, as ordinarily practised, involves the repeated injection of a vaccine with a view, not only to cure of an existing infection, but also to prevention of subsequent infection, and here vaccine therapy and vaccine prophylaxis meet on common ground.

Theoretically, therefore, as in ordinary vaccine prophylaxis, specificity of antigen must, at least in our present state of knowledge, be the highest possible if we are to expect the best results. The difficulty arises in preparing a vaccine that can be regarded as specific in many of the affections for which vaccines are used. Valuable information on this point may be expected from those recently organized attempts to control the prevalence of respiratory affections in boarding-schools and institutions by prophylactic vaccines. It is greatly to be hoped that these efforts will be so directed that comparative knowledge may be gained on many important particulars—such, for example, as the qualitative and quantitative vaccine formulae.

SUMMARY.

To sum up briefly what I have put before you, I have emphasized the importance of the non-specific element in vaccine therapy in its purely curative aspect, without ignoring the possible benefits that may accrue from repeated vaccine administration with a view to prophylaxis. I should like to say, however, that in giving my impressions of the rationale of vaccine therapy I have merely been elaborating views that have long been entertained by immunologists but have, I believe, not been adequately ventilated among those who daily practise the method. My object has been achieved if what I have said may help the practitioner to view his aims and achievements in vaccine therapy from a somewhat less conventional angle.

ON THE CONTROL OF HEART DISEASE IN CHILDHOOD.

BY

MARGARET F. LOWENFELD, M.R.C.S., L.R.C.P. Eng.

(From the Medical Department, Royal Hospital for Sick Children, Glasgow.)

ONE of the most serious issues presented to practical medicine to-day is the problem of cardiac disease in the young. By the estimate of Dr. Carey Coombs¹ the onset of two-thirds of our adult cardiac morbidity occurs during the period of life from 5 to 15 years of age. Dr. Askins states that we are losing 18,962 lives per annum from this cause alone, and there must not be forgotten in this connexion "long periods of illness, the misery of repeated breakdowns, and the immense industrial loss involved during the years which elapse between the time when the patient develops the disease and when he is ultimately killed by it,"² if we are to gain an idea of the magnitude of the problem involved.

It is now generally admitted that carditis in childhood is for all practical purposes a rheumatic manifestation; the problem of carditis is thus synonymous with the problem of rheumatism, and in practice the control of heart disease in childhood means the control of the rheumatic child. For this outlook on the question the British Medical Association is in no small measure responsible, and from the illuminating discussions of the whole question arranged by its Sections of Medicine, Diseases of Children, and Public Health in 1923 and 1925, a very considerable body of information has emerged relating to the manifestations of the disease itself and the available agencies for coping with it. A consideration of these discussions brings out clearly that rheumatism is an exceedingly long-drawn-out and chronic infection, which in all its forms should be considered as passing through three stages—the acute, the convalescent, and the quiescent. To be effective, therefore, any attempt at control of the disease must take cognizance of each of these, and be directed along three definite lines.

1. The Acute Stage.

That a very significant diminution in the incidence of carditis can apparently result from efficient handling of this stage has recently been brought out by Dr. Bertram³ in a survey of the after-history of cases treated at the Royal Hospital for Sick Children, Glasgow. She showed that whereas only 24 per cent. of those treated in hospital for their first attack of acute rheumatism or chorea subsequently developed carditis, this sequel occurred in 88 per cent. of those who were treated at home. This is the stage most easily reached by our present organization, and there seems no valid reason why the children's hospitals and the children's departments of the general hospitals at present existent could not satisfactorily cope with it so long as provision can be made to ensure a sufficient length of residence.

2. The Convalescent Stage.

Upon a satisfactory convalescence depends the child's chance of recovery from rheumatic fever or chorea without damage to his heart. The two essentials are: an adequate period of rest and a graduated return to ordinary conditions of living. Treatment of this stage of the disease, therefore, entails the adequate provision of convalescent homes or rest hospitals in sunny and dry areas, where children can receive medical supervision, graduated exercise, and suitable education.

3. The Quiescent Stage.

After the acute and convalescent stages have passed there is a further phase of the disease, extending over many years, and during which the possibilities of recurrences are always present. The very essence of the rheumatic infection is its chronicity and great tendency to relapse, and this third stage, which may be called the "quiescent stage," since no active manifestations are present, is of the greatest significance in any scheme for prevention. It will be readily understood that it is neither feasible nor desirable that this period should be passed in

hospital, yet it is during this time that need for watchfulness is greatest if the tendency to relapse is to be controlled.

It is here that the failure of our machinery is most apparent. While exhaustive and skilful care is expended upon the acute cases in our wards, and while public opinion is wakening to the need for further facilities for convalescents, no adequate provision exists for the vaguely rheumatic child, the child in the pre-rheumatic stage, and the child between his definite acute attacks.

In America a serious attempt has been made to tackle this side of the problem, and through the initiative of the Society for the Prevention and Relief of Heart Disease special classes (called cardiac clinics) have been created for the purpose. These provide continuous supervision for the rheumatic child during the whole of his pre-puberty life. American results show that by means of this kind of supervision the work of hospitals and convalescent homes can be conserved and so supplemented that a very large number of children and young persons can be rescued from the ranks of invalidism and returned to normal life.

An organized attempt to carry out such a scheme was inaugurated by William St. Lawrence* of St. Luke's Hospital, New York, in 1915. Stimulated by his record of the results obtained, an experimental clinic on the same lines was instituted at the Royal Hospital for Sick Children, Glasgow, as part of the medical department, in December, 1923. The aim of the clinic was to find out how far such supervision was practicable under British conditions, to what degree and by what means carditis in the children supervised could be prevented, and to devise a system of registration which should provide material for further study of the disease. The children attending the clinic had all been at one time resident in the Royal Hospital for Sick Children for attacks of acute rheumatic fever, chorea, or carditis, and formed part of the material used for an etiological and sociological survey carried out by Dr. Sutherland and myself, under the auspices of the Medical Research Council, in 1923-24.

CLASSIFICATION OF CASES.

For the proper conduct of such a clinic a satisfactory and practicable classification of the children supervised is a fundamental requirement. St. Lawrence classified his cases according to their cardiac efficiency, which he held could be satisfactorily estimated by means of the child's tolerance to exercise, and in his description of the clinic he details the special exercises adopted. Such a method of measuring cardiac efficiency we found, at least in the children coming under our care, not to be practicable, and we entertain grave doubts if any exercise can be performed by every child with sufficient concentration and uniformity to render it an adequate basis for classification. Before deciding, however, to abandon St. Lawrence's procedure a number of experiments were carried out, not only with the "Lewis class exercises" recommended by St. Lawrence, and with other similar tests, but also by means of an ergograph and the spirometer. In the case of the latter two methods, the reactions of both normal and cardiac children were investigated. The results of these demonstrated to us the inadvisability of placing reliance upon any such tests for general use with young children. We therefore devised in its stead the following simpler classification embracing seven groups, based on the past histories of the children and the present cardiac findings by ordinary clinical methods. Upon this classification the whole work of the clinic depends. It is as follows:

CLASS P. Potential heart cases—that is, cases with definite rheumatic history who have never had cardiac involvement and are now well.

CLASS A. Cases with a history of definite rheumatism with cardiac involvement, which has now disappeared.

CLASS B. Cases with a definite rheumatic history and present signs of cardiac involvement but no symptoms referable to the heart.

CLASS C. Cases with a definite rheumatic history and present signs and symptoms of cardiac involvement but no disability for ordinary life.

CLASS D 1. Cases with a definite rheumatic history, present signs and symptoms of cardiac involvement, and definite disability for ordinary life.

CLASS D 2. Cases without a rheumatic history, but showing

signs of a cardiac lesion, and with some definite disability for ordinary life (fainting, dyspnoea, precordial pain, etc.).

MISCELLANEOUS. Cardiac irregularities, effort syndrome, erythema nodosum, and cutaneous eruptions supposed to be of rheumatic origin.

The actual carrying out of the work is as follows. The clinic meets once a week, at a time which does not interfere with the children's school attendance, in an ordinary room of the hospital. No special apparatus beyond a weighing scale is used. Upon the arrival of a new child at the clinic he is stripped and his weight, temperature, and pulse are taken; these are entered on a slip of paper, with which, still undressed, he approaches the doctor. For each child there is a complete clinical sheet, on which an abstract of his previous health and his hospital record have already been entered, with due note taken of the method by which he was treated in the wards. Complementary to this is a social record kept by the lady almoner which deals with the whole of the social side of the case. For convenience of reference these two are printed in different colours but filed together.

A complete examination of the child follows, with special attention to teeth, tonsils, stance, presence or absence of anaemia, state of the bowels, and general health. The mother is then interviewed, and points with regard to habits, etc., considered. Consultation with the almoner disposes of such matters as efficiency of clothing, holidays, trouble with school teachers, etc. The child is now graded, the degree for the present provisional, and treatment is begun. This is directed towards the clearing up of all septic foci in the body, the establishing of satisfactory and regular bowel actions, and where possible the rectification of unsatisfactory habits. Arrangements with the throat department make possible the prompt care of all suspect throats, and every throat not entirely normal is passed to this department for examination. All carious teeth, irrespective of dentition, are attended to, and no child of whatever age is allowed to retain a spot of caries in its mouth. All bowel irregularities are supervised and the child kept under observation until action has become satisfactory. If desirable and possible a holiday in the country is arranged for. Clothing is inspected, particularly boots, and where possible rectified. Home conditions are uncontrollable, but what modifications are possible are attempted, and pressure brought to bear with regard to regular meals, sleep, exposure, etc. Relations with school teachers are inquired into and where—as for example, in the case of those children suffering from chorea—these are unfortunate, co-operation with the school board can often bring about an improvement in affairs.

As regards drugs, a consideration of the relative efficiency of the different remedies from the standpoint of carditis has already been made by Dr. Bertram, and the superiority of salicylates, in our opinion, definitely shown. Sodium salicylate, therefore, forms the basis of all medicinal treatment in the clinic, and upon the reappearance of any rheumatic manifestations whatever a course of sodium salicylate is instituted. Even young children, it is found, can bear courses of 60 grains per diem with ease, provided it is combined with double the amount of sodium bicarbonate and precautions are taken against constipation. The mother of any child on sodium salicylate is advised as to the appearance of symptoms of intolerance, and instructed to suspend the drug for forty-eight hours on their occurrence. During the carrying out of all these procedures the child attends at the clinic when necessary. As soon as everything has been done that can be done, a further careful cardiac examination is made and a definite class assigned to the child. Under this letter he is registered, and on this his future attendance at the clinic depends. The intervals at which children attend the clinic are as follows:

Class P children at intervals of 4 months	
Class A children	3
Class B children	6 weeks
Class C children	4
Class D 1 and D 2 children	2

Attendance of Classes C, D 1, and D 2 vary greatly according to their condition, but upon a uniform basis of four and two weeks. Having once been graded the child attends according to his class, and at each subsequent

attendance the same procedure obtains. To facilitate the routine a rubber stamp has been prepared, giving the essential headings under which examination of the child is made. The use of this outline standardizes the record and ensures no point being forgotten.

It is the work of the almoner attached to the clinic to keep the attendance record in order and to notify the mothers, since the whole basis of the work rests upon systematic and regular attendance. No effort is spared to impress this fact upon the mothers and to secure their co-operation. A careful explanation of the importance of this point is always given at the clinic to each mother, and the reasons for the exact interval of attendance required for her particular child explained to her. Any mother has the right to bring her child to the clinic, whether in or out of her turn, if she fears the recurrence of trouble. After a time it has been found possible with nearly all mothers to gain their warm co-operation. Specially marked is the effect of this upon the general welfare of the children. Feeling that an interest is being taken in the child, as a rule the mother responds with an all-round improvement in care, as much in the points which have not been commented on as in those that have, and it is to this that a good deal of the results of the clinic can be attributed. In cases where prolonged effort has failed to secure the co-operation of the mother, either in the matter of attendance or in any of the procedures recommended by the clinic, the child's name is erased from the list.

To carry out the work of the clinic the staff for 1923 to 1924 consisted of one doctor, a lady almoner delegated to the clinic from the almoner's department, and a nurse. An assistant doctor and a voluntary visitor have since been added.

RESULTS OF THE CLINIC.

As the clinic has only been in existence for two years it is impossible to draw any far-reaching conclusions, but the following brief analysis of the *first year's* work is of interest and shows the value of such a department.

Total number of cases dealt with (57 girls, 36 boys)	93
Number discharged through lack of co-operation...	9
Number discharged as being too old	3*
Number transferred to home for chronic cases (since recovered)	1
Number transferred to other clinics	1
Number remaining on register	79
Number of meetings of clinic	48
Average attendance at clinic	8.2

* No children over 15 years are admitted to the Royal Hospital for Sick Children, Glasgow.

The cardiac condition of the children according to the above classification on their admission to the clinic was as follows: P, 26; A, 30; B, 23; C, 9; D 1, 1; D 2, 2; Miscellaneous, 2.

The fate of these children during the period under review was as follows: Recovered 5, improved 1, developed cardiac lesion 2 (moved to Class B), disabled 1 (since recovered), *in statu quo* 70. These changes in classification of the children are shown in detail in the following table.

<i>Improved.</i>			
Cases moved from Class C to A	...	...	1
Cases " " Class B to A	...	...	4
Cases " " Class C to B	...	...	1

<i>Worse.</i>			
Cases moved from Class P to B	...	...	1
Cases " " Class A to B	...	...	1

It is interesting to compare these facts with the figures for rheumatic recurrences, which are as follows: Arthritis 3, chorea 8, indefinite manifestations (myalgia and erythema nodosum) 2. The distribution of these recurrences among the children is shown in the following table.

Rheumatic Recurrences.	Class of Child.						
	P.	A.	B.	C.	D 1.	D 2.	Misc.
Acute arthritis ...	—	3	—	—	—	—	—
Chorea ..	—	5	3	—	—	—	—
Indefinite rheumatism ...	1	—	—	—	—	—	—
Erythema nodosum ...	—	1	—	—	—	—	—

It is worthy of note that 70 per cent. of the recurrences took place among Class A. In only one of these did a subsequent cardiac lesion occur, a result that can most probably be attributed to the thorough care and treatment accorded while in hospital.

During the second year of the clinic the fate of the same group of children was as follows: Died 2, disabled completely 1, developed cardiac signs 3, improved 1, and recovered 2. The changes in classification were as follows:

<i>Improved.</i>			
Cases moved from Class D 2 to B	...	...	1
Cases " " Class C to A	...	...	1
Cases " " Class B to A	...	...	1

<i>Worse.</i>			
Cases moved from Class P to B	...	...	1
Cases " " Class A to B	...	...	2

The incidence of rheumatic recurrence during this year was as follows: Arthritis 4 (1 acute, 3 subacute), chorea 10 (6 severe, 4 slight), chorea and arthritis 1, indefinite rheumatism 3. All these cases of acute arthritis were treated at home. The distribution of these recurrences according to the classification of the children is as follows:

Rheumatic Recurrences.	Class of Child.						
	P.	A.	B.	C.	D 1.	D 2.	Misc.
Acute arthritis ...	—	—	—	—	1	—	—
Subacute arthritis ...	1	—	2	—	—	—	—
Chorea ...	3	2	5	—	—	—	—
Chorea and arthritis ...	—	1	—	—	—	—	—
Indefinite rheumatism ...	1	2	—	—	—	—	—

A summary of the two years' work of the clinic is contained in the following table.

Class of Case.	Total.	First Year.		Second Year.		Improved.		Apparently Recovered.*	
		Died or Disabled.	Worse.	Died or Disabled.	Worse.	First Year.	Second Year.	First Year.	Second Year.
P. Rh.—Carditis ...	26	—	1	3	1	—	—	—	—
A. (Rh., old + Card.)—Card.	30	—	1	—	2	—	—	—	—
B. Rh.+Card.—Symps. ...	23	—	—	—	—	—	—	4	1
C. Rh.+Card.+Symps. ...	9	—	—	—	—	1	—	1	1
D 1. Rh.+Card.+Symps.+ Disability	1	—	—	—	—	—	—	—	—
D 2. Card.—Rh.+Symps. ...	2	—	1	—	1	—	1	—	—
Miscellaneous ...	2	—	—	—	—	—	—	—	—

In the first year 70 patients remained *in statu quo*, and in the second year 62.

* Since the work covers only two years, nothing final can be said as to this class of child.

With regard to the two fatal cases and the one child disabled during the second year, it should be recorded that in each instance hospital treatment had been prematurely terminated owing to ward infection, and that subsequent co-operation with the clinic had been most unsatisfactory. On the other hand, among those cases in which it was possible to carry out the full regime, no death has occurred, no permanent disablement, and no child has deteriorated to a point necessitating removal into Class C, while two children have been substantially improved and seven have recovered complete health.

CONCLUSIONS.

1. Any attempt to control the rheumatic infection in childhood must include provision for the acute, the convalescent, and the quiescent stages of the disease.

2. That by the establishment of a clinic of the kind described rheumatism in the children supervised can be

controlled, and the incidence of carditis reduced to a minimum.

3. That in it an instrument of research is provided for increasing our knowledge of the heart of the child and its response to the rheumatic toxin, and that the correlation of records obtained in such clinics would throw very valuable light upon the nature of the disease.

4. Finally, that the cardiac classification proposed offers a suitable basis for such correlation.

It is a special pleasure to record our indebtedness to Miss Watson, almoner, for her invaluable assistance in the organization of the clinic, since the success of the department has been in a large measure due to her efforts. To Professor Leonard Findlay, to whose initiative the inauguration of the clinic was due, and under whose care it continues, I wish to express my sincere gratitude for his unfailing help and encouragement in the development and correlation of the work and the supervision of its details.

REFERENCES.

¹ BRITISH MEDICAL JOURNAL, October 31st, 1925, p. 791. ² Ibid. ³ Ibid., March 14th, 1925, p. 496. ⁴ Hospital Service Series, May, 1920, 151-181.

THE ACTION OF INTESTINAL EXTRACTS.

(Preliminary Communication.)

BY

W. E. DIXON, M.D., F.R.S.,

AND

J. H. WADIA, B.A., B.Sc.

(From the Pharmacological Laboratory, Cambridge.)

Cow and Dixon have shown that injections of boiled and filtered intestinal mucous membrane into dogs induce a secretion of pituitrin in the cerebro-spinal fluid. The effect is not immediate, and the pituitrin cannot be detected till about an hour after injection and does not reach its maximum for one and a half hours or more. The determination of the amount of pituitrin was made by the routine method on the uterus of the virgin guinea-pig. These observers also showed, however, that cerebro-spinal fluid so obtained exerts all the other known actions of pituitrin. The fact that the intestine is concerned in this secretion suggested to us that the pituitary secretion would likely be concerned with some digestive or metabolic mechanism. After numerous attempts to explain the secretion our efforts were at last led in the right direction by the observation of Burn that pituitary extract antagonizes the action of insulin.

If insulin is injected into anaesthetized dogs it produces a fall in blood sugar which reaches a minimum about three hours after injection. If in such an animal the cerebro-spinal fluid is tapped after the fashion of Dixon and Halliburton and tested for pituitrin it is found to be present one and a half to two hours after injection; that is to say, insulin increases the secretion of pituitrin just as it has been shown to increase adrenaline, but that this secretion is not obvious in the case of the pituitary until the blood sugar has been considerably reduced.

The following typical protocols will explain the nature of the experiments.

Experiment I.—Dog, male, weight 10.5 kilos. Anaesthetized by chloroform, then A.C.E., and finally morphine and urethane.

	Blood Sugar.	Pituitrin in C.S.F.
After 15 mins. anaesthesia ...	= 0.067	 —
After 45 mins. " ...	= 0.074	 —
After 1 hr. 15 mins. " ...	= 0.085	 —
After 1 hr. 45 mins. " ...	= 0.095	 —
After 2 hrs. 15 mins. " ...	= 1.040	 —
After 2 hrs. 45 mins. " ...	= 1.150	 —

Experiment II.—Dog, female, weight 12 kilos. Anaesthetized by chloroform, then A.C.E., and finally morphine and urethane. 24 units insulin were given intravenously fifteen minutes after anaesthesia.

	Blood Sugar.	Pituitrin in C.S.F.
Before injection and 14 mins. after anaesthesia ...	= 0.066	 —
3/4 hr. after injection ...	= 0.061	 —
1 1/2 hrs. " " ...	= 0.055	 +
2 1/4 hrs. " " ...	= 0.047	 ++
3 hrs. " " ...	= 0.043	 ++
3 3/4 hrs. " " ...	= 0.051	 —

Experiment III.—Dog, male, weight 10 kilos. Anaesthetized by chloroform, then A.C.E., and finally morphine and urethane. 20 c.cm. of boiled and filtered intestinal extract were given intravenously fifteen minutes after anaesthesia.

	Blood Sugar.	Pituitrin in C.S.F.
Before injection and 14 mins. after anaesthesia ...	= 0.074	 —
3/4 hr. after injection ...	= 0.069	 —
1 1/2 hrs. " " ...	= 0.060	 +
2 1/4 hrs. " " ...	= 0.052	 ++
3 hrs. " " ...	= 0.041	 ++
3 3/4 hrs. " " ...	= 0.047	 —

It will, of course, be suggested that the secretion of these two ductless glands is a provision for antagonizing excessive insulin action. The analogy between injections of intestinal extracts and those of insulin is so marked in this respect that we were induced to try the effect of alimentary extracts on blood sugar in rabbits. Injections of boiled and filtered duodenal mucosa in these animals induce a fall of blood sugar comparable with that of insulin. The fall often goes down to the convulsant level, though we have never been able to produce convulsions. The active substance is not secretin since it is destroyed by boiling with dilute acids, which process does not destroy the secretin, since we were able to show that the extract still contained a plentiful supply. Boiling with 1 per cent. sodium bicarbonate also destroys the blood sugar reducing substance. Boiled and filtered extracts of pancreas and many other tissues which we have used do not exert this effect. Ivy and Fisher state that the intestine contains one-fiftieth the amount of insulin of that in the pancreas. We have prepared insulin from the intestinal mucous membrane of pigs by the Dudley method; we are not prepared at the moment to give any figure of its amount, but it is considerably greater than that suggested by Ivy and Fisher. Nor at this stage are we prepared to offer information as to why this insulin body comes out in boiled intestinal extracts and not in other tissue extracts. We think, however, that the evidence suggests that pituitary secretion following the injection of intestinal extract is of the same nature as that which obtains after the injection of insulin.

A COMMENTARY

ON

TWO CASES OF HUNTINGTON'S CHOREA.

BY

ALAN F. GRIMBLY, M.A., M.D., D.P.M.,

DEPUTY MEDICAL SUPERINTENDENT,

AND

ISABEL G. H. WILSON, M.B., Ch.B., D.P.M.,

LATE ASSISTANT MEDICAL OFFICER,

SEVERALLS MENTAL HOSPITAL, COLCHESTER.

We have recently had under our care at Severalls Mental Hospital two brothers who suffered and died from Huntington's chorea. In view of the slight incidence of this disorder we venture to set forth in some detail an account of these cases based on our clinical and *post-mortem* investigations.

CASE I.

W. G., an ex-soldier, aged 34, was admitted to hospital on July 9th, 1917.

History.—The patient had served in the army for eleven years prior to 1914, and he re-enlisted during the war. He was appointed to the Field Artillery, and was stationed at Woolwich, but never saw active service abroad. A few months after re-enlistment he was sent to a military hospital for observation of his mental condition, and was found unfit for further service. He was discharged from the army and admitted to the local infirmary, being subsequently certified insane and sent to Cane Hill Mental Hospital, whence he was transferred to Severalls. He was stated to have contracted syphilis in India about 1906, and had been diagnosed as a case of dementia paralytica. A brother had died in Brentwood Mental Hospital.

Condition on Admission.—Mentally he was dull, apathetic, and took very little interest in his environment. He was rambling in his talk, and his memory was extremely defective; he could not remember his regimental number or the addresses of his near relatives. Speech was slurred. He was not hallucinated, but was restless, threatening, and inclined to be violent in his conduct. Physically he was well nourished, and showed no signs of injury. The cardiac, respiratory, and alimentary systems were normal. The pupils were equal, but sluggish in reaction to light. The knee-jerks were diminished and the gait was ataxic. He was