

SOCIAL AND PSYCHOLOGICAL ASPECTS OF SYDENHAM'S  
CHOREA

by

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Psychological and Social Aspects  
of Sydenham's Chorea.

I. Introduction.

In 1685 Thomas Sydenham gave an admirable clinical description of the disease to which his name is now attached. He ascribed it to a Humour which, entering into the nerves, irritated them and caused the movements (Latham, 1850: Babonneix, 1937). The two hundred and sixty years that have passed since then have yielded much information and produced a voluminous literature concerning the disease, but it is no great exaggeration to say that even to-day we cannot be much more accurate in our definition of its pathogenesis. The questions that still remain unanswered are (1) What is the nature of the "Humour" ? (2) What produces it ? and (3) How does it act to produce the resultant movements ? The answers given to these questions at any period during the past two hundred years commonly reflect the prevailing medical bias of their time and country of origin. A good deal was written in the 18th Century to which reference was made in a monograph by Bernt of Prague in 1810. In the same year Bouteille in Paris published a treatise and is said to have been the first writer to speak of Rheumatismal Chorea, though the association was also noted by/

by Bright in 1802, and Addison has been quoted as the first to draw attention to it. The great development of clinical Hospital Medicine of the 19th Century finds expression in the many studies which began to appear during this period in France, Germany, America, and notably in this country where the condition was particularly common - so common in fact that it was sometimes known on the Continent as Chorea Anglorum, though the appellation was mainly used for purposes of differentiation. The names of Sée and Roger in France: Romberg and Steiner in Germany: Weir Mitchell, Jacobi and Osler in America: and Fagge, Hughlings Jackson, Broadbent and Gowers in this country are among many associated with this stage. These studies established beyond doubt the close association of the condition with Juvenile rheumatism. They were based on systematic clinical observation and pathological investigation. In the latter part of the century the birth and development of Bacteriology opened a new approach and exerted a profound influence, - an influence that may be said to have been dominant until quite recently. Bacteriological approach combined with the clinically proven association of chorea with rheumatism went far to crystallise ætiological opinion, /

opinion, so that, as Usher wrote in 1938, the causal relationship of the latter to the former "has grown almost into a tradition." Since about 1935, however, certain considerations have caused an increasing number of workers, notably in North America (Gerstley, 1935; Coburn, 1937; Usher, 1938), but also in this country (Walker, 1935; Hubble, 1943), to challenge the validity of this tradition and to return to the more open-minded attitude of the pre- and early bacteriological era.

That Chorea could be induced by purely psychological influences was held by many of the older writers. Broadbent (1869) wrote "... I cannot but conclude that shock is not uncommonly the real cause of this affection", and looked upon "Chorea in the child as, in some sort, the equivalent of insanity in the adult." According to Von Ziemssen (1878), "Psychical disturbances, whether acting acutely in the form of fright or dread, or bringing to bear the slow depressing influences of sorrow and fear, of pain or discontent, are without doubt powerful agents in bringing the disease to an outbreak ...". Risien Russell (1899) asks "... how are we to explain by this hypothesis (i.e. that chorea is infective in origin) those instances in which the manifestations of/

of chorea have followed so closely on fright that it seems impossible to escape from the assumption that we are dealing with cause and effect ?"

In his skilful analysis of "The Nature of the Rheumatic Child", Hubble (1943) expresses the view that the bacteriological researches of recent decades "have produced much knowledge but no finality". "The comparative failure of these researches", he considers "demonstrates the need for returning to the pre-occupations of sixty years ago, to the study of the soil rather than of the seed, for it is here that the key to this 'peculiar type of host response' must eventually be found".

The writer's own views began to veer in this direction as a result of experience with a most unusual and interesting case of iatrogenic disease. The patient, a woman, first came under observation in 1932. At that time she was 53 years of age, and was already labeled with the diagnosis of Chorea which she was said to have had, with remissions, for twenty years. Her history briefly was as follows:- She was a member of a large family with a respectable and timid outlook on life and an unbounded respect for illness and the medical profession. She had scarlet/

scarlet fever at the age of 6, from which she appeared to make a complete recovery. At 13 she had rheumatic fever. She was medically examined by her own doctor a few years later as she contemplated taking up teaching as a career, and was found to have a cardiac lesion. From then onwards she suffered from dyspnoea on exertion. At the age of 32 she had a further attack of rheumatic fever, for which she was treated with absolute rest in bed and a diet which consisted almost entirely of milk and carbohydrates, and developed anæmia. She had been about eight months in bed when her father died. She was much distressed by this event. At this juncture, she received a severe shock. Her room was next to that in which the coffin was reposing. In the middle of the night the coffin, owing to faulty balance on the trestles, fell. The patient was greatly startled and from that time onwards was subject to violent choreiform movements of arms and legs. They ceased for a number of years to recur ten years later following a further shock, when her mother was taken to a nursing home for an operation. Again the movements gradually diminished and ceased, but recurred in eight years time following the death of a brother. They had continued without remission since/

since that time and by 1932, the time of examination, were induced by the slightest stimulus, such as a stranger talking in the house or a fly buzzing in the room. They were accompanied often by hyperpnoea. She had not been out of bed for 21 years. It was obvious that there was a powerful hysterical factor in this case and the diagnosis was consequently regarded as doubtful. Yet the essential points of such a diagnosis were present - the history of scarlet and rheumatic fevers, with subsequent carditis, and of specific incidents of shock and fear-producing experiences. It was equally obvious that if treatment were to be of any avail, it would have to be directed towards this psychological element. In the event, treatment on this line proved remarkably successful. Heavy sedation with luminal, as much as 6 grains daily, being continued for several weeks, eventually stopped the movements. Massage and a balanced diet improved the general health so much that after about a year it was possible to get the patient up and sufficiently well to go away for a country holiday. Salicylates were not used at all.

About this time it began to be appreciated that the erythrocyte sedimentation rate was a valuable guide/

guide to the progress of rheumatic disease as well as of tuberculosis (Hill, 1932 et al.), and it became a routine practice in most children's hospitals to carry out E.S.R. tests at regular intervals in all children with rheumatic disease. It was soon discovered that in a number of children with chorea, but without either arthritis, carditis or nodules, the readings were more or less normal. Here seemed to be another difficulty added to the known apyrexia and normal leucocyte counts in these children, in the way of accepting an infective process as an essential aetiological factor.

Might it be that chorea was in fact what to simple observation it appeared to be namely, an exaggerated fidgetiness resulting from prolonged apprehension and embarrassment, and that the frequent rheumatic concomitants were in casual and not causal relationship to it ?

It is surprising to find in the copious literature on this disease, one in which there is obviously a great disturbance of the emotions, so little record of attempts to investigate factors which might be expected to lead to such disturbance.

To/

To make a contribution to the study of such factors was the object of this investigation.

2. Present Investigation.

It was decided to make an attempt to study the soil in which chorea developed. For this purpose the mother (and sometimes also the father) or guardian of each child treated for chorea in the principal medical ward of the Royal Aberdeen Hospital for Sick Children, or in the outpatient department, was interviewed on one or more occasions. The object of the interview was to determine in addition to the usual history of birth, feeding, previous illness and family history, the presence of any factors which might adversely affect the child's mental and emotional stability. A pro-forma (Appendix - 1) was used to guide the investigation and explains the type of information that was sought.

It was felt that such adverse factors were most likely to be found in the circumstances of the home or of the school. In this connection it is interesting to note that while most authors refer to the possible ætiological influence of school life, comparatively little has been said of the part played by home circumstances. It is indeed hardly surprising/

surprising that school life should have attracted attention in the ætiological study of a disease of which the incidence is over 80% in the normal school age. An attempt was made to estimate the mental and emotional attributes and make-up of the parents. Relations with other children in the family, with other relatives and with neighbours were enquired into and an endeavour made to assess the physical and economic conditions of the home. Once the object of the enquiry had been explained, most of the mothers were readily co-operative: sometimes so enthusiastically so that their contributed information had to be accepted with a certain reserve. Information regarding school possibly suffered in accuracy by being obtained at secondhand through the parents but in a number of cases the parents had already discussed the situation of the child with the teacher, or did so after the first hospital interview.

Originally, 53 cases were studied. These represent for practical purposes an unselected series. During the years 1935 to 1939 inclusive, 72 cases diagnosed as chorea were treated in the hospital. In some of these cases it was not possible to arrange the necessary interview; and the whole enquiry had to be abandoned on 1st September 1939. It has been necessary/

necessary to discard seven cases on account of the incompleteness of the hospital records, and four others in which the diagnosis of chorea was not sustained (3 habit spasm, 1 hysteria). 42 cases, therefore, remain and form the basis of this study.

Ten of the children were referred to Mr Rex Knight, Lecturer on (now Professor of) Psychology at Aberdeen University, who is specially interested in Child Guidance. The only selection applied was that for the purpose of this reference town children were chosen to save expense to the parents from the country. One of the ten (Case No.15) had started her chorea when living in the country. A summary of Mr Knight's conclusions is contained in Appendix 4.

### 3. General Analysis of the Series.

In general, analysed as regards the points usually studied in such series, such as sex, age of onset, season of onset etc., the present series conforms to others investigated in this country.

#### (i) Sex.

Of the 42 children concerned, 27 were girls and 15, boys. Adding the seven cases omitted on account of incomplete records, the figures would be 33 and 16, giving the usual ratio of rather more than two girls to/

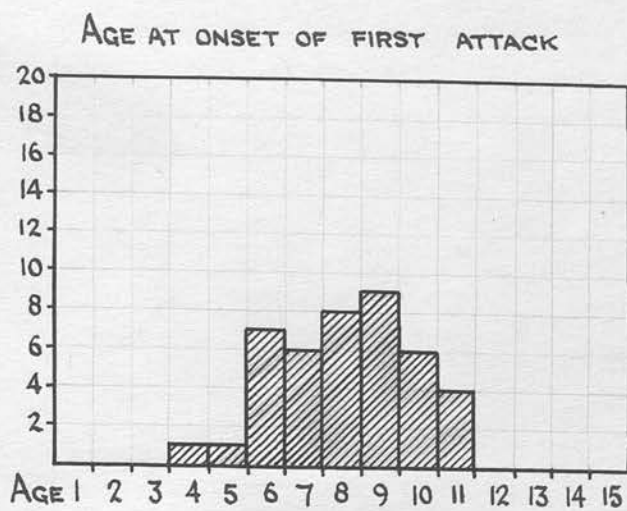


FIG. I.

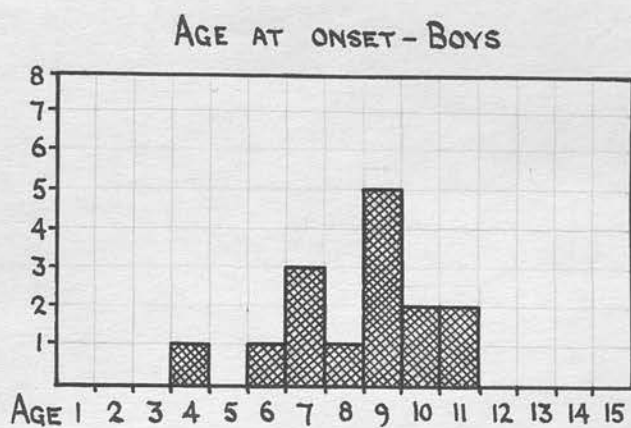


FIG. II.

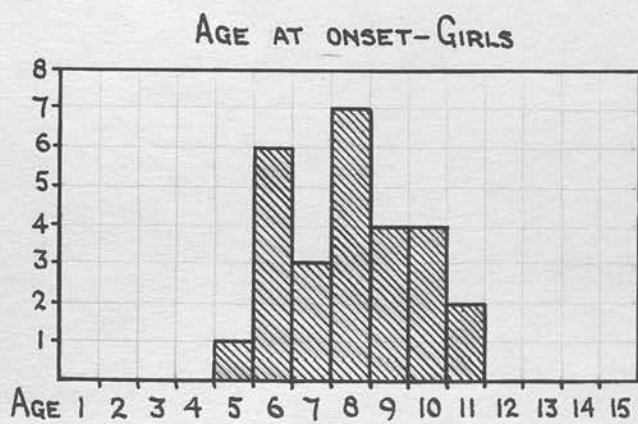


FIG. III.

to one boy.

(ii) Age at Onset.

The average age at onset of the first attack was almost exactly 8 years - in the case of the girls exactly 8 years and for the boys 8.1 years - though the greatest number of cases occurred at the age nine. A curious feature appears on plotting graphs of the age of onset. A combined graph (Fig.I) of the whole group shows a fairly steady rise from the age of five to a peak at ages eight and nine and thereafter a steady fall. If, however, the sexes are separated both curves show a drop in the middle of the rise, in the case of the girls (Fig.III) at the age seven and in that of the boys (Fig.II) at age eight. Though with such small numbers this feature may well be without significance, it is nevertheless interesting to note that the form of the curves is strikingly similar.

This age-incidence corresponds with that found by Walker (1935), who also found a secondary peak about puberty, but it differs to some extent from that given by Wilson (1940) who in discussing "the period of maximum liability" states that "from details concerning individual years that of puberty (13) is found to stand out, but in Fletcher's series of 600 cases/

cases (at Guy's Hospital) it was the tenth year." In neither case is it made quite clear whether the figures refer to the age at onset of the first attack.

The age-incidence in America seems to be higher than that recorded in the present series. Hedley (1940) in a series of 687 cases of all ages in Philadelphia gives the mean age as 10.5 and the median age as 10.1, "based on the age of the patient during the initial admission in the period under study". Hempelman (1925) places the greatest incidence "between the seventh and thirteenth years."

Since the present series deals only with children up to the age of twelve (the maximum age for admission to the hospital) and thus misses the 'puberty' cases, it is probable that the age-incidence agrees closely with that normally found. Out of the 42 children concerned, 36 began their first attack between the ages of 6 and 10.

(iii) Season of Onset.

Figure IV shows the month of onset of the 42 first attacks. Seventeen (40%) of these occurred in December or January and thirty-two (76%) between October and March. This winter preponderance is in line/

MONTH OF ONSET OF FIRST ATTACK IN SERIES

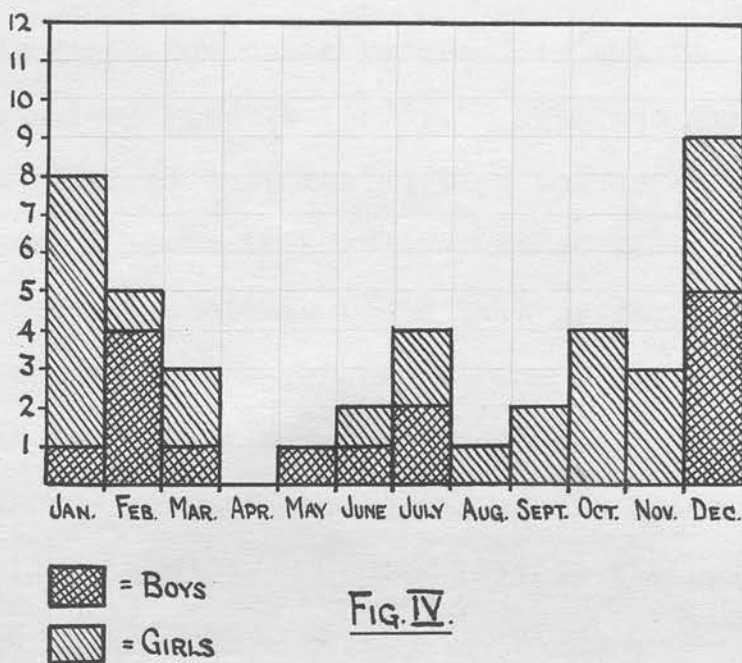


FIG. IV.

QUARTER OF ONSET OF FIRST ATTACK IN SERIES

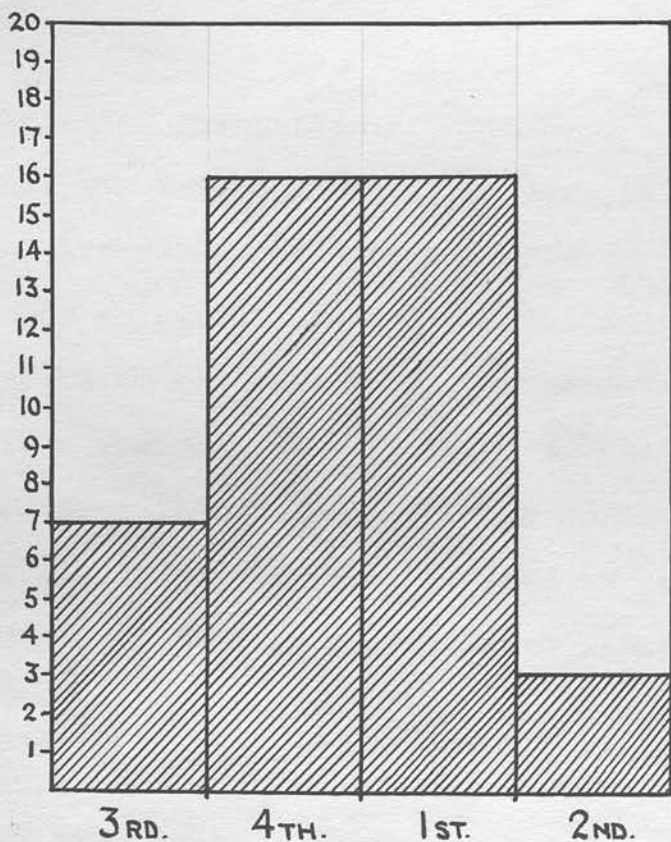


FIG. V.

line with the usual British experience. Wilson (1940) quotes Fletcher as finding 'peak' months in December and January in 574 cases recorded in the St. Bartholomew's Hospital Reports (1896). American experience on this point is more varied than the British, so that whereas Lewis in a collection of 1387 cases in Boston and Philadelphia found that by far the greatest number occurred in March, April and May, Abt and Levinson in Chicago reported that season did not play a constant role in their series of 226 cases (Abt, 1925; Wilson, 1940). Hedley (1940), taking the month of initial admission to hospital in 687 cases in Philadelphia, found a slight preponderance in the first half of the year (57.7%), and only 16.6% in the last quarter.

(iv) Associated Rheumatism.

Under the heading Rheumatism were included carditis, arthritis, nodules and growing pains. Where doubt existed, a positive finding was recorded. A history of tonsillitis was not regarded as evidence of previous rheumatism. If it were, then at least half the juvenile population of the North-East of Scotland would have to be considered as having suffered at one time or another from rheumatism.

A. Previous Rheumatism./

A. Previous Rheumatism. Fifteen (36%) of the forty-two children gave a positive history of illness which could be regarded as rheumatic, ten girls and five boys. Four others, two girls and two boys, had a history of chorea without other evidence of rheumatism (what has been called in America 'pure' or 'straight' chorea), making 19 (45%) in all with a possible history of previous rheumatism.

B. Concurrent Rheumatism. In seventeen of the children, thirteen girls and four boys, a rheumatic lesion was either present or suspected (in all cases carditis) during the period of hospitalization. In only one case (No.25) were nodules noted, and she also probably had a carditis. She had a B.S.R. of 20. Her subsequent history is encouraging. She had no recurrence of chorea, remained well, married and has a baby. In no case was concurrent arthritis observed. In six of these seventeen cases, the diagnosis of carditis was doubtful. In two the B.S.R. was normal, and all six subsequently remained well and without recurrence of chorea. Two, however, had had sore throats with fever within a month of admission.

Somewhere between 25% and 40% of the series may be considered to have had concurrent rheumatic/

rheumatic lesions. In sixteen of the series the E.S.R. was not found at any time during the period of observation to exceed 12mm. in 1 hour.

C. Subsequent Rheumatism. It has been possible to follow-up thirty-four of the series, twenty-four girls and ten boys. Unfortunately, it was not possible to examine them and the presence or absence of rheumatism or recurrence of chorea are estimated from the subsequent histories obtained by a lady social worker. Where a history of subsequent ill-health was obtained this has been recorded as rheumatism.

In general the subsequent histories show a gratifying absence of serious after-effects. For example, of the ten boys, one is in the Royal Navy, one in the Royal Marines, one in the Merchant Navy and one was in the Royal Air Force. This last, however, (Case 43) is the only one of the thirty-four who has died. He died early in 1945 of "heart trouble" after having served fifteen months in the Air Force. He had been passed fit on entry into the service. There was some doubt as to the condition of his heart at his last recorded examination at the hospital in the spring of 1937. The heart at that time was not appreciably enlarged, and no murmur was/

was detected. But the pulse-rate was rather fast and there was a persistent reduplication of the second pulmonary sound. Two others have passed their medical examinations as fit for service with the Forces. The remaining four are not yet of military age. One works with a fish company, one is a ship's carpenter and the other two are still at school.

Of the thirty-three surviving patients of the follow-up group, only three, all girls, now show evidence of ill-health and probably have residual heart lesions. Of these, two (8 and 23) are more or less chronic invalids and have had recurrences of chorea. The third is said to be "in fairly good health" but still nervous.

Of the remaining twenty-one girls, two are married and have babies and one is in the Women's Auxiliary Air Force. The others are either still at school or employed as maids, shop-assistants and the like.

Recurrences of chorea have been surprisingly few, only three of the thirty-four having had definite attacks of chorea since their discharge from hospital. Two of these are the invalid girls already referred to. The third (No.15) is said to have had "aeveral attacks" subsequent to her discharge but none since she left school. Two others/

others, one girl (No.35) and one boy (No.42) have residual fidgetiness when excited.

These results compare significantly with those of Sutton and Dodge (1938) who consider that "chorea should continue to be regarded not only as a manifestation, but as a major manifestation of rheumatic infection" and who treated it accordingly. They report that of thirty-seven cases followed for from four to six years, "50%" had recurrences. Wilson (1940) giving the findings in an aggregate series numbering 1,138 cases in all, records that 47% were found to have undergone multiple attacks.

Gerstley (1935) reported that "since the organisation of the special clinic for chorea, we have had very few recurrent attacks from our patients who have attended...regularly... The excellent results...indicate the importance of improved environment and mental hygiene in these patients." Markey (1936) expressed similar views while Usher (1938) believes that "failure to direct our treatment along these lines" (i.e. towards 'the basic nervous constitution of the child') "explains in/

in great part the frequent recurrences which take place after discharge from hospital."

D. History of Rheumatism in Siblings. Two of the twenty-seven girls of the series had siblings who had suffered from rheumatism, one of whom had also had chorea. A sibling of one of the fifteen boys had suffered from chorea.

(v) Town or Country Homes - Urban or Rural. Of the forty-two children of the series, thirty-four were from homes in the city of Aberdeen and eight from the surrounding country, that is, from the counties of Aberdeen and Kincardine. Approximately 80%, therefore, are children from city homes. It was felt that this figure might be weighted somewhat in favour of town cases by reason of the fact that the investigation involved one or more interviews with the parents at the hospital. However, on analysing the home addresses of the 131 children treated in the hospital for chorea from 1929 to 1942, it was found that 100 were from homes in the city of Aberdeen, i.e. 77%. It seems therefore that the special group is representative enough in this respect.

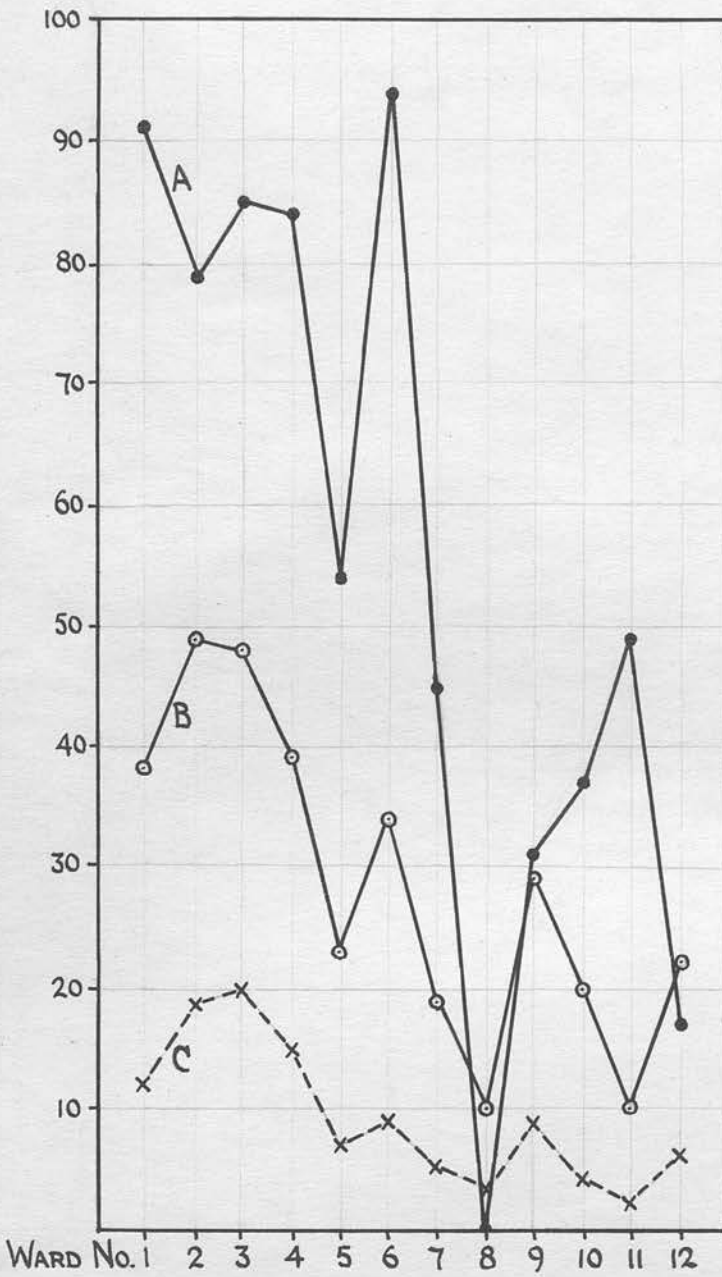
In the Report of the Committee

on/

on Scottish Health Services, 1936, the population of the city of Aberdeen is given as 167,000: that of the counties of Aberdeen and Kincardine combined as 180,000. While it is true that some country cases may be treated either at home or in Cottage Hospitals, it is unlikely that their number is high and there can be no doubt that the figures strongly support the accepted finding that chorea is chiefly an urban disease. If to the city children are added those who lived in street houses in country towns, the percentage rises to 87.

The total admissions to the hospital for the year 1945, exclusive of those admitted simply for tonsillectomy, was 2,322 of whom 1,191 (51%) were from the city of Aberdeen, 504 (22%) from country towns and 627 (27%) from the country.

(vi) Population Density and Chorea. Bruce Perry (1937) in an extensive investigation of carditis in children in Bristol found a significant correlation between the distribution of the cases and the density of the population in the different wards of that city. The above-mentioned 100 children from Aberdeen revealed a similar distribution. Fig.VI is a graph showing a) the number of cases of chorea per 100,000 of/



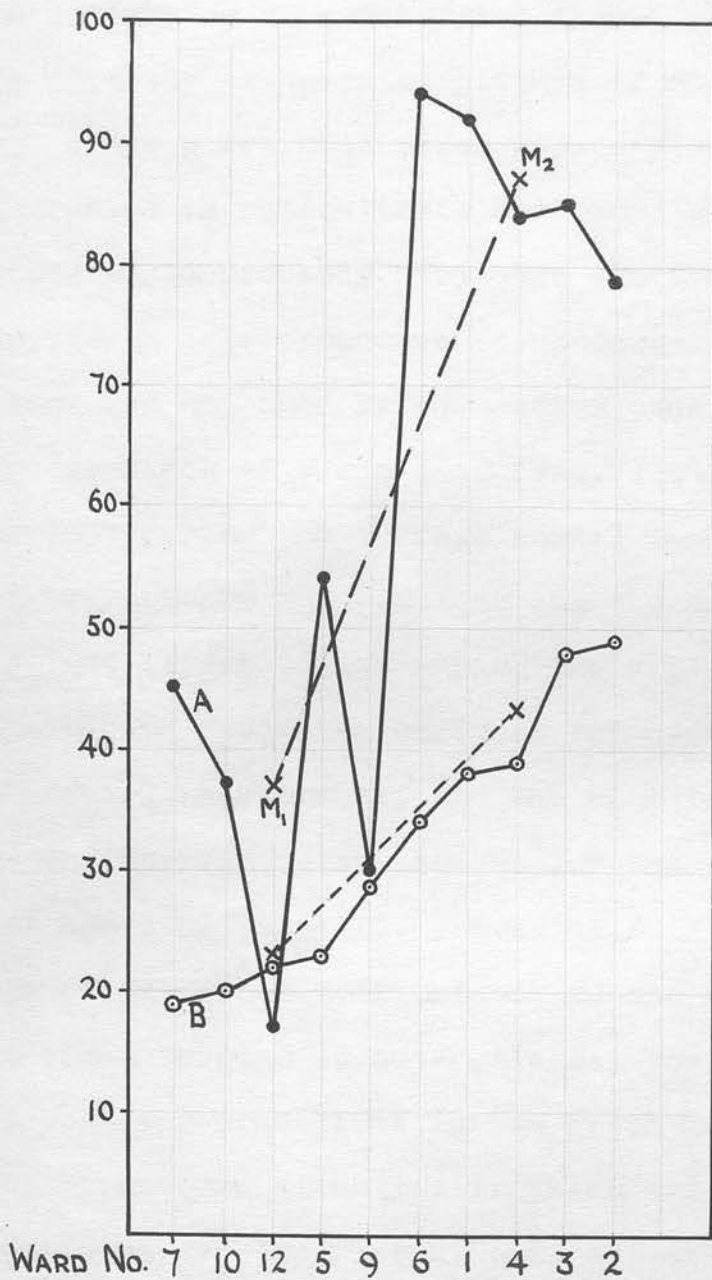
- A:- CASES OF CHOREA PER 100,000 OF POPULATION.  
 B:- % OF POPULATION LIVING 2 OR MORE PERSONS PER ROOM.  
 C:- % OF POPULATION LIVING 3 OR MORE IN THE WARDS OF THE CITY OF ABERDEEN.

FIG. VI.

of the population, b) the percentage of the population living more than two persons per room, and c) the percentage living more than three per room, in the different wards of the city. Though the numbers are small, the graph shows a general correlation. Ward No. 11 with a low population density shows a relatively high number of cases (six). Of the six cases from this ward, five came from one street which is situated in a slum clearance scheme and inhabited by people recently removed from the more crowded parts of the city. Fig. VII shows a similar graph of the ten city wards left after omission of this exceptional ward and Ward No. 8 (a 'west-end' one from which no cases were admitted), arranged in order of density of population. It will be seen that the case incidence from the five more crowded wards is more than twice that from the five less crowded. Hedley (1936) found the distribution of chorea roughly comparable to that of rheumatic fever except that a more general distribution is indicated.

#### 4. Effect of the War on the Incidence of Chorea and Rheumatism in North-East Scotland.

During the ten years 1930 to 1939 the annual average number of admissions for chorea to the Royal Aberdeen Hospital for Sick Children was 15.4. With the outbreak of war there was a spectacular drop in this figure, the annual average for the years 1940/



DISTRIBUTION OF 100 CASES OF CHOREA IN 10 WARDS  
 IN THE CITY OF ABERDEEN SHOWING  
 A:- CASES OF CHOREA PER 100,000 OF POPULATION,  
 B:- WARDS ARRANGED IN ORDER OF DEGREE OF OVERCROWDING,  
 M<sub>1</sub>:- MEAN OF 5 LEAST OVERCROWDED WARDS,  
 M<sub>2</sub>:- MEAN OF 5 MOST OVERCROWDED WARDS.

FIG. VII.

1940 to 1944 being 5. This last figure probably gives a slightly exaggerated picture of the fall in numbers, since a few mild cases were during the war period treated as out-patients who under pre-war conditions would probably have been admitted. A similar, though less pronounced drop occurred in the admissions for non-choreic rheumatism, the corresponding figures being 16.8 and 11.2 (Fig.VIII). During the 1930-1939 period the average annual number of medical in-patients was 508: during the war period 1940 to 1944 it was 472. During the pre-war period the non-choreic rheumatic children represented 3.1% of the medical in-patients, and the choreic children 3.0%. The corresponding figures for the war period are 2.4% and 1.0% (Fig.IX). Even allowing for the probable slight error attributable to the omission of mild cases treated as out-patients, these figures suggest that war conditions in the North-East of Scotland produced a situation in which children were less liable to develop chorea, whilst their susceptibility to non-choreic rheumatism remained relatively uninfluenced. The percentage of non-choreic rheumatics among the in-patients in 1944 was actually above the pre-war average.

The/

ADMISSIONS FOR CHOREA AND RHEUMATISM  
FROM 1930-1944 (INCL.) TO R.A.H.S.C.

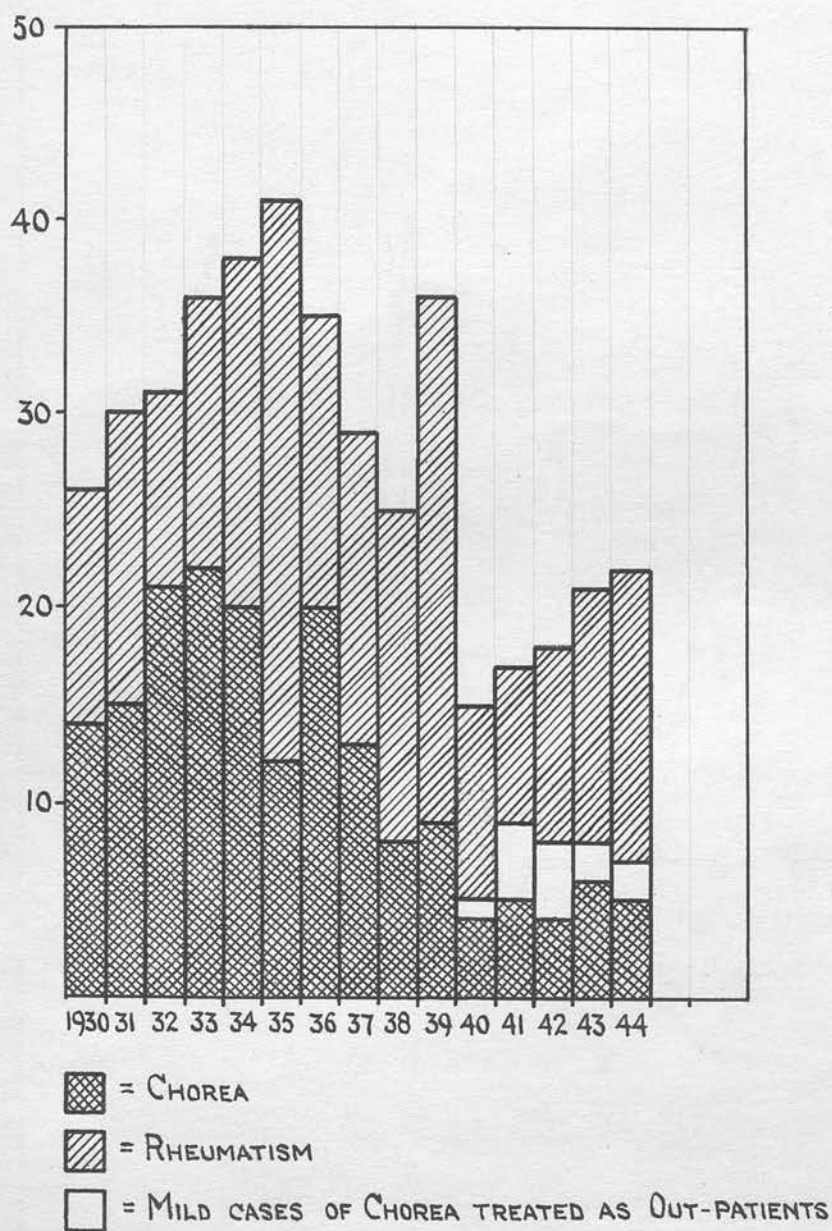


FIG. VIII.

PERCENTAGES OF CHOREA AND RHEUMATISM FROM 1930 TO 1944

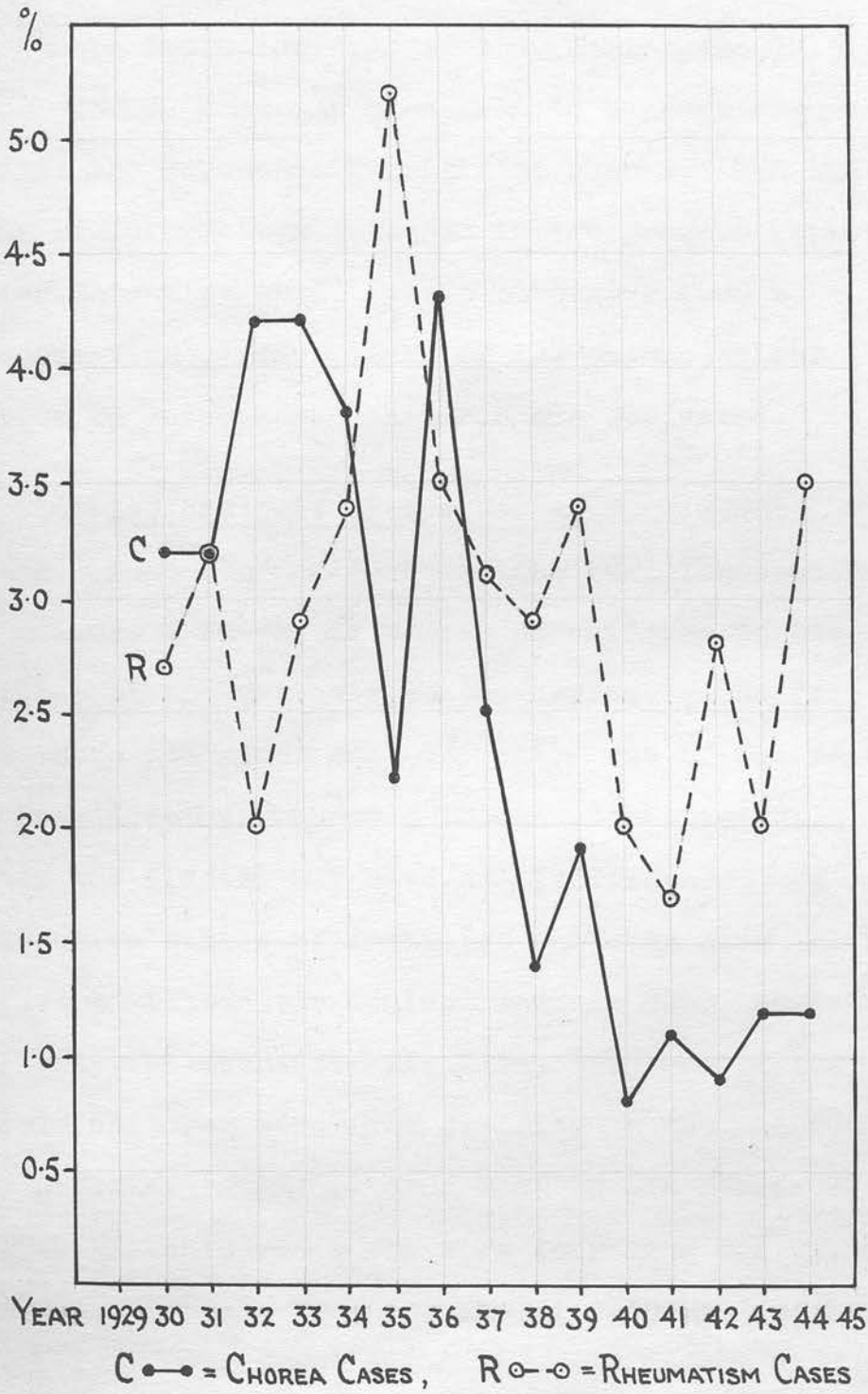


FIG. IX.

The absence of any marked effect of war conditions on the incidence of chorea was noted by Wall (1933) and others including F.J.Poynton, during the 1914-1918 War. It has commonly been held to support arguments against the psychogenic origin of chorea. In the light of information gathered in the present investigation this view would appear to derive from a misconception of the nature of the psychological hazards to which these children are subjected.

5. Special Analysis of the Series.

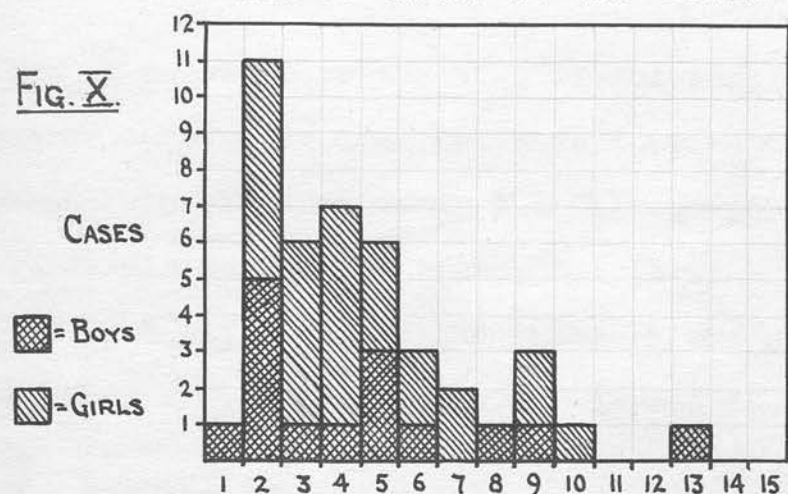
A. Number of children in the families concerned.

Figure X shows the number of children in the families of the patients in the series. The fact that there was just one only child out of the forty-two seemed rather unusual, though with this small number the finding may have no significance. A consecutive series of forty-two children over the age of five admitted to a medical ward in 1945, showed four only children (see Fig.X11). Eleven of the choreic children were from families of two.

Gerstley (1935) records that in his series of fifty-eight children there were four from one-child families. Figure X1 shows the distribution of his patients/

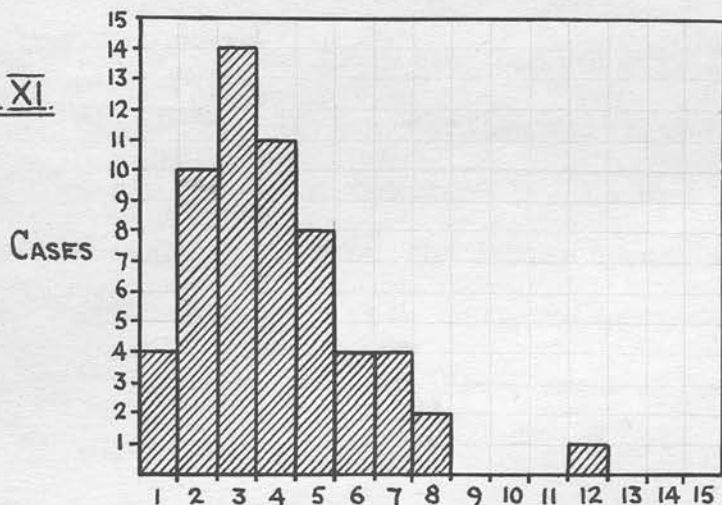
SIZE OF FAMILY IN THE SERIES

FIG. X.



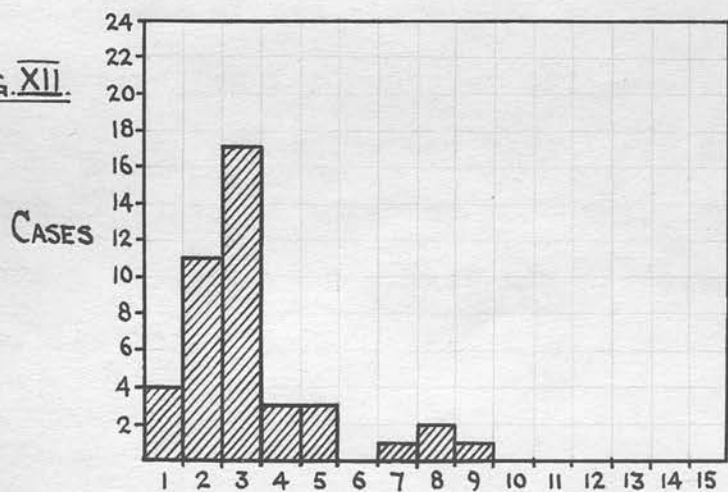
SIZE OF THE FAMILIES OF GERSTLEY'S (1935) SERIES OF 58 PATIENTS

FIG. XI.



SIZE OF FAMILY IN 42 CONSECUTIVE ADMISSIONS OF CHILDREN (NON-CHOREIC) OF 5-12 YEARS TO A MEDICAL WARD-R.A.H.C.

FIG. XII.



patients in relation to the size of the families from which they came. He does not give comparative figures of non-choreic children among the Chicago population from which his series was taken, but it will be observed that his figures like those of the present series, show a high proportion of 'large' families.

#### B. Position in the Family.

A study of the position of the child in the family yielded some interesting and possibly significant information. ( See Table overleaf and Fig. XIII )

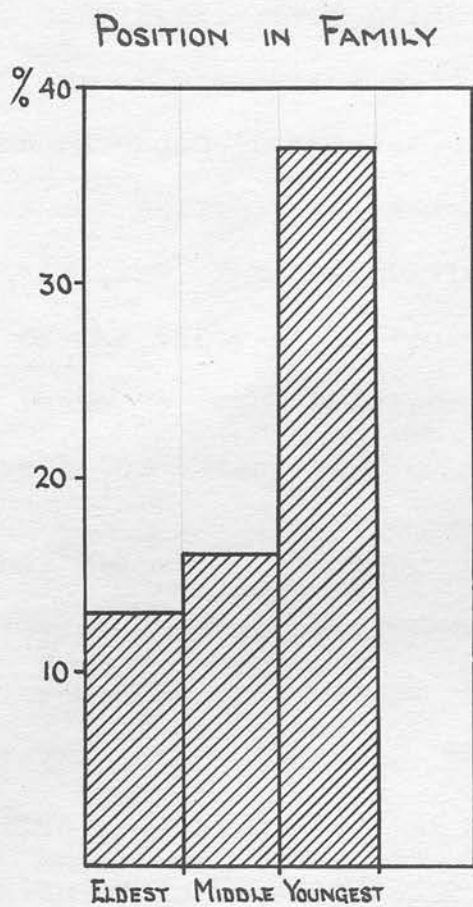
In eight out of the eleven cases where there were only two children in the family, it was the elder child who was affected. On the other hand, among the thirty (affected) families with three or more children, only four eldest children were affected, all girls. In these thirty families there were, naturally, thirty eldest and thirty youngest children: and there were eighty-six surviving 'middle' children. Eleven out of the thirty youngest children were affected, and fifteen out of the eighty-six middle children. This apparent predilection for youngest children was found to be much more marked among the boys. In no case in the nine families of three or more where the patient was a boy, was the eldest boy affected.

Investigating/

POSITION IN THEIR FAMILIES OF THIRTY CHOREIC CHILDREN.

	GIRLS		BOYS		BOTH			
	Number with Chorea	Approx. Proportion with Chorea	Total	Number with Chorea	Approx. Proportion with Chorea	Total	Number with Chorea	Approx. Proportion with Chorea
Eldest	4	1:5	9 (8)	0	0	30 (29)	4	1:7 (1:7)
Middle	12	1:4	37(26)	3	1:12 (1:8)	86 (75)	15	1:6 (1:5)
Youngest	5	1:4	9 (8)	6 (5)	2: 3 (5:8)	30 (29)	11 (10)	1:3 (1:3)
Total	21							

NOTE re 'middle' children:- In the hospital notes of these children the number of recorded 'middle' children is 106, but of these 20 had died in infancy or early enough in life to have no direct influence on th environment of the patient. The figures here given exclude these siblings. The family of one of the boy patients numbered 13, all living. The figures given in parenthesis represent the result of omitting this family from the calculation.



PERCENTAGE OF ELDEST, MIDDLE, AND YOUNGEST CHILDREN  
IN 30 "LARGE" FAMILIES AFFECTED WITH CHOREA.

FIG. XIII.

Investigating the position in the family of his fifty-eight patients, Gerstley (1935) found that twenty of them were first-born, fifteen youngest and six only children. This last figure does not tally with the number recorded in his 'size of family' list. The discrepancy may possibly be explained by the inclusion in this list of non-surviving children. Forty-one out of the fifty-eight "occupied positions in the family known to paediatricians and students of behaviour as being hazardous."

#### C. Maternal Factor.

Normally no other single factor is so important in influencing the nature of a child as the quality of the maternal care. This factor was therefore particularly studied. It was not, of course, one which could be measured by any objective standard. The points postulated in the proforma were considered and a plus and minus method, based on the results, employed. Where the mother was judged to be of calm, stable temperament a minus was recorded. If she gave evidence of undue excitability, irritability, anxiety or other temperamental quality likely to engender in the child a feeling of apprehension or uncertainty, a plus was recorded, and when such quality/

quality was very marked, two pluses. In only eight cases were minuses recorded, four each in the girls and the boys. In the remaining thirty-four there are pluses, and nine of these are estimated at two plus. Of these nine, five were the mothers of boy patients.

In general, the impression gained was that the mothers tend to be anxious-minded women living under strain, usually over-conscientious and often with strong scholastic or social ambitions for their children. It is interesting in this connection that, referring to the difficulty of estimating and classifying maternal care the Medical Research Council Report (1927) says, "many careful, anxious, conscientious mothers, whose maternal care would be very good did their circumstances permit, must of necessity be undergraded owing to their being handicapped in this respect." It is debatable whether anxiety should be included among the desirable qualities in a mother. It seems possible that the prevalence of this quality may have a bearing on the common belief that the incidence of rheumatism and chorea is higher among the so-called artisan class than among the very poor.

#### D. Paternal Factor.

Although/

#### D. Paternal Factor.

Although a number of the fathers actually attended at one or more interviews, in the majority of cases estimation of this factor had to depend on the mother's account. There seems little doubt that over the series the paternal influence played a less important role than the maternal. Eighteen, or nearly half of the fathers were almost certainly of even temperament and could not be considered responsible for anxiety or apprehension in their children. It was interesting that in a very large proportion of cases, enquiries on the subject of discipline elicited the information that this was left to the mother. Three of the fathers were marked two plus. Two of these were heavy drinkers and the third was a hectoring, bullying type of whom his children were definitely afraid. One was the father of a girl (Case No.23), the others of boys (Cases Nos.45 & 51).

#### E. Family Factor.

In thirty, or over two-thirds, of the cases there was a disturbing factor in the relationship of the child with one or more of the brothers and sisters. This was nearly always a matter of jealousy. It was probably always present in the two-family cases but has been marked minus in three of these, two of them boys with younger sisters (Cases Nos.43 & 45); the third/

third was Case No.1 whose mother openly compared the child's scholastic achievements unfavourably with those of her sister. Although commonly occurring, this factor did not seem in any case to justify a two-plus estimate. In no case did it seem to play more than a supplementary part.

F. Adverse Home or Housing Factor.

The main criterion in estimating this factor was overcrowding, though such points as distance from water supply and toilet, and attic or basement situation were also taken into account. No very high standard of house was required but even so, thirty were assessed as plus and no less than eleven as two plus. In one case (No.51) four children slept in one bed. In another (No.41) six boys, the unemployed father and the mother lived in two rooms in an old slum house.

G. Economic Factor.

This factor though naturally closely related to the last, did not necessarily accompany it, nor was it quite so frequently found, there being twenty-five pluses and only four double pluses. It might be absent in the presence of severe over-crowding as in Case No.6 where seven children and their parents lived/

lived in a farm cottage but were relatively well off in the essentials of life. In two cases (Nos.36 and 39), it was present in the absence of marked overcrowding, in both cases the father being unemployed. In one case (No.21) the weekly income for parents and four children at the time the child took ill, was twenty-seven shillings. As might be expected, this too appears to be a supplementary factor aggravating others, notably the parental.

#### H. School Factor.

This factor was found to be present much less frequently than was expected. This was interesting in view of the fact that it has been given considerable prominence in many investigations of chorea, Osler (1920) for example, speaking of the "so-called 'school-made' chorea". It is possible that this finding reflects the lessening severity of modern teaching methods, and this change of school atmosphere may have a bearing on the falling incidence of the disease.

Eighteen cases in all, ten girls and eight boys, were assessed with pluses. One girl (No.15) and one boy (No.46) have two pluses. In each of these, although there were also adverse home and economic factors, it was felt that the school factor - fear/

fear and dislike of the teacher in each case - was chiefly responsible for engendering a state of chronic anxiety and apprehension.

#### I. Other and Miscellaneous Factors.

In nine cases, seven girls and two boys, there were miscellaneous factors. These either concerned relations with neighbours or relatives outside the immediate family, or were connected with specific frights or chronic fear states. One girl (No.31), for example, was terrified by a boy who chased her with a stick, and was afraid to go out and play whilst he was around. This child was aged five, the youngest of the girls in the series, and her illness began within a month of going to school where she was subjected to persecution by the same small boy, and it is probable that this factor was an important one in her case. Usually this factor was associated with adverse home conditions.

#### 6. Summary of the Social and Psychological Factors.

Analysis of the environmental situation or life-background of these forty-two children reveals that in no single case could it be said of the child that he or she was being brought up in a comfortable, decent home by stable parents unhampered by gross financial/

financial difficulties, and was leading a normal happy school life. The conditions to which these children were constantly subjected were such as might be expected to engender a state of chronic apprehension and anxiety. The child at this age has not the means of escaping from an intolerable situation that are available to the older child and to the adult.

#### 7. Discussion.

For over a century, aetiological thought on Chorea has been dominated by the proven association of the condition with Juvenile Rheumatism. To certain minds, impatient of the requirements of strict logic, this seems to be sufficient proof of the causal relationship between them. Thus in a well-known text-book, we read, "It is not now necessary to give the old statistics which proved twenty years ago that without rheumatic infection, there is no true Chorea" (Wall, 1933). In another authoritative work it is written, "From all the available pathological evidence, Chorea appears to be a meningo-encephalitis, a view which certainly fits in best with the clinical character of the disease and with its position as a rheumatic lesion." (Poynton & Schlesinger, 1931). In a third we find, "It is essentially a manifestation of rheumatic infection of the cerebral hemispheres" (Walshe, 1941). These quotations might fairly be taken/

taken to represent present day teaching, at least in this country.

It is difficult to believe that dogmatic statements of this kind would have been made, had chorea continued to be studied, as it originally was, as a disease in itself, rather than as a form of rheumatism in childhood, or had not almost every study in recent decades started from the premise that along with carditis, arthritis, nodules, tonsillitis, and growing pains, chorea is one of the manifestations of rheumatism. Wall's pronouncement is simply question-begging; it is argument by definition. It would be quite possible to argue by this method that all pigs are white, by refusing to count as a pig any beast that was not white. The strength of this aetiological view is well illustrated in the first case in the present series. In the notes on the original examination, the physician in charge wrote, "Tongue movements, position of hands, typically choreic. Very fidgety with anxious strained look". Later, in a letter to the child's doctor, he wrote, "This is rather a doubtful diagnosis as there is a large psychic element in the case".

Recently a more judicial attitude has been taken.

Thus, /

Thus, Wilson (1940) wrote , "For the better part of a century, since the original observations of Hughes and Sée, rheumatism has been recognised as constituting a factor in the development of the disease, but the evidence, though abundant, needs sifting. Some assert an absolute causal relationship between the two, chorea being the symptom; others accept their frequent coincidence without conceding a directly rheumatic origin for the nervous syndrome. Until the true nature of rheumatism itself is discovered opinions on the interaction of the two will continue to vary". It is interesting to note that even in this cautious statement the last sentence almost implies an acceptance of the causal relationship. McNee (1940) in a critical survey says, "There is still... a want of positive knowledge of the commonest cause of cardiac disease in youth, for the aetiology of rheumatic fever and chorea escapes us."

Bruce Perry (1937) writing in another, though related connection points out that "it is impossible to argue from observed association to actual causation ...observed association is the starting-point and not the end of research."

There are formidable arguments against accepting the/

the causal relationship of the two conditions, and its more thoughtful proponents have recognised this, and are not dogmatic. Thus, Cheadle (1897) considered that "the presumption is strongly in favour of the view that, in the great majority of cases, at all events, chorea is of rheumatic origin." Purves Stewart, writing in 1906, pointed out that "The results of (post mortem) examination may be negative, the brain, spinal cord, and peripheral nerves appearing absolutely normal - so far, at least as the present methods of neuro-pathological research enable us to judge", and concluded, "It is not at all improbable that chorea in many cases may be due to a toxin, probably closely associated with the rheumatic toxin, if not identical with it."

Osler (1920), after listing seven points which suggest but do not prove an infective origin concludes in a similarly guarded phrase, "It seems not improbable that it is a form of infective encephalitis with a special localisation."

Risien Russell (1899) is even more cautious. In discussing the pathology he writes:- "Fascinating as is the hypothesis of the infective origin both of acute rheumatism and chorea, it is far from proved; and/

and the same may be said of our knowledge of the affinities of the two diseases. There are many facts in the causation of chorea which demand careful consideration before we hastily accept any such generalisation."

Nervous instability is noted by all students of the disease, but its aetiological significance has been interpreted in widely different ways. The difficulty which confronts those who accept the toxic-infective theory of the pathogenesis is to determine whether it is the cart or the horse. "Chorea", says Wall (1933) "is essentially the manifestation of rheumatism in the neurotic subject. The instability of the nervous system may be inherited, or may be acquired through illness, fatigue, excitement, and so on. Rheumatism invariably has some effect on the nervous system of a child rendering it unstable, excitable, and emotional, and therefore, it is difficult to determine how far the so-called predisposing causes are truly causative. Undoubtedly for the most part they are not active in originating the chorea but merely unmask or exaggerate a chorea already present in an incipient stage. Fright, for instance, is often given as a cause of an attack of/  
of/

of chorea; but in most instances, the child does not develop chorea because it has been frightened, it is frightened because it is already in an emotional state of early chorea, and the disorder is thereby unmasked." Similar though usually less emphatic views have been expressed by nearly all writers in text-books and monographs until quite recently, amongst others by Hempelmann (1925) Poynton & Schlesinger (1931), Holt & Howland (1931), Lapage (1933), Pearson (1939). Poynton and Schlesinger draw attention to one well-authenticated fact which is hard to explain by this hypothesis. "Why a child with an unstable nervous system should be liable to rheumatic infection, and if so, why it is not more frequent among the well-to-do, are questions not easily answered."

The conclusions of Neustatter (1937) are significant in this connection. They include the following:-

- "1. Nervousness is not greater in joint rheumatism than in other illness or in general debility, but is significantly greater than in normal children.
2. The high total of nervous features observed in rheumatism/

rheumatism is due to the very high incidence of such features in chorea, and in children who come under observation only from pains.

3. As nervousness is present in a significantly greater proportion of children before the age of two, who are later nervous, the nervousness is not a rheumatic manifestation. The rheumatism may aggravate the nervousness, but does not cause it. There is probably a common diathesis for nervousness and rheumatism."

Neustatter also considers that "there is suggestive evidence that bad home conditions may play a part in producing nervousness."

The general impression left by a study of the literature on this subject is one of inconclusiveness and uncertainty. The arguments of those who definitely accept and proclaim the toxic-infective hypothesis smack of special pleading; they could not be described as scientific deductive reasoning from proved data. In any case, as Hubble (1943) says, "the facts concerning chorea do not support any theory that chorea is directly due to the rheumatic 'invader' or to 'rheumatic toxæmia'". It is clear that in its straight-forward/

straight-forward form of postulating a specific rheumatic bacterial toxic agent operating in the child's blood or tissues to produce acute rheumatism or chorea or both, the hypothesis must be rejected. All the known signs of toxæmia may be absent in chorea. To explain this it is sometimes suggested that chorea in itself is indicative of a mild infection (Duckett Jones, 1935. Ash, 1936). If this be accepted, however, it becomes difficult to explain why, since the greater includes the less, every child with rheumatic fever does not at the same time have chorea. To get over this difficulty it is necessary to postulate that this comparatively light infection is working under the special conditions of a child with a peculiarly sensitive nervous system. We are thus thrown back once more on the necessity to explain this unusual nervousness.

Two recent trends in medical thought have operated during the past ten or twelve years to loosen the hold of this traditional attitude to the problem of the aetiology of Sydenham's Chorea. These are first, the growing appreciation and understanding of the part played by psychosomatic disturbance in the production of physical symptoms and functional disorder and, more recently still, the/  
the/

the biological emphasis in the aetiological concepts of what has come to be known as Social Medicine. Both of these approaches to the problems of aetiology are broader and cast wider than the older systems which attempted always to narrow down the search in the hope of being able eventually to point the accusing finger triumphantly to the incriminated agent. They are the outcome of the growing acceptance of the view that health and disease, though they may be regarded conceptually as opposites and antithetic, are in reality but opposite ends of an infinitely graded scale; that the state of health of an individual at any time is, as it were, the measure of his success in reacting to his total environment. A system of aetiological study based on such a concept demands the widest possible investigation of the total environment, both internal and external, past and present.

Reports of investigations of this type in relation to the problems of chorea began to appear about a dozen years ago. Walker (1935) enquiring into the social environment of 188 cases, found 65 to come from families living seriously below proper subsistence level, and noted that there appeared to be "a definite relationship between population-density and/

and chorea". Some years earlier the Medical Research Council (1927) had published its Special Report of a large-scale investigation of 'Social Conditions and Acute Rheumatism', in which 'Rheumatism' was taken to be 'Acute Rheumatism with its recognised manifestations, chorea, organic heart affection and nodules'. This investigation supported the frequently expressed view that highest incidence is found not among the lowest income group but in those slightly above this level. (The distribution of the Aberdeen cases is in line with this view so far as chorea is concerned. See Fig.Vll.) On the other hand, during a Royal Society of Medicine discussion on 'the aetiology of Acute Rheumatism and Chorea in relation to social and environmental factors' in 1934, J.A. Glover expressed the belief that the true incidence of acute Rheumatism is directly proportional to the degree of poverty and suggested that a larger proportion of the least resistant among the very poor fail to survive to the rheumatic age. Coburn and Moore (1937) analysing a series of 114 cases of chorea, followed monthly for from 2 to 10 years and a consecutive series of 137 cases admitted to a hospital, found that in one half of these cases the "attacks were not preceded by respiratory infections, but/

but seemed to be associated with psychic trauma." Hubble (1943) brings under review these various findings and observations on social status in relation to rheumatism and chorea. After referring to the Medical Research Council's classification of the families in its investigation (1927) into three economic groups, in inverse order of poverty, as Groups, A, B, and C, he writes, "No observer has suggested that the mental and nervous stresses of poverty on children may be as important as the physical. It needs little imagination to see that the nervous stresses of poverty will be greater in Group B than in Group A or C, greater than in the less poor and in the more poor - that is, in the family which has known failure and is pre-occupied with the fear of falling again, with its struggle to keep up appearances, with its avoidance of social life, with its emphasis on hard work as a prelude to success, and with the distortion of its emotional life by fear and insecurity; this is the domestic background to Group B. families. Is it fantastic to see in this environment one of the breeding-grounds of child rheumatism? In which class should we expect to find that education imposes a greater nervous strain? Although this factor of nervous instability may explain/

explain the higher incidence of rheumatism at this particular economic level of poverty, the general association of rheumatism with poverty at all levels probably depends, as a host of observers have assumed, on the physical accompaniments of poverty, poor clothing, bad and damp housing, malnutrition, and overcrowding. While most of these factors operate by reducing the resistance to infection, others such as over-crowding presumably act by increasing the number and virulence of nasopharyngeal infections."

A general conclusion which it would seem justifiable to draw from such findings and observations is that certain factors commonly but not necessarily associated with poverty play an important part in the genesis of chorea (and juvenile rheumatism). The present investigation strongly supports such a conclusion and suggests that so far as chorea is concerned, these factors are of a psychological rather than a physical nature.

The finding in every one of 42 cases of life situations calculated to induce in the child a state of long-continued nervous strain and apprehension, and that management based on the appreciation and amelioration of this situation was followed by a recurrence/

recurrence rate markedly below that usually experienced cannot easily be explained otherwise.

Our modern realisation that physical changes are frequently induced by purely psychological disturbances makes it less difficult than it was thirty or even twenty years ago to accept a psychogenic origin for the physical concomitants of chorea, both the hyperkinesia and the muscular hypotonia. Electro-encephalographic investigation has not demonstrated any very constant finding in cases of chorea, but has frequently shown irregular areas of cortical hyperexcitability, commonly localised in the central region contra-lateral to the maximum motor disturbances. (Buchanan et al 1942). Modern neuro-anatomical studies have demonstrated the very close integration of the so-called pyramidal and extra-pyramidal systems and the existence of intricate circuits passing from the cortex to the basal ganglia and back again (Mettler, 1942). Wilson (1928) many years ago postulated that chorea must be attributed to the disorder of a system and commended Hughlings Jackson's concept of "physiology in difficulties". That a destructive lesion of a part or parts of these systems can produce the movements of chorea has been proved beyond doubt in the case of Huntington's/

Huntington's Chorea and of many examples of senile or arterio-sclerotic chorea, but that such a lesion is necessary to their production is very simply disproved by the fact that they can be produced voluntarily without any difficulty by any healthy person. That functional disorder should result from prolonged affective disturbance is not only possible but even probable. Exhaustion of the striatum or globus pallidus are likely to produce results similar to if not as profound as destruction of them. It might in fact be expected that they would produce the release phenomena of striatal elimination and loss of large-muscle tone of pallidal origin in just the degree to which we find them in children with chorea. The gradual passing of these features which marks recovery from the illness would naturally follow recovery from the exhaustion.

From all these considerations it seems possible to adduce a valuable clue as to the nature of the 'Humour' which Sydenham postulated, whence it is derived and how it acts. It can be regarded as an affective disturbance induced by subjection to psychological stresses from which the child can find no satisfactory escape. If this disturbance is sufficiently severe or long-continued it produces the hyperkinesia and hypotonia which are characteristic of/  
of/

of the established disease, very probably through cortico-thalamic exhaustion.

This hypothesis is consistent with the age, sex and social incidence of the disease. Its validity is supported by the success of treatment based upon it, and by the quite common absence of any of the known signs of infection in undoubted cases. It provides a very probable explanation of the falling incidence of chorea and of the relatively much greater fall as compared with that of juvenile rheumatism, for, while the physical lot of the 'rheumatic' classes - apart perhaps from improved diet - has not undergone any marked amelioration, there has in recent years been a very real advance in the understanding and management of children, both at school and at home. It is uncertain whether this fall was influenced by war conditions since it had already begun two or three years before the outbreak of war but we should expect the lessening of neurotic illness which accompanies the external pre-occupations of the state of war to have some such effect. (Burlingham and Freud 1942)

Most important of all the hypothesis sheds light on the central problem - the nature of the association between chorea and juvenile rheumatism. The link between/

between them in all probability is that their causes commonly but **not necessarily** occur in conjunction as concomitants of poverty and over-crowding. Exposure in varying degrees and at varying times to these two sets of causal factors, the one physical and the other psychological, we should expect to give rise to an incidence of the two conditions such as has been revealed by many and careful observations, so that some children so exposed will develop chorea, others rheumatism and others again both, either concurrently or at intervals of time. We should expect, as we find, that the child debilitated by latent or overt chorea will be more likely than his tougher brother or sister to succumb to the factors which give rise to rheumatism. That chorea causes rheumatism is probably nearer the truth than that rheumatism causes chorea.

#### SUMMARY AND CONCLUSIONS.

1. The history of medical opinion on the aetiology of Sydenham's Chorea over the two and half centuries since he described it has been briefly reviewed.
2. It is pointed out that, although much has been learnt of the condition, no generally acceptable theory of the nature of the "Humour" to which Sydenham/

Sydenham conjecturally ascribed it has as yet been forthcoming.

3. The hardening of opinion in favour of a toxic-infective theory, which followed on the development of Bacteriology, is shown to be unjustified.

4. Certain sociological factors in relation to 131 children treated for chorea in the Royal Aberdeen Hospital for Sick Children between 1930 to 1942 have been considered, and the influence of war conditions on the incidence of the disease in the North East of Scotland.

5. A more thorough and detailed investigation into the life circumstances of 42 of these children is recorded, which revealed that in every case the child was subjected over a considerable period of time to conditions calculated to induce functional nervous disturbance.

6. The results of these investigations are shown to be similar to those of recent investigations of the same kind by <sup>a</sup>pediatricians both in this country and in North America, and to support the conclusion reached by many of these investigators that chorea is probably a psychologically determined disease.

7. It is suggested that we now have the clue to the nature of Sydenham's 'humour'. It can be regarded/

regarded as an affective disturbance induced by subjection to psychological stresses from which the child can find no satisfactory escape.

If this disturbance is sufficiently severe or long-continued it produces the hyperkinesis and hypotonia which are characteristic of the established disease, very probably through cortico-thalamic exhaustion.

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APPENDIX 1

C H O R E A

Name:  
Address:

Age:  
Case No.

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1. Number in Family:

---

2. Position in Family:

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3. Age of nearest sibs., how much older or younger:

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4. Character of Mother

- (a) Education - good, average or poor
  - (b) Intelligence - good, average or poor
  - (c) Emotional make-up
    - Excitable, irritable, calm:
    - Conscientious, over-conscientious, careless:
    - Normally affectionate, over-affectionate, indifferent:
    - Domineering, normally firm, weak:
  - (d) Special remarks:
- 

5. Character of Father

- (a) Education - good, average or poor
  - (b) Intelligence - good, average or poor
  - (c) Emotional make-up:
    - Excitable, irritable, calm;
    - Conscientious, over-conscientious, careless:
    - Normally affectionate, over-affectionate, indifferent:
    - Domineering, normally firm, weak:
  - (d) Special remarks:
- 

6. Difficulties in Family

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7. Difficulties at School

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8. Other Psychological difficulties:

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9. Manifestations of Rheumatism:

---

10. Any other chronic infection:

---

11. Tonsils: present or absent:      Healthy or unhealthy

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12. B.S.R.

---

13. Special Remarks:

APPENDIX 2

Case notes of the Series

CASE NO. 1.

DORIS A.

Admitted to Hospital - 25.2.37 Aged 11 (Born 17.1.26)

**History of Illness:-** Had 'jerks' before tonsillectomy in November 1936, but they ceased after operation. About New Year began to be excited and have jerking movements again and to make grunting noises. No gross difficulty with feeding.

**Previous Illnesses:-** Measles at age 5, and Mumps. Occasional tonsillitis. Tonsillectomy in November 1936. No history of growing pains.

**Condition on Admission:-** Very fidgety, with anxious strained look. Emits loud snorts and sighs, as if she had nasal obstruction. Tongue movements and position of hands - typically choreic. Struggling movements involving whole body. T. (Rectal) 100.2° P. 120. R. 22. Constipated. Throat - tonsil beds inflamed. Heart - not enlarged, overacting. Systolic bruit at base, where second sound is accentuated. Other systems - N.A.D. B.S.R. 10mm. in one hour (on 13.3.37 - 6 mm. in 1 hour.) Pirquet test - negative.

**Social and Psychological Background:-** Second of a family of two girls. Sister, 3 years older, reported by own doctor to have cardiac murmur. Home conditions probably satisfactory physically. Father a printer by trade, thin, timid, excitable, inclined to spoil the children, leaves discipline (and probably other decisions) to the mother. The mother - ambitious, over-conscientious, over-anxious, and inclined to be irritable. Stated in interview - "We put the children first in every case" "My whole life to them." She occasionally spanks the children, but they are very obedient. Sex education very old fashioned. Mother - "She always seems a baby to me" Child is fond of fairy tales.

School - First out of class of 50 for whole year, was very tired at the end of the Summer Term, and suffered from anorexia nervosa. Movements were first noticed at this time. This child was seen by Mr. Knight who found her I.Q. to be 128 and described the mother as "fussy and over-anxious" He quotes the mother as saying in front of the child - "She's not right and I'm worried" and "Her sister passed her exam. and got her bursary when she was younger than Doris."

CASE NO. 1. (cont'd)

FOLLOW-UP

Home visited - 18.8.45. This girl works as a shorthand -typist with the Public Assistance Board. She appears to be a smart girl still, having won several prizes at evening classes. This year she hopes to take up languages.

She is an extremely active girl and sometimes, especially when she is tired, she blinks her eyes more frequently and more noticeably than is normal. Otherwise she is perfectly normal.

CASE NO. 2.

JEMIMA B.

Admitted to Hospital 23.3.37 Aged 9 (Born 11.9.27).

History of Illness:- Well till December 1936. Then vague malaise, anorexia and occasional abdominal pain. Two weeks before admission became very restless. Right arm and leg especially affected with jerking movements. Sometimes difficulty with speech. Emotionally unstable. For a week before admission dropped things but fed herself quite well.

Previous Illnesses:- Whooping cough at 2, measles at 7. Head injury 3 years previously (no fracture or concussion). No history of sore throat or growing pains.

Condition on Admission:- A pale, delicate looking child with flushed cheeks. Extremely restless and nervous. T. (Rectal) 99°, P. 104 (sleeping, 84) R.24. Teeth and tongue - satisfactory. Tonsils - enlarged, red and ragged with pus-filled crypts - swab; haemolytic streptococci. Heart - a diffuse forcible apical impulse in 4th L.I.S. in M.C.L. Loud slapping 1st mitral sound accompanied by systolic bruit, heard all over praecordia and conducted to axilla. Equivocal presystolic thrill and murmur. C.N.S. - typical choreic hyperkinesis, otherwise N.A.D. Other systems - N.A.D. B.S.R. 95 mm. in 1 hour. Pirquet test - negative.

Social and Psychological Background:- Youngest of a family of three, the others being boys. Oldest boy is nervous and suffers from asthma. Home conditions cramped - 2 rooms. Slum district. Father - a harbour bridge operator, intelligent and fairly well educated, usually calm but sometimes irritable, over-conscientious, possibly over-affectionate and probably rather weak, being given to threatening punishments which he does not carry out. He cleans the children's boots and has a special affection for the girl. Mother - of average intelligence and education, excitable, over-conscientious, over-affectionate, and weak. Also a punishment-threatener. Has a stammer. School - a good scholar, high up in her class. Good at arithmetic. Anxious-minded about school e.g. - scared of being late. Doesn't like new teacher (Since Xmas 1936) who, she says, shouts at the class. Departure from health noticed soon after return /

CASE NO. 2. (cont'd)

return to school in January. Mother states that child has been easily frightened since her head injury in 1934, when she was knocked down by a van.

Subsequent History:- Tonsillectomy carried out on 29.4.37 (i.e. 5 weeks after admission) On 5.6.37 it was 9. By 7.6.37 the heart sounds were normal and exercise tolerance quite good. It is probable that this child's heart condition was a toxic myocarditis rather than a true rheumatic carditis.

FOLLOW-UP

Home visited - 22.8.45. This girl is now working in a Co-operative shop in Loch Street. She has had no further attacks of Chorea and after being in hospital was never off school. Last March she was accosted by a man in the black-out on two successive nights and was very perturbed. She is still attending her own doctor (Dr Esslemont) and had been in hospital. To begin with an appendicitis was suspected but now it has been diagnosed as being constipation caused by the shock to the nervous system. (At the time of her illness her father worked with the Harbour Commissioner. At that time they lived in two rooms.)

CASE NO. 3.

HELEN B.

Admitted to Hospital 12.2.37. Aged  $6\frac{1}{2}$  (Born 11.6.30).

History of Illness:- Well till about a month before admission when she began to have jerking movements of arms and legs and grimacing. She had difficulty with speech, writing and feeding, and was dropping things during the week or two before admission. Stated to have had influenza when the illness started.

Previous Illnesses:- Whooping Cough at 9 mths; rickets at 18 mths; and orthopaedic treatment for legs at 4; chicken pox at 2; measles at 3; diphtheria at  $4\frac{1}{2}$ ; No history of sore throats or growing pains.

Condition on Admission:- Restless and fidgety. T. (Rectal)  $100.2^{\circ}$ , P. 112 (sleeping, 88) R. 22. Teeth and tongue - satisfactory. Tonsils - enlarged, red and ragged. Heart - diffuse apical impulse in 5th L.I.S. about M.C.L., no murmurs. Other systems - N.A.D. B.S.R. 38 mm. in 1 hour. Pirquet Test - negative.

Social and Psychological Background:- Third child of a family of 6 (living). Oldest girl. No family history of rheumatism. Home conditions cramped, physically and economically, only two rooms and two beds. Father - ship's engineer of average intelligence and probably above average education. Placid, possibly over-affectionate, not a disciplinarian. More at sea than at home. Discipline largely left to the mother. The child is very fond of the father who is inclined to spoil her. Mother - of average intelligence and education, excitable and occasionally irritable. Does not use corporal punishment but exerts discipline by "roaring". The child is very friendly with next-door neighbour, a middle-aged woman with a grown-up daughter, who gives her many things her mother cannot give her. Child quite often leaves her dinner and goes to feed with them. School - no special difficulty. Very anxious to please, but not very clever. Was kept back a class after first year. No evidence of anxiety about school, on which she is not at all keen.

Seen by Mr. Knight. I.Q. was not done, but impression was that she was a nice, bright child of average intelligence.

CASE NO. 3. (cont'd)

FOLLOW-UP

Home visited - 1.9.45. This girl now works in Woolworth's Stores in George Street. She is a very healthy girl and has completely outgrown the effects of Chorea.

At the time of her illness the family lived in a very small house with only two rooms - there were seven of a family. The mother is very much happier in her new home.

CASE NO. 5.

CONSTANCE C.

Admitted to Hospital - 22.6.37 Aged 9 (Born 20.12.27)

History of Illness:- About two weeks before admission, got very bad marks at school for writing, though she had previously been a very good writer. A week later, twitching movements of the left arm and leg were noticed. A few days later movements had become more severe and the face was affected. During all this period child was emotionally unstable.

Previous Illnesses:- ? Ophthalmia right eye at 3 weeks (said to be pneumococcal) Tonsillectomy at age 4. Measles and whooping cough at age 5. Serum sickness following treatment for whooping cough. Tendency to sore throats and urticaria. No history of growing pains.

Condition on Admission:- Intelligent-looking child. Movements not very pronounced. T. (Rectal) 99.2°. P. 122 (sleeping, 100) R. 22. Tongue clean. Teeth - some carious. Throat - clean. Heart - not enlarged. Soft systolic bruit in all areas (a week later this had dissappeared) C.N.S. - hyperkinesis, otherwise N.A.D. Other systems - N.A.D. B.S.R. 57 mm. in 1 hour.

Social and Psychological Background:- Eldest of a family of three girls. A boy died in infancy while her mother was carrying Constance. Home conditions physically and economically satisfactory. Father - shopkeeper (boots and shoes) of good intelligence and education. Excitable, impulsive and affectionate. Child is very fond of him (C.G. Clinic visitor described him as "self indulgent") Discipline left to mother. Mother - of average to good intelligence and education, highly strung, over conscientious and inclined to be irritable. Exophthalmic, but pulse slow. Probably domineering. Remarks during interview included - "Very particular with their upbringing" "I must get home for the children." Does not approve of kissing, which she regards as unhygienic. Socially and educationally ambitious. Own educational ambitions were thwarted.

Family situation - Baby Sister is aged 4 months. Mother has impression that Constance is jealous, and reported following incident:- Mother said, with reference to the baby's dress, "You had a dress like this when you were a baby" The child replied, "Did I look as sweet as that? I wish I didn't have to wear glasses."

CASE NO. 5. (Cont'd)

School - Keen, over-anxious. Does well. Her teachers say she is an outstanding pupil, but I.Q. was only 106. Probably undergoes considerable strain to maintain her reputation which may depend on neatness and good behaviour rather than intelligence.

FOLLOW-UP

Home visited - 24.8.45. This girl seems to be fairly healthy. But some time ago she fell downstairs in her office and when she came home one of her hands became useless - her foot was slightly affected too. Her doctor said it might have been due to a slight shock. After a few days in bed she was alright again. Her mother is rather worried because her maternal grandmother suffered from Chorea - or something similar - as an old woman. Constance has fainted on one or two occasions.

She works in the District Man Power Board and has rather long hours of work. She gets very tired but she does take quite a lot of rest. She was described by her employer as having "a very nimble brain" and is efficient at her work. She has been asked to try the Civil Service Exam. but she does not wish to do this - she hopes to go abroad soon.

CASE NO. 6.

BARBARA C.

Admitted to Hospital 30.10.36 Aged 8 (Born 25.1.28)

History of Illness:- Six weeks before admission noticed to be fidgety with her arms, especially right. Often dropped things. Easily upset and cried readily. Two weeks before admission developed Rubella. Movements became, if anything, more marked, and spread to face. Unable to feed with right hand. Three days before admission allowed up. Movements more pronounced.

Previous Illnesses:- Whooping Cough at age 4. Measles at age 6. Jaundice at age 7. A year ago "growing pains" in both thighs for a few days. Two weeks ago Rubella.

Condition on Admission:- High Coloured. Startled expression. Very restless. T. (rectal) 98° P. 86 (sleeping, 78) R. 22. Teeth and tongue satisfactory. Tonsils - enlarged, red and ragged. Heart - not enlarged. Sounds closed. C.N.S. - hyperkinesis, otherwise N.A.D. Other systems - N.A.D. B.S.R. 26 mm. in 1 hour. Pirquet test - negative.

Social and Psychological Background. Fourth in a mixed family of seven. Home conditions probably cramped. Father - a farm grieve of average intelligence and education, placid, conscientious, and normally affectionate. Leaves discipline to the mother. Mother - of average intelligence and education, normally calm, but sometimes irritable. Whipped the child when the illness began because she thought she was being "silly". Family situation - Child was easily "put out". Cried when she didn't get her own way. The nearest younger sibling, a girl, is very fit and active and often annoys Barbara. School - keen on school and teacher, but is not high in class. Developed a stammer when she first went to school. This went but has recurred occasionally since. Is afraid of the Headmaster - "Shook" when talking about him. Has been strapped several times.

CASE NO. 7.

ISABELLA G.

Admitted to Hospital 20.1.36 Aged 10 (Born 2.9.25).

History of Illness:- Three months before admission, started to have twitchings of arms and legs. These became gradually more marked and for a week or so before admission were severe. She had to be strapped down in bed and had to be fed. She was extremely excitable.

Previous Illnesses:- Measles in infancy, Chicken Pox and Mumps. About a year before admission, eight weeks in bed with "Rheumatic Pains". No history of sore throat.

Condition on Admission:- Extremely restless with grimacing and marked choreic movements. T. (Rectal) 99.6° P. 88 R. 28 Teeth - satisfactory. Tongue - furred. Tonsils - enlarged. Heart - not enlarged. Blowing systolic mitral murmur with short conduction. C.N.S. - hyperkinesis. Otherwise N.A.D. Other systems - N.A.D. Mantoux test positive. B.S.R. (on 28.1.36, during reaction to Nirvanol) 22.

Social and Psychological Background. Second of a mixed family of four. Home conditions probably fairly satisfactory. Father - chief engineer on a trawler, of average intelligence and education, not excitable, probably domineering. Does not thrash children. "Just has to look at them", according to the mother. The mother - below average intelligence, excitable, very forgetful (brought child's birth certificate to hospital to remind her.) Had chorea as a child. Has bronchitis. Home situation - often quarrels with elder brother. Nearest younger sibling, a girl, is delicate and requires a lot of attention from the mother. A fifth child, a girl, died at 3 months of pneumonia. Isabella "ran the house" at the age of 9 when the mother was ill. School - successful. Top of her class before taking ill. Fond of Teacher.

Subsequent History. Tonsillectomy was performed on 2.4.36 H. streptococci were grown from the tonsils. A month later the B.S.R. had fallen to 8 mm. in one hour. The apical systolic murmur was still present.

CASE NO. 7. (cont'd)

FOLLOW-UP

Home visited - 3.9.45. This girl is perfectly healthy. After leaving school she worked in a shop - now she is in the W.A.A.F. She has had no more attacks of Chorea. The mother suffered from Chorea when she was a young girl. They lived in rather over-crowded conditions.

CASE NO. 8.

HENRIETTA G.

Admitted to Hospital - 13.4.36 Aged 10 (Born 3.1.26)

**History of Illness:-** This child had a long history of rheumatism and chorea. In bed with rheumatism for 7 months in 1929. Frequent attacks of pain in ankles and calves. Towards the end of 1932, choreic movements were first noticed. In Woodend (municipal) Hospital with chorea in 1933. In P.A.H.S.C. each year subsequently either on account of carditis or chorea.

**Other Illnesses:-** Whooping cough in infancy, dysentery at age 3 (Rheumatism followed this), measles at age 5, rubella at age 6. No definite history of sore throats.

**Condition on Admission:-** Slight choreic movements. T (Rectal) 99°. P. 100 (sleeping, 94). R. 24. Teeth and tongue - satisfactory. Tonsils - not enlarged. Heart - probably slightly enlarged. Apical systolic thrill. Rough systolic murmur. C.N.S. - moderate hyperkinesis. Otherwise N.A.D. Lungs - scattered rhonchi. Abdomen - N.A.D. W.R. and Pirquet test - negative. B.S.R. - 10 mm. in 1 hour.

**Social and Psychological Background.** Fourth of a mixed family of five. Home conditions - cramped, physically and economically. Father - a fish market porter in casual employment, of average intelligence and education, placid, easy-going. Never angry with children. Discipline left to mother. The mother - of average intelligence and education, excitable and inclined to be irritable with children. Politically ambitious. Secretary to Labour Women's Committee in the City Ward. Interested in Municipal politics. Fish worker before marriage. Wishes she had had better education. Never thrashes the children, but sometimes threatens thrashing. Family situation - Elder girl sleeps with Henrietta, who will not sleep alone, will not go to sleep till sister comes to bed, which is late as she works in a cinema. Will sleep, however, with little brother. Now gets on well with this child, but still says openly of him, that he "took her place". He is evidently a very attractive little person, who was born 8 months before Henrietta's first attack of chorea.  
School - Has only spent three months in all at school.

CASE NO. 8. (cont'd)

FOLLOW-UP

Home visited - 29.8.45. This girl is in very poor health. She has never been able to work. She had another attack of Chorea after being in hospital.

Since then she has been in hospital several times - once or twice at Forresterhill and several times at Woodend - with a bad heart. In the meantime she is in Woodend Hospital with tuberculosis and has been there for eighteen months.

Before being in hospital this last time she was in a very bad nervous condition but the rest seems to have steadied her.

There are no signs of Chorea now.

CASE NO. 12.

IRENE F.

Admitted to Hospital 24.12.37 Aged 8 (Born 23.2.29)

**History of Illness:-** For about 3 months before admission, the mother had noticed the child becoming progressively more restless and emotional. Twitching movements of the hands, mouth and eyes developed, and she became untidy and clumsy at meals. Five weeks before admission, she was sent home from school because she was 'jumpy' and had had an epistaxis.

**Previous Illnesses:-** This child had a long history of ill-health from birth. She was said to have been born three weeks after term and had a white asphyxia. She had pneumonia four times before she was two and frequent colds often with bronchitis subsequently. Tonsillectomy was carried out at age 2. She had measles at 5, whooping cough at 6, and chicken pox at 7. Note - Heart said to be affected after pneumonia.

**Condition on Admission:-** Marked twitching of mouth and eyes, very excitable and nervous. T. (Rectal) 98.4°, P. 104, R. 22. Teeth - many carious. Tongue - clean. Throat - inflamed, tonsil remnants. Heart - diffuse, forcible, apical impulse in 4th L.I.S. about M.C.L. Loud systolic murmur conducted to axilla. C.N.S. - hyperkinesis, otherwise N.A.D. Other systems - N.A.D. B.S.R. (1.1.38) 15 mm. in 1 hour.

**Social and Psychological Background.** Second of a family of three girls. The eldest girl is a step-sister (same mother) Home conditions - poor. Father - a labourer, usually employed, of average to good intelligence and education, probably over-conscientious and over-affectionate. Makes a lot of Irene and puts her to bed. Discipline mainly left to the mother. The mother - of average to good intelligence and education, inclined to be excitable and occasionally irritable. Never thrashes the children. Occasional cuff on the head. "Tongue rather than hand". Family situation - the two younger children are always together. Irene is the more affectionate, and makes much of her sister who is much fitter and more independent. Since she was 18 months, Irene has slept at paternal grandmother's house, where she spends much time. Gets on well with the grannie who is inclined to spoil her. School - rather behind with school work on account of frequent absence, but gets on quite well. Father helps her with her lessons.

FOLLOW-UP

Home visited - 28.8.45. This girl was described by her mother as still being of a nervous disposition. She has always been rather delicate and has to be carefully watched. But now she enjoys fairly good health. Sometimes she does become very excited but her mother tries to prevent any such situation arising. But there are no evident signs of Chorea. Her own doctor recommended that none of the girl's desires be thwarted and they try to comply with his wishes as far as is possible. She left school early. Owing to her bad health she was always behind at school and was very sensitive about it so her mother took her away from school and since that time she has been working in a paper-mill and is doing well there. She works with a machine. She has never been off work except for a few days when she cut her arm rather badly.

Recently her mother's sister died and Irene was very unhappy about it. Since that time she does not like to sleep with her younger sister and always asks if she may sleep with her mother. If she is allowed to do this she sleeps well. Her mother said "She has a very happy nature and is a bright little spark". They live in a three-roomed house but it seems to be fairly clean and well-kept.

CASE NO. 13.

MARY F.

Admitted to Hospital - 14.12.35 Aged 9 (Born 12.1.26)

**History of Illness:-** Was in R.A.H.S.C. from January to April 1934 on account of chorea which had begun two weeks before admission. Made an apparently complete recovery, the heart being considered normal on discharge, and remained well till about two weeks before second admission, when her mother began to notice increasingly frequent jerking movements of arms and legs, especially left. She was nervous and emotional, crying readily. Complained of being tired.

**Previous Illnesses:-** Measles at age 5. Frequent sore throats prior to tonsillectomy in 1934. At age 3 had "rheumatic pains" in the legs, so badly that she couldn't walk.

**Condition on Admission:-** Restless and emotional. Choreic movements. T. (Rectal) 98.2°. P. 102. R. 26. Teeth and tongue - satisfactory. Throat - clean. Heart - diffuse apical impulse about M.C.L. Apical systolic murmur conducted towards axilla. Accentuated P.2. C.N.S. - hyperkinesis, otherwise N.A.D. Other systems - N.A.D. B.S.R. (24.12.35) 71. W.R. and Pirquet test - both negative.

**Social and Psychological Background:-** Younger of a family of two girls. Home Conditions - slum district but probably fairly satisfactory. Father - a labourer (employed), of average intelligence and education, over-conscientious, anxious-minded and easily exasperated. Family situation - the children quarrel a lot, often coming to blows, when the elder usually wins. Mary is inclined to bully younger children. She is occasionally whipped by either parent for naughtiness. She reacts extremely and hysterically - attacks of breath-holding. She does not play readily with other children. School - quite fond of school and gets on well, though she is rather unduly nervous if she has to do anything in front of the class.

#### FOLLOW-UP

Home visited - 4.9.45. After leaving school this girl worked in a bookseller's shop but only for a short time. Since then she has been working in Woodend Hospital as a maid. Her mother said she was very happy here - she likes the pleasant surroundings.

She still has a nervous disposition and sometimes gets very excited but there are no traces of Chorea. She seemed to improve steadily after they removed to their new home.

CASE NO. 14. GWENDOLINE G.

Admitted to Hospital - 12.3.36 Aged 7 (Born 29.5.28)

History of Illness:- About  $3\frac{1}{2}$  months before admission began to have twitching movements mainly of the left side of the body. These became gradually worse and after about a month her doctor was called in, and complete rest was prescribed. The movements, however, though less marked after this, continued. She had to be fed.

Previous Illnesses: - Whooping cough at 18 months. Measles at 2, Chicken pox at 6. No history of sore throats, nor growing pains.

Condition on Admission:- Extremely restless. Grimacing. Marked choreic movements. T. (Rectal)  $98.6^{\circ}$  P. 108. R. 26. Tongue - clean. Teeth - considerable caries. Tonsils - small, slightly inflamed. Swab - pneumococci. Slight vaginitis. Swab - pneumococci. Heart - not enlarged. Sounds closed. C.N.S. - marked hyperkinesis, otherwise N.A.D. Other systems - N.A.D. B.S.R. 27 mm. in one hour. Pirquet test - negative.

Social and Psychological Background:- Third of a mixed family of seven. Is oldest girl. Home conditions - very cramped, physically and economically. Family evicted from their house in November 1935. Father - butcher and cattle dealer. Unemployed for two years. Probably below average intelligence, placid. Mother thinks he spoils the children. The mother - of average intelligence and education. Inclined to be excitable and occasionally irritable. Does all the punishing. No thrashing. Occasional "skelp". Family situation - the immediately older sibling, a brother, was delicate and slow in walking. "Mother had two babies." Gwendoline is very fond of the younger children and shows no sign of jealousy. She was first noticed to be unusually excitable and easily frightened, when she was between 2 and 3 years old. Present symptoms began when the family was evicted. 3 cousins, two in one family and one in another, have had chorea. School - late in starting school and consequently behind. Had 2 miles to go to school. Did not get proper dinner. Sometimes did not eat her sandwiches. Seems quite fond of school. No severe punishment.

CASE NO. 15. WINIFRED G.

Admitted to Hospital - 8.2.36 Aged 9 (Born 14.10.26)

**History of Illness:-** About October 1935, the mother noticed that the child was dropping things at table and had difficulty in walking and speaking. About end of October seen by doctor, who recommended she be rested in bed and not go back to school (see below). She improved considerably, but movements recurred in the New Year.

**Previous Illnesses:-** Measles at age 4. Chicken pox and mumps. Tonsillectomy at age 5. About this time operation (? tenotomy) for torticollis. No history of sore throats or growing pains.

**Condition on Admission:-** High coloured. Extremely restless. Marked choreic movements. T. (Rectal) 98.6°. P. 116 (sleeping 100) R. 24. Teeth satisfactory. Tongue clean. Throat - clean. Heart - not enlarged, sounds closed. C.N.S. - marked hyperkinesis, otherwise N.A.D. Other systems - N.A.D. B.S.R. 8 mm. in one hour. Pirquet test - negative.

**Social and Psychological Background:-** Youngest of a mixed family of six. Home conditions - cramped. Probably satisfactory as regards food. On a farm. Father - a cattleman, of average intelligence and education, placid and good with the children. Discipline left to the mother. The mother - of rather more than average intelligence and education, calm and capable, possibly rather domineering. Children are "very obedient". Family situation - Winifred has always been quiet and shy, especially with people older than herself. Plays happily with children of her own age. School - up to end of Summer 1935 seemed happy and successful at school. Teacher described her as "one of her best scholars. A good writer". In September, a new (temporary) teacher. Movements noticed three weeks after return to school. Permanent new teacher about this time. Shook and violently reproved Winifred for wriggling in her seat. After that movements began to get worse. She was also teased by boys on the way from school and threatened with worse if she told. She was removed from school on doctor's advice at end of October. Improved sufficiently for a return to school after the New Year to be considered and mentioned by visiting teacher. Child declared she would not go back "unless she got a new teacher" and movements became worse again.

CASE NO. 15.

FOLLOW-UP

Home visited - 20.8.45. This girl was described by her mother as being healthy but of an excitable nature. She still has twitchings in her hands but this must be barely noticeable because the mother freely admitted that she had not noticed anything unusual; but on the father's remarking about it she did agree with him.

Winifred is now a dressmaker. (With Talbot's having served her apprenticeship with Meldrum the tailor) She is happy in her work.

After leaving hospital she had several attacks of Chorea but her mother nursed her at home. Finally she had to be taken away from school because of it. Since then she has been quite healthy.

The father was a builder's labourer at the time of her illness, (after the family moved into Aberdeen) At present he is suffering from thyroid trouble. At the beginning of the girl's illness they were living in the country.

CASE NO. 16.

IRENE G.

Admitted to Hospital - 9.11.38 Aged 11 (Born 2.10.28)

**History of Illness:-** This child had her first attack of chorea at the age of seven. She was in hospital in 1937. During the earlier attacks, the movements were mainly on the left side but this time are affecting the right. Movements were observed also during sleep.

**Previous Illnesses:-** Measles and whooping cough at 5, mumps at 6, occasional tonsillitis up to 1936 when her tonsils were removed.

**Condition on Admission:-** Excited movements very marked. Temperature (Rectal)  $99.8^{\circ}$ , Pulse 88, Respirations 20. Tongue - slightly furred. Teeth - fair. Throat - clear. Heart - not enlarged, sounds closed. C.N.S. - hyperkinesia, otherwise N.A.D. Other systems - N.A.D. B.S.R. 12 mm. in one hour. Mantoux and Wassermann tests - both negative.

**Social and Psychological Background:-** Second of family of three girls. One girl, next youngest to Irene, died in infancy. Home conditions - strained. Father - unemployed, of average intelligence and education, is irritable and quick-tempered. Lost his job at the end of March through breach of discipline. Tends to domineer over children. Discipline is a source of friction between the parents. The mother - of average intelligence but poor education, which was interrupted by illness. Excitable, has arthritis, easily tired, fairly often in bed, has a slight stammer. Occasionally "skelps" the child. Family situation - is always fighting with older sister. The latter had acute rheumatism in August 1937 and Chorea. Likes to mother little sister, tends to try and boss her. School - not very successful, used to be strapped a lot for fidgeting in class. Often late for school. Additional note - A tenant in the house, a man and his children used to frighten the patient. This, apparently, was actually vindictive. The Child was afraid to go upstairs, in the dark, past the door of this tenant. This had been going on for about two years.

**Subsequent History:-** This child had a very mild recurrence in November 1939 and was only kept in hospital six days, during which time there were no definite choreic movements.

CASE NO. 16. (Cont'd)

FOLLOW-UP

Home visited - 31.8.45. This girl has had no more attacks of Chorea and seems to be a perfectly normal, healthy person.

She has been working since she left school and has never had a day's illness.

CASE NO. 17.

RUTH McC.

Admitted to Hospital - 4.4.38 Aged 7 (Born 28.6.30)

History of Illness:- Eyes examined at school in January, glasses recommended. The mother did nothing about this and a week before admission, the child was examined again when chorea was suspected. About a month before admission, the child became very fidgety and grimaced a lot, became emotional and irritable.

Previous Illnesses:- Bronchitis at 6 Months, measles at 2, fairly frequent colds since about three years old.

Condition on Admission:- Rather anxious expression, slight choreic movements, restless. Temperature (Rectal) 99.8°, pulse 100, respirations 24. Teeth - a few carious. Tongue - clean. Tonsils small but probably infected. Heart, not enlarged, overacting. Sounds closed. Chest - slight Harrison's sulcus. C.N.S. - hyperkinesia. Other systems - N.A.D. B.S.R. - 7 mm. in one hour. Throat swab - haemolytic strep.

Social and Psychological Background:- Eldest of a family of three. Others are boys. Home conditions - very unsatisfactory, see below. Father - tram-car conductor, of average intelligence and education. Fairly placid and normally affectionate. Is often off work with colds. Mother - of average intelligence and education, rather anxious-minded and inclined to be irritable. Is constantly in a state of apprehension in case children damage her mother's property, also apprehension of possible harm to children, i.e. fire or street accidents. Normally affectionate, does not thrash children, occasional "skelp". Family situation - no evidence of any abnormal jealousy, a good deal of insistence on equal shares between children. School - no obvious difficulty, reads and spells well, worries over lessons. Additional note - Family lives with maternal grandmother. The father stays with his own mother. Only two rooms for seven people - i.e. grandmother, mother, three children and two aunts. Neighbours were jealous of her "tidy" children. She always takes children with her doing messages. The children prefer this to staying with grandmother.

CASE NO. 17. (cont'd)

FOLLOW-UP

Home visited - 18.8.45. From the mother's report this girl seems to be quite better. Immediately after leaving school she took up work in Munro's printing press but in what capacity her mother did not know. Just after starting work Ruth was off ill for a few days with spasms of dizziness. She attended a doctor who said it was nothing serious. At the time of Ruth's illness her father worked as a tram-conductor. The father is now in the Army but the family have removed to a house of their own.

CASE NO. 19. MURDINA McG.

Admitted to Hospital - 11.1.37 Aged 8 (Born 22.4.28)

History of Illness:- About three months before admission jerky movements of arms and legs began and continued. Her speech became badly articulated and she started dropping things. She responded slowly to orders and questions. Her nature changed. Previously quiet and shy, she became noisy and restless and cried readily.

Previous Illnesses:- Whooping cough at age 3. Scarlet Fever at age 5. The mother said there was some question of the heart being affected at the time of the Scarlet Fever. In the Autumn before admission, she was kept off school for six weeks and in bed for a month, on account of growing pains. The movements started soon after her return to school.

Condition on Admission:- Very restless. T. (Rectal) 99°. P. 108 (sleeping; 78) R. 24. Teeth - dirty, some caries. Tongue - clean. Tonsils - enlarged, ragged and red. Heart - possibly slightly enlarged. Apex in nipple line. Soft systolic bruit in all areas with short conduction towards axilla. C.N.S. - hyperkinesia, otherwise N.A.D. Other systems - N.A.D. except some small boils on the legs. B.S.R. (19.1.37) 80 mm. in 1 hour. Pirquet test - negative. Note - By 27.2.37 the B.S.R. had fallen to 8 mm. in 1 hour. It rose following tonsillectomy to 62 and fell again in a month 4 mm. in 1 hour.

Social and Psychological Background:- Sixth of a mixed family of ten of whom five had died in infancy, including the first three. Home conditions - cramped, though house is modern. Probably financially straitened. Father - trawler fisherman of average intelligence and education, at once over-affectionate and domineering. Especially affectionate with Murdina, the only surviving girl except an infant. There is a father-daughter alliance. "No disobedience when father is at home" (Mother) The mother - of average intelligence and education, excitable and very talkative. "I let them understand that they are children and that father comes first." Father is used as a threatened punishment. Family situation - Murdina makes much of her little brother aged 4, who is rather spoilt. She sleeps with him. Sex matters are badly handled. "Wouldn't take her clothes off in front of father." School - keen on school, and evidently gets on well. Inclined to be over-anxious about work.

CASE NO. 19. (cont'd)

FOLLOW-UP

Home visited - 1.9.45. This girl has outgrown the effects of Chorea. She has been working since she left school. She eats well and sleeps well and leads an active life. She now lives with her aunt, her mother having died several years ago.

CASE NO. 20.

MARIE McK.

Admitted to Hospital - 20.3.36 Aged 10 (Born 17.6.25)

History of Illness:- Two to three months before admission was noticed to be rather nervous and to cry easily. About three weeks ago before admission she started to have twitching movements of her arms and legs. The father stated that these started just after she had got a fright when her grandmother "took a bad turn". The child was scolded for being frightened, whereupon she had a fit of hysterical screaming and her eyes became "fixed".

Previous Illnesses:- Measles at age 5; rubella at age 6; scarlet fever at age 8. Tonsillectomy at 3; For two or three years before admission had suffered from attacks of headache and vomiting.

Condition on Admission:- Very restless, grimacing and pale. T (Rectal) 99.4° P. 108, R. 22, Teeth and tongue satisfactory. Heart - N.A.D. C.N.S. - N.A.D except hyperkinesis. Other systems - N.A.D. B.S.R (24.3.36) 8 mm. in 1 hour.

Social and Psychological Background:- Elder of a family of two, the other being a boy. Home conditions probably fairly satisfactory. Father - a newspaper line-typer of rather above average intelligence and education, excitable and inclined to be domineering. The mother - of average intelligence and over-average education. Excitable, over-conscientious and anxious about the son (see below), over-affectionate and weak in her discipline. Family situation - the boy is delicate, having had several operations and has required a good deal of attention. Marie spent a lot of time with her grandmother who spoilt her, so that she resented discipline on her return home. She said to her grandmother that her father preferred her little brother. School situation - over-anxious and conscientious about her homework. Before her illness came on she was working four to five hours a night at her lessons. Near the top of her class. Additional note - Marie had a rapid birth, and was very restless as an infant, crying a great deal and sleeping little.

#### FOLLOW-UP

Home visited - 31.8.45. This girl appears to be a healthy person and has outgrown the effects of Chorea. For a long time she suffered from violent headaches which were followed by bilious attacks. Her doctor recommended her to wear spectacles and now she has these attacks much less frequently.

She works with the Co-operative doing very close work and probably suffered from eye-strain.

CASE NO. 21.

KATHLEEN McL.

A private patient first seen 17.11.36.  
Aged 8 (Born 1.8.28).

History of Illness:- About a month before she was first seen was noticed to be becoming clumsy, knocking over cups and spilling her tea. Jerky movements of the limbs were noticed about this time and her writing deteriorated.

Social and Psychological Background:- Youngest of a mixed family of four. Very definitely the baby. Five years younger than the third child. Home conditions - cramped, 2 rooms. Economically unsettled. Family income at present 27/-. Father - no settled employment. Often unemployed. Of average intelligence and education. A rather "feckless" unambitious person. Mother - Very much the "grey mare". Of more than average intelligence. Education interrupted on account of Rheumatic Fever at age 11. Inclined to be excitable and often irritable ("I'm not very patient"). Ambitious and rather domineering. Family situation - Kathleen has always been excitable. Probably always been rather over-awed by her mother. On one occasion had to be put to bed for a week-end after her mother had smacked her for dropping something. School - Does well and likes her teacher. She is often checked for talking in class. Nearly always had to spend a week-end in bed after starting school each term. She is very fond of reading, but bad at sewing.

#### FOLLOW-UP

Home visited - 1.8.45. Kathleen has remained well and developed normally and happily. There has been no recurrence of choreic symptoms. She works in the Laundry of the City Hospital. Still somewhat dominated by her mother. The home circumstances have improved considerably.

CASE NO. 22.

ANNABEL McL.

Admitted to Hospital - 21.7.36 Aged 6 (Born 9.1.30)

**History of Illness:-** About five weeks before admission Annabel was badly frightened when her little sister got her head stuck in a fence. The next day she was tired and had a headache. Her doctor gave her a sedative and she was better the next day. She was noticed to be unduly fidgety in school. She was away from home in the country with a grandmother for two or three weeks at the beginning of July (holidays), and during this time became progressively more restless. She complained of tiredness. On her return she was taken to her doctor, who diagnosed Chorea.

**Previous Illnesses:-** Whooping-cough at age 2. Mumps at age 3. Measles at age 5. Chicken-pox at age 6. Rather frequent colds. No history of sore throats or growing-pains. Has always been nervous.

**Condition on Admission:-** Twitching of head and limbs. Movements inco-ordinate. T. (Rectal) 98.8. P. 116. R. 261. Teeth - several carious. Tonsils - enlarged. Some nasal discharge. Heart - rather impure first sound. Well-marked sinus arrhythmia. Otherwise - N.A.D. C.N.S. - N.A.D. except hyperkinesia. Other systems - N.A.D. B.S.R. 13 min. in 1 hour.

**Social and Psychological Background:-** Elder of two girls; two years older than her sister. Home conditions - probably fairly satisfactory, though district rather slummy. Father - a box-maker of average intelligence and education. Of quite stable temperament, a believer in education and anxious for the children to do well at school. Mother - of average intelligence and education. Excitable and easily irritated. Admits to shouting at the children when she is angry. Occasionally "spanks" but has never "thrashed" Annabel. Family situation - often seems irritable without apparent cause. ? jealousy of little sister. School - seems to like school, and is keen on writing and drawing. Does not take a good breakfast during school term, but does not exhibit any other obvious sign of anxiety.

CASE NO. 22. (cont'd)

FOLLOW-UP

Home visited - 23.8.45. This girl now works as a tailor's machinist with Kerr, Leid & Co., Guild Street and has been there since she left school. She is still sometimes very restless and the mother thinks there are still traces of Chorea but another woman who lives with them is of the opinion that there is nothing abnormal about the girl's restlessness. The mother occasionally doses her with aspirin.

Her own doctor has recommended that the girl go to bed early but she does not comply with his wishes. She is a very active girl and really does not get enough rest.

She does not seem to be of a nervous disposition - the air raids did not have an adverse effect on her.

At the time of her illness her father worked as a box-maker.

CASE NO. 23.

EMMA McM.

Admitted to Hospital 23.12.35 Aged 6 (Born 10.12.29)

History of Illness:- Three days before admission was noticed to be twitching her R. arm and leg. For six weeks before this she had been noticed to be restless and nervous in her sleep.

Previous Illnesses:- None admitted. Had never had a doctor.

Condition on Admission:- Restless. Twitching of limbs, esp. on the R. side. T.(Rectal) 99.8. P. 120 (sleeping 100). R. 24. Teeth - good. Tonsils clean. T. Glands slightly enlarged. Heart - probably slightly enlarged. Systolic murmur at apex, conducted some way towards axilla (a diastolic murmur near the apex developed later.) C.N.S. - NA.D. except hyperkinesis. Other systems - N.A.D. B.S.R. 65 min. in 1 hour.

#### Social and Psychological Background.

Eldest of a family of five, the others all being boys. One of these died at age 3 of "gastritis", one was still-born, and a third (aged 2) at this date in Hospital under treatment for rickets. Home conditions - bad. Two attic rooms. Father - a shore-porter. An epileptic. Drank heavily at one time, but stopped two years ago. Of under-average intelligence and education. Excitable, but not hasty with the children. Mother - of average to poor intelligence and education. Nervous (e.g. when left alone) and anxious. "Always expects the worst". Is hasty with the children and shouts at them. The father says she has a "stormy voice". Family situation - seems fond of younger children, but shows evidence of jealousy over possessions. School - very keen. Apparently doing well. "Wouldn't go to bed till lessons are done".

CASE NO. 24.

JESSIE M.

Admitted to Hospital - 21.2.36 Aged 11 (Born 14.9.24)

**History of Illness:-** Two previous admissions to Hospital for Chorea in 1933 and 1934. Since the 1934 attack she had remained well until she returned to school after the Xmas holidays, i.e. Jan., 1936. She then became fidgety and was scolded by her teachers for her writing and sewing. She was kept off school and in bed on the advice of the Dispensary doctor until admission.

**Previous Illnesses:-** Measles and Whooping-cough at age 2. Tonsillectomy whilst in Hospital in 1933.

**Condition on Admission:-** Rather restless. T. (Rectal) 99. P. 88. R. 24. Teeth - some carious. Throat clean. Heart - not enlarged. Faint systolic just internal to apex. C.N.S. Right K.J. greater than left. N.A.D. Other systems - N.A.D. B.S.R. (25.2.36) 26 min. in 1 hour.

**Social and Psychological Background.**

Second of a family of four, youngest a boy. Home conditions - slum. Economically bad. Father - unemployed labourer. Only occasionally employed for several years. Of average intelligence and education. Excitable and irritable at times. Rather domineering ("Father's word is enough"), but does not thrash the children. Mother - of under-average intelligence and education. An anxious-minded, rather inadequate person. Family situation - Jessie tries to boss her sisters and often hits them, quarrelling and then trying to make up. This tendency only became marked after the first attack of Chorea, but she was always a nervously active child. School - high up in her class, but was kept back a year owing to interrupted school time. Seems fond of her teacher, but is often scolded for restlessness and is easily put out by this.

**Additional Note:-** On 30.7.36, after the discharge from Hospital, the mother stated that Jessie was "very disobedient and sulky", presumably rebelling against the discipline at home, but six weeks later she was "less ill-natured".

**FOLLOW-UP**

Home visited - 27.8.45. This girl's mother said that there had been no traces of Chorea for a long time. She is now a healthy girl. She is married and has a small child. They live in three rooms in a very unhealthy, dirty house.

CASE NO. 25.

ROBINA P.

Admitted to Hospital 18.2.38 Aged 10 (Born April 1927)

History of Illness:- A few weeks before admission her little brother was taken to hospital suffering from pneumonia. Immediately after this she was noticed to be fidgety and excited. A little later she complained of pain in the legs, regarded as growing pains. Ten days before admission definite jerky movements of the R. arm and leg were noticed. She dropped things and walked jerkily. She took to feeding herself with her L. hand.

Previous Illnesses:- Measles at age 3. Whooping-cough at age 4. Fractured clavicle in 1936.

Condition on Admission:- Pale. Irregular jerking movements of R. arm and leg. T. (Rectal) 98. P. 120. R. 24. Teeth - good. Tonsils - enlarged, red and ragged. Heart - probably slightly enlarged. Blowing systolic maximal at apex and conducted to axilla. C.N.S. - N.A.D. except hyperkinesia. Other systems - N.A.D. B.S.R. (27.2.38) 20. Rheumatic nodule on flexor tendons of L. wrist.

#### Social and Psychological Background.

Eldest of a mixed family of four. Home conditions - tenement. Said to be "very noisy". (see below). Told her mother she did not want to go home from Hospital. Father - a dock labourer of average intelligence and education. Stable temperament. Mother - of average intelligence and education. Stable temperament. Family situation - nearest sib, a boy, is rather "good". "She (i.e. Robina) would better to be the loon" (Mother). (See H.I. above) School - apparently gets on quite well.

Additional Note:- Robina spends a lot of time in her grandmother's house (in the same building) where she plays with her aunt (Father's sister) to whom she is much attached.

#### FOLLOW-UP

Home visited - 3.9.45. This girl is perfectly healthy and has a baby. She has had no more attacks of Chorea.

She worked after she left school until she had her baby.

CASE NO. 26.

JESSIE P.

Admitted to Hospital - 13.12.35 Aged 11 (Born 3.1.24)

**History of Illness:-** A month before admission she had a sore throat and fever. The R. arm was said to be red and swollen at that time (the description suggested urticaria). About the same time her mother noticed she was twitching the R. arm and leg. After two weeks in bed this passed off, and she went back to school. A week later the teacher told her mother that Jessie could not hold her pen on account of jerking movements, which became steadily worse and occurred even in sleep.

**Previous Illnesses:-** Diphtheria at age 3. Frequent sore throats, even after tonsillectomy at age 5.

**Condition on Admission:-** Restless and grimacing. Movements most marked on R. side. T. (Rectal) 99. P. 96. R. 24. Teeth - several carious. Throat - clean. Heart - not enlarged. Soft systolic murmur at apex, conducted a short way towards axilla. Sinus arrhythmia. C.N.S. - N.A.D. except hyperkinesia. R.K.J. greater than L. Other systems - N.A.D. B.S.R. (30.12.35) 30 mm. in 1 hour.

**Social and Psychological Background:-** Youngest of a family of 9, of whom two died in infancy. The others are all males. Home conditions - cramped, but probably economically relatively satisfactory. Eldest son is 35, and all the boys are at home. Father - a slater's labourer of average intelligence and education and stable temperament. Easygoing. Mother - stated age 51, of average intelligence and education and apparently stable temperament. Family situation - her brothers are all said to be normally kind to Jessie. She is never whipped at home. She tends to sit in the house rather than play with other children. School - does not get on well. She is above the average age in her class and is bottom of it. She is sometimes whipped at school. She dislikes school and sometimes has to be forced to go.

#### FOLLOW-UP

Home visited - 21.8.45. This girl now works with the Co-operative - in a shop.

There have been no further attacks of Chorea and she is quite healthy.

At the time of her illness her father worked with a factor. At present her mother is in hospital with tuberculosis.

They live in a very small house in a basement.

Admitted to Hospital - 16.1.39 Aged 11 (Born May 1927)

History of Illness:- Three days before admission jerking movements of left arm and leg were noticed. The mother stated that the movements started after Agnes had visited the house of a chum who had died. There she was taken to "view the corpse", an experience which had greatly impressed her. On her return she described the friend's appearance in great detail.

Previous Illnesses:- Much illness. A "blue" baby at birth. Two operations for hernia at 7 months. Pneumonia on these occasions. Measles - twice. Whooping cough. Scarlet Fever. Diphtheria. Appendicectomy at age 6. Pleurisy at age 10.

Condition on Admission:- Restless and anxious. Twitching of left arm and leg. T. (Rectal) 99.8°. P. 96. R. 20. Teeth - many carious. Tonsils - red and ragged. Heart - not enlarged, overacting. Emphatic sounds. No murmur. C.N.S. - N.A.D. except hyperkinesia. Other systems - N.A.D. B.S.R. - 2 mm. in 1 hour.

Social and Psychological Background:- Fourth of a family of five, of whom the second died in infancy. All are girls except the eldest. Home conditions - slum, cramped and financially restricted. Father - a labourer of average intelligence and education, of stable temperament. Discipline mostly left to the mother, but the children "take a telling from him." The mother - of possibly above average intelligence and average education. Has herself had a lot of illness since the birth of the last child and is attending her doctor for "nerves." Excitable, anxious-minded and irritable. "Skelps" the children. "You can't let them get over the top of you". Family situation - the youngest child, who is 5 years younger than Agnes, is a "spit-fire". Agnes cries when this child takes things away from her, but would rather give them up than fight. She is timid and lacking in vigour. She has stammered at times since her appendicectomy. Did not like hospital. There is some quarrelling with the elder children. School - seems to get on well both with her teacher and the other children.

#### FOLLOW-UP

Home visited - 21.8.45. This girl has been working in a Glove factory for four years. The mother was not very communicative but the girl seems to be quite healthy now - there are no traces of the illness. At the time of her illness her father worked with Johnston Bros. haulage contractors. They lived in a very unhealthy part of the town.

CASE NO. 30.

GEORGINA R.

Admitted to Hospital - 8.11.37 Aged 9 (Born 25.1.28)

History of Illness:- Had rheumatic fever about mid-August 1937. Kept in bed till end of September. Back to school on 18 October 1937. Soon after her return she began to be clumsy at table, dropping spoons and upsetting cups. She was very emotional and cried readily if scolded. She is left-handed.

Previous Illnesses:- Jaundice, measles and whooping cough at age 4, chicken pox at age 5. Scarlet Fever at age 7. Bilateral otitis media for eleven weeks following Scarlet Fever. Present illness began with a sore throat.

Condition on Admission:- Emotional, jerky spontaneous movements of left side of the body. T. (Rectal) 98.6. P. 104. R. 24. Teeth - many carious. Tonsils inflamed. Tonsillar glands enlarged. Heart - overacting. Diffuse forcible apex about N.L. Systolic mitral murmur conducted to axilla and heard over most of precordia. Ears - scarring of drums. Perforation R. C.N.S. - N.A.D. except hyperkinesis. Other systems - N.A.D. B.S.R. (13.11.37) 16 mm. in one hour.

Social and Psychological Background:- Seventh of a mixed family of nine, three of whom have died, one a girl next oldest sib to Georgina at age 8 of meningitis following scarlet fever, the other two in infancy. Father - a blacksmith of average intelligence and education, and stable temperament. The mother - of average intelligence. Education suffered through absence on account of illness. An epileptic, had fits up to 21 years of age. Excitable and irritable. Often 'skelps' the children, but never "thrashed" them. Worried a lot about her house till 6 years ago when it was done up. The house is four miles from the village, and had no inside water. Family situation - Georgina seems to be jealous and frightened of her little sister (a year and a half younger than herself) who bosses her. The younger child had rickets and was "made much of" at the age of 2. For a long time, Georgina has been inclined to be spiteful and deliberately disobedient. School- has been off school a good deal, and is rather backward. She is left-handed and her teacher used to smack her for using her left hand, but has lately desisted from this on medical advice.

CASE NO. 31.

MABEL R.

Admitted to Hospital - 26.6.39 Aged 5.

History of Illness:- For five months before admission was fidgety, dropping things and having difficulty in feeding herself. Movements were more marked on the right side, and the right side of the mouth twitched. Speech was sometimes affected and she cried or laughed on the slightest provocation.

Previous Illnesses:- Measles at age 2. Chicken pox at age 4. Mumps at age 5. Tonsillectomy - November 1938.

Condition on Admission:- Marked choreic movements, particularly of the right side. T. (Rectal) 99.6° P. 104. R. 22. Teeth - good. Throat - clean. Heart - N.A.D. C.N.S. - N.A.D. except hyperkinesis. Other systems - N.A.D. B.S.R. - 16 mm. in one hour.

Social and Psychological Background:- Youngest of a mixed family of four. She is a twin. Her twin sib died at the age of four days. Home conditions - very slummy. Father - a labourer of average intelligence and education. Easy going and evades problems of discipline. The mother thinks he should do more of the "dirty work". The mother - of average to good intelligence and average education, but excitable and sometimes irritable. General impression - amiable but unwise. Only once smacked Mabel who reacted hysterically. Family situation - no gross difficulties. Only those normal to the self-assertion of the smallest of the family. Is jealous of her sister's curls, and, if this sister has her hair in curling pins, Mabel tries to pull them out. School - illness started about a month after she went to school. Reported that she had been smacked for fidgeting. The mother thinks this was probably slight, but the child came home crying. The teacher suggested seeing the Doctor after this incident. Additional note - a boy about a year older, who lives nearby, chases her with a stick. Mabel is "terrified" by him, and is frightened to go out and play when he is around.

#### FOLLOW-UP

Home visited - 20.8.45. This girl seems to have recovered completely. She is still at school and doing quite well there. She has had no more attacks of Chorea and there are no traces now. They live in an extremely dirty house.

CASE NO. 32.

ROBINA S.

Admitted to Hospital - 10.6.37. Aged 7 (Born April 1930)

History of Illness:- Early in August 1936, i.e. ten months before admission, was noticed to be very jumpy. Carried on at school till December when she was seen by the school doctor who declared her unfit for school. She returned to school after three months and continued to attend until three weeks ago when she was again pronounced unfit.

Previous Illnesses:- Arm scalded at age 1. Subject to upper respiratory infections. No other serious illnesses recorded.

Condition on Admission:- Very restless. Unsteady gait. Jerky movements of both arms. Occasional grimacing. T. (Rectal) 98. P. 96. R. 22. Teeth - very bad. Tonsils - small but inflamed. Pharyngitis. Heart - not enlarged. Sounds closed. C.N.S. - N.A.D. except hyperkinesia. Vaginitis (swab grew B. Influenzae). Other systems - N.A.D. B.S.R. (12.6.37) 12 mm. in 1 hour.

Social and Psychological Background:- Elder of two children, the other a boy 19 months younger. Home conditions - bad. Slum (house subsequently condemned. See below). Father unemployed. Father - a labourer, unemployed for six years. Of average intelligence and education. Irritable. Suffers from headache. A student of politics. The mother - of under-average intelligence and average education. Easily frightened and alarmed. General health is poor, and she is irritable and quick-tempered. She spans the children when irritated. Dissatisfied with house, "I'd like a shift". Family situation - since she was about two, i.e. after the birth of her brother, Robina has always been doing things to attract attention. Her grandmother, who inclined to favour Robina rather than the boy, died eight months ago. School - apparently quite happy at school, in spite of irregular attendance. Additional note - the family lives in the attics of the house, and Robina often showed fear of going to bed on account of noises of rats above her head. She seems to be fear-ridden, and screamed and kicked when taken to the Ward on admission.

CASE NO. 32. (cont'd)

FOLLOW-UP

Home visited - 21.8.45. According to the mother's report this girl has made a complete recovery. She has been keeping a close watch on her daughter for signs of Chorea but none have been apparent. The mother seems an anxious type of person. She was very worried at the time of air-raids in case they would upset Robina but there was no sign of undue nervousness.

Her mother said "I think she conquered it herself - she is very proud". The girl does not seem to remember her illness apart from the fact that she was in hospital for a considerable time.

After she left school she worked in a cinema but she left because her mother did not like her doing evening work. She then took another job but left it because the pay was not good enough. Now she is working in Littlejohn's, a grocer in the market. At the time of her illness her father was unemployed. The house in which they lived is now condemned.

CASE NO. 35.

DOROTHY W.

Seen as Out-Patient - 15.2.39 Aged 8 (Born Dec. 1930)

**History of Illness:-** About two years before she was brought to Hospital, she was noticed to be becoming unduly restless and excitable. Towards the end of 1938 twitching of the R. eye and side of the mouth and R. shoulder girdle was noticed by the mother, but passed off. A few weeks later these movements recurred and were more pronounced.

**Previous Illnesses:-** Measles at age 3. Whooping cough at age 4. Scabies at age 6. Chicken pox at 7.

**Condition on Examination:-** Grimacing. Jerking movements, mainly R. sided. Teeth - bad. Tonsils - not enlarged. Heart - not enlarged. Sounds closed. C.N.S. - N.A.D. except hyperkinesis. Other systems - N.A.D.

**Social and Psychological Background:-** Elder of two girls, the other aged  $2\frac{1}{2}$ . Home conditions - small house, but probably fairly satisfactory. Father - a fish-worker. Employed. Of average intelligence and education. Nervous and excitable. Apt to be angry with the children. The mother - of possibly above average intelligence and average education. Has exophthalmos, but seems of stable temperament. States she never punishes the children severely, but sometimes "shakes" them. Family situation - her mother stated that she thought Dorothy's illness might have been started with the birth of the younger child. She was very jealous of the baby. This child has a wild temper and the two children do not get on well together. Dorothy tends to give way, and take refuge in reading. School - moderately successful at school. Average place in class. Average age. Lately great difficulty with writing. Additional note - Dorothy talked with a stammer at first, but is getting out of this now.

CASE NO. 35. (cont'd)

FOLLOW-UP

Home visited - 31.8.45. This girl was described by her mother as being much improved but not just quite better yet. There are still traces of Chorea - she twists her mouth occasionally and sometimes moves her tongue in an uncontrolled way. But she is improving gradually and her mother thinks she is outgrowing it. She has a nervous temperament and is highly strung.

Her general health is good. She eats well and sleeps well but she is not a very robust girl - she is easily tired out.

After being in the Sick Children's Hospital she was in Newhills Convalescent Home for several months. This was on the recommendation of her doctor.

After leaving school she was a hairdresser but did not like this type of work. Now she is a cook in the Douglas Hotel. She is happy in her work. They live in a small house but it appears to be a well-organised household.

CASE NO. 36.

HELEN W.

First Admitted to Hospital 21.12.36.

Aged 8 (Born 18.1.28).

**History of Illness:-** A month before admission complained of pain in the legs, and was kept in bed for a few days. A week later had a sore throat, and two weeks before admission jerking movements of the head were noticed. These continued and spread later to the arms and legs. She became very restless and her gait was unsteady.

**Previous Illnesses:-** Measles at age four. Chicken pox.

**Condition on Admission:-** Extremely restless. Choreic movements, marked inco-ordination. T (Rectal) 99.6. P. 112. R. 26. Teeth - caries. Tonsils - red and enlarged. Heart - not enlarged. Soft systolic murmur in all areas. C.N.S. - N.A.D. except hyperkinesia and inco-ordination. Other systems - N.A.D. B.S.R. - not recorded. (Note:- this child developed diphtheria soon after admission and was transferred to the City Hospital)

**Social and Psychological Background:-** Third of a mixed family of four. Home conditions - probably financially straitened. Father - unemployed labourer of average intelligence and education. Conscientious but irritable, "very strict". Feels he has to be. Has looked after the children for three years. The mother - of above average intelligence but average education (according to the father). Has been subject to depression since birth of the youngest child three years ago. For past year has been in the mental hospital. Attempted suicide before she was taken there. Family situation - Helen quarrels frequently with her elder sisters. School - is fond of school. Is near the top of her class and gets on well with the teacher.

**Second Admission:-** 13.5.39. This attack started three months before admission. She had been kept in bed during this time and had improved considerably. About three weeks before admission she had an exacerbation. On examination, the heart was found to be quite normal, and the B.S.R. was 9 mm. in one hour. She improved rapidly and was discharged well in a month. Tonsillectomy was carried out, as she had had several bouts of sore-throat.

CASE NO. 36. (cont'd)

FOLLOW-UP

Home visited - 4.9.45. This girl has had no further attacks of Chorea. Her father remarked that there was very little to be said about his daughter - she is a perfectly normal, healthy girl and not unduly nervous. He has been in the army for a number of years but he had never heard of any recurrence of Chorea.

CASE NO. 37.

GEORGE Ba.

Admitted to Hospital - 11.12.36 Aged 7 (Born 9.9.29)

History of Illness:- First attack of chorea began in December 1935, and the child was in hospital during January and February 1936. He was discharged well and remained so till early December 1936, when he again became restless and the movements recurred.

Previous Illnesses:- Measles at age 2. Scarlet fever at age 4. Pneumonia three times - at 6 weeks, age 2 and age 4. Operation for hernia at age 9/12.

Condition on Admission:- Very restless and emotional. Purposive movements very very jerky. Involuntary movements chiefly left side. T. (Rectal) 100 P. 104. R. 28. Teeth - fair. Tonsils - small and red. Pharynx - inflamed. Heart - not enlarged. Sounds closed. Respiratory system - nasal catarrh. Numerous moist râles. C.N.S. - N.A.D. except hyperkinesis. B.S.R. (15.12.36) 14 mm. in one hour.

Social and Psychological Background:- An only child. Home conditions - slummy, 2 rooms. Father's income 30/- Mother in occasional employment. Father - a lorry driver of average education and intelligence and stable temperament. The mother - of average intelligence and education. Herself an only child, was very nervous as a child but states she never actually had chorea. Excitable and irritable. Inclined to be severe with George, and occasionally spansks him. Family situation - the father was abroad when George was born and until he was four years old. The child did not show any obvious signs of jealousy on his return. In December 1935 they took in a boarded-out baby of eight months. George's first attack of chorea began within three weeks of this. School - is occasionally bullied. Gets on well with teacher.

#### FOLLOW-UP

Home visited - 20.8.45. This boy now lives with his mother and step-father, Mr Gillan and works with a fish company.

His step-father says there are still slight traces of Chorea - slight movement of the hands - but it is barely noticeable.

His mother said that a few years ago she was afraid that George was about to have another attack of Chorea but it seemed to pass over.

His father was a lorry-driver at the time of his illness.

The house in which they lived is now condemned.

CASE NO. 38.

GEORGE Be.

Admitted to Hospital - 26.2.36 Aged 11 (Born 5.12.24)

**History of Illness:-** Two weeks before admission became very fidgety. His face twitched and his arms and legs were never still. These symptoms became progressively more marked. He had had pains in the legs for a few weeks and had been ailing for a few months (see below).

**Previous Illnesses:-** Measles and whooping cough at age 5. Chicken pox and mumps at age 6. Scarlet Fever at age 7. Fractured wrist at age 8. Tonsillectomy at age 8. Nephritis following Sc. F. and again in October 1935, following a sore-throat. Recurrence six weeks before admission which cleared up before the onset of choreic symptoms. He was off school during all this period.

**Condition on Admission:-** Choreic movements moderately severe. T. 100.8 P. 108. R. 24. Teeth - fair. Throat - clean. Tongue - furred but moist. Heart - not enlarged. Sounds closed. C.N.S. - N. A.D. except hyperkinesis. Urine showed no albumin, but epithelial debris and occasional casts were seen in the deposit, for a week following admission. Other systems - N.A.D. B.S.R. (3.3.45) 25 mm. in 1 hour. A week later the reading was 6 mm. in one hour.

**Social and Psychological Background:-** Youngest of a mixed family of five. Home conditions - cramped. All five children are at home. Three rooms. Father - corporation gas-fitter, of average intelligence and education. Rather excitable but well controlled. Is not irritable with children. The Mother - of average intelligence and education, of stable temperament. Family situation - the third child, a girl of 19, is 'nervy' and inclined to be irritable with George, who on account of a lot of illness and his position as the baby of the family has been somewhat spoilt. George has always been anxious-minded, e.g. afraid of missing trains. School - "Does quite well at school. Good at drawing." Has never shown any reluctance to go nor spoken of any bullying or other difficulty.

CASE NO. 38.

GEORGE Be.

FOLLOW-UP

Home visited - 23.8.45. This boy seems to have developed into a very healthy person. Both his mother and a former neighbour remarked on the transformation - he had never been very strong when young but now he is very robust.

He has been in the Navy for three years. When he joined up he explained that he had Chorea as a boy - he was given a thorough Medical examination and was passed fit. Since being in the Navy he has not had a day's illness.

At the time of his illness his father worked as a gas fitter and they lived in a three-roomed house.

CASE NO. 39.

DAVID C.

Admitted to Hospital - 10.9.35 Aged 8 (Born 31.7.27)

History of Illness:- Present admission is fourth for chorea. First attack occurred early in 1933 at the age of 6. Subsequent attacks at intervals of 9 months to a year. Choreic movements were noticed about four weeks before present admission. The mother attributed them to the excitement of playing with other children during the school holidays, and suggested that he was better at school - less excitement. Nevertheless, in spite of return to school, the symptoms became more marked and the doctor sent him to hospital.

Previous Illnesses:- Measles and whooping cough as an infant. Restless infancy with much crying. Tonsillectomy 1933.

Condition on Admission:- Restless. Involuntary choreiform movements. T. (Rectal) 99.4° P. 88. R. 22. Teeth - fair. Throat - clean. Heart - not enlarged. Sounds closed. C.N.S. - N.A.D. except hyperkinesia. Other systems - N.A.D. B.S.R. (29.10.35) 5 mm. in 1 hour.

Social and Psychological Background:- Elder of two boys. Home conditions fairly satisfactory now. Previously considerable financial anxiety owing to unemployment. The mother considers the house is damp. Father - casual dock labourer. Often unemployed. Of average intelligence and education. Irritable and noisy with the children. Is affectionate but 'likes to be strict with them'. Has thrashed them several times. The mother - of average intelligence and education. Excitable, worrying type. Over-conscientious and over-affectionate "I just live for them" (i.e. the children). Family situation - was very jealous of his little brother, but appreciated his company more after being in hospital. School - does not like school, but gets on fairly well. Has lost ground through illness, but has caught up a good deal. Additional notes - Had Enuresis up to age 6. This ceased with the onset of chorea, and has not recurred. 16.3.37. Has been very much better since he has been treated with more understanding. Increased employment has also greatly helped home atmosphere. David was run over at end of June this year and sustained a fractured pelvis. He made a good recovery and showed no signs of chorea.

CASE NO. 39. (cont'd)

FOLLOW-UP

Home visited - 24.8.45. This boy now works as a Painter's apprentice. He has been medically examined for the Army and was passed A1.

There are no traces of Chorea.

CASE NO. 40.

ALEXANDER C.

Admitted to Hospital-12.2.37 Aged 8 (Born 21.3.28)

History of Illness:- About 2 months before admission was noticed to be jerking his head. This gradually became more noticeable, and he complained of headache. He was listless and disinclined to play. Three weeks before admission similar movements of the hands were noticed. Cried on the least provocation.

Previous Illnesses:- Operation for hernia at age 3. Tonsillectomy at age 4. Previous to this he had frequent sore throats. Measles at age 6. Mumps.

Condition on Admission:- Fairly quiet. Moderate "choreic" hand with inco-ordination on purposive movement. T. (Rectal) 99.4. P. 108 (sleeping 100) R. 22. Teeth - dirty. Throat - some pharyngitis. Heart - overacting. Otherwise N.A.D. C.N.S. - N.A.D. except slight hyperkinesia. Other systems - N.A.D. B.S.R. - 12 mm. in 1 hour.

Social and Psychological Background:- Younger of twin boys in a family of four boys and one girl (aged 13) Home conditions:- probably fairly healthy. Father - a hall keeper aged 65 of average intelligence and education, and stable temperament. Punishment largely left to the mother. The mother - of average intelligence and education. Excitable, easily flustered, over-conscientious and socially ambitious. Is anxious when the children are out of her sight, and does not allow the boys to play football. Occasionally spansks them. Family situation - The girl was treated several times in hospital between 1929 and 1934. for T.B. She has never been to school. Alexander had positive Pirquet test. Up to the time of his tonsillectomy he seemed weaker than his twin, but subsequently was the stronger of the two. School - apart from not being allowed to play football, gets on quite well. Is better than his brother at lessons.

CASE NO. 41.

ROBERT C.

Admitted to Hospital-14.12.35 Aged 8 (Born 30.7.27)

**History of Illness:-** Present admission was his third for Chorea. About 6 weeks before admission was noticed to have recurrence of his choreiform movements. These were severe at first, but became less and were not severe at time of admission. For a week or two before this he had been "run down" - anorexia, nausea, frontal headache and occasional watery vomiting. He had been in bed three weeks before admission. Discharge from right ear for two weeks before admission.

**Previous Illnesses:-** Measles at age 2. In hospital for Chorea 1932 and 1934. Bacillary dysentery in 1934. Tonsillectomy whilst in hospital in 1932.

**Condition on Admission:-** Rather restless. Mild Choreiform movements. T.(Rectal) 98.6°. P. 88. R. 24. Teeth - good. Throat - Post-nasal discharge. Ears - Right suppurative Otitis Media. Heart - not enlarged. Blowing systolic mitral murmur with short conduction. C.N.S. - N.A.D. except slight hyperkinesis. Other systems - N.A.D. B.S.R. (24.12.45) 25 mm. in 1 hour.

**Social and Psychological Background:-** Fifth of a family of eight boys, of whom the second was still-born and the sixth died of whooping-cough at 8 months. Home conditions - very bad. Two rooms in slum area. Father - a fish-worker, unemployed, of average intelligence and education. Fairly stable temperament, but sometimes irritable. His mother, a brother and a sister all said to have had Chorea. The mother - of average intelligence and education. Excitable, but struggles to do her best under great difficulties. Family situation - Robert has always been of a timid and non-belligerent temperament, and cries readily. First attack of chorea started 6 months after the death of his small brother. Poor sleeper. School - about average place and age in his class. Is fond of school and gets on quite well. His teacher understands about his illness.

CASE NO.41. (Cont'd)

FOLLOW-UP

Home visited - 24.8.45. This boy works as a stable boy and is very happy in his work. He was a very delicate boy when young. His mother said "I thought I'd never make a man of Robert". Since he left school there have been no traces of Chorea. He was medically examined for the Army a few weeks ago and was passed fit except for a perforated ear. Because of this he was put into Category 4. At the time of his illness his father was unemployed and the family lived in two rooms. They were allowed to have their new home mainly because of Robert's poor health.

Admitted to Hospital - 26.6.39 Aged 7.

History of Illness:- About a month before admission became jumpy - fidgety movements and blinking. These symptoms became steadily more pronounced. He complained of a tired feeling in his legs.

Previous Illnesses:- Measles and whooping cough at age 1. Scarlet fever and chicken pox at age 2. Burn of leg at age 3. No history of sore throats.

Condition on Admission:- Mild choreiform movements. T (Rectal) 99.6 P. 76. R. 20. Teeth - satisfactory. Tonsils - enlarged and ragged. Heart - not enlarged. Sounds good. No murmurs. C.N.S. - N.A.D. except slight hyperkinesis. Other systems - N.A.D. B.S.R. - 5 mm. in 1 hour.

Social and Psychological Background:- Youngest of a family of three. The eldest, a boy of 14, had chorea at age 7. The girl, aged 9, is healthy. Home conditions - a poor house in a slum district. Father - a bar-tender, of average intelligence and education, and stable temperament. Punishment is left to the mother. The mother - of average intelligence but poor education on account of frequent absence from school because of illness. At present awaiting admission to hospital for gynaecological operation. Excitable, irritable and anxious. During interview constantly twisted a handkerchief in her hands. Discipline probably spasmodic. Admits to a good deal of whipping when she is irritated. Family Situation - the children apparently get on quite well together. School - the mother thinks James' teacher is nice. He goes to a different school from the neighbourhood boys - i.e. an Episcopalian School. He is not fond of school, but gets on quite well. He doesn't readily go out and play with other children, evidently preferring to stay at home.

#### FOLLOW-UP

Home visited - 24.8.45. This boy is still extremely nervous and still has symptoms of Chorea. He is at school and seems to get on fairly well there. He is thirteen and a half years old. About five years ago he fell off a wall and had concussion. Since that time he has suffered from violent headaches. He will not sleep alone at night and when his mother asks him what he is afraid of he replies "Nothing but I'm just afraid". If he is left alone in the house he locks himself into a room. An older brother, who is now in the Army, also had Chorea. He has recovered except for a slight tremble in his hands. They live in a very small unhealthy looking house.

CASE NO. 43.

ARCHIBALD D.

Admitted to Hospital-5.1.37 Aged 10 (Born 18.6.26)

History of Illness:- Previously (1934) in hospital, for chorea. About a month before present admission choreiform movements in the right hand were noticed. About a fortnight the right leg was also involved. About a week before admission he fell twice while out walking. During this period he had been easily frightened and was not sleeping well.

Previous Illnesses:- Measles and whooping cough at age 1. Choreia at age 7. Tonsillectomy whilst in hospital at this time. Sore throat in October 1936.

Condition on Admission:- Pale, delicate-looking. Very restless. Choreiform movements of hands. T (Rectal) 100. P. 88. R. 22. Teeth -fair. Throat - pharyngitis. Heart - not appreciably enlarged. Systolic murmur present at all areas and conducted to axilla. C.N.S. - N.A.D. except some hyperkinesis. Other systems - N.A.D. B.S.R. 2 mm. in 1 hour.

(Note - It is of interest to note, in view of this boy's subsequent history that on 25.3.37, though there was some tachycardia - P, lying 93, and standing, 112 - no enlargement or murmur were detected.)

Social and Psychological Background:- Elder of a family of two, the other a girl of 6. Home conditions - probably fairly satisfactory though in slum district. Father - a shipwright of above average intelligence and average education. Rather excitable and over-conscientious. Suffers from "rheumatics". Punishment is left to mother. Archibald is more friendly with his father than with his mother. The mother - of above average intelligence and average education. Was usually top of her class at school. Ambitious. Rather irritable and impatient - e.g. Archibald was given an aeroplane at christmas. He objected that it was not what he wanted and was smacked for doing so. He promptly developed hysterical apnoea. Family situation - seems fond of his sister, but sometimes complains that she gets more than he does. School - is top of his class. Worries about his work. Reads avidly, even technical books. Additional points - eats a lot and greedily. Does not play readily with other boys. Is easily frightened. Attends Church and Sunday School regularly.

CASE NO. 43.

FOLLOW UP

Home visited - 4.9.45. This boy died very suddenly nine months ago. He died of heart trouble. His mother said the Choreic movements had completely gone but she remarked "I don't think anyone really gets over Chorea." It had left him with a bad heart.

He was up at University doing B.Sc. (Eng.) but his mother thought that studying was too much for him. About two years ago he joined the R.A.F. and when he was medically examined he was passed fit. They removed to their new house mainly because of the boy's health.

CASE NO. 44.

HUGH F.

Admitted to Hospital-18.2.38. Age 10 (Born 25.1.28)

**History of Illness:-** Second admission for chorea. About a month after return to school in the Autumn, i.e. October 1937 became excitable and fidgety, but symptoms were not considered sufficiently severe to keep him off school. Ten days before admission school medical officer at routine inspection referred the child to his own doctor. About this time movements of arms, legs and face were said to have become worse.

**Previous Illnesses:-** Hernia operation at age 1½. Measles at age 6. Chorea - June 1937.

**Condition on Admission:-** Grimacing, nervous and fidgety. Choreiform movements of both arms. T (Rectal) 98. P. 96. R. 20. Teeth - good. Tonsils small, but Tonsillar glands palpable. Heart - not enlarged. No murmurs. C.N.S. - N.A.D. except hyperkinesis. Abdomen - N.A.D. except healthy R.I.H. scar. Other systems - N.A.D. B.S.R. 4 mm. in 1 hour.

**Social and Psychological Background:-** Elder of two boys. Home conditions - house modern and comfortable. No trouble with neighbours. Father - salesman of average to good intelligence and education. Excitable. Normally conscientious and affectionate. States that he does most of the disciplining, as his wife can't be bothered. The mother, however, maintains that it is the other way round! The mother - of average intelligence and education. Was normally calm up to three years ago when she had a "nervous breakdown" attributed to menopause, though she was only 36 at that time. Since then she has been irritable and excitable. The father states that she is always apprehensive. Her sister died in a Mental Hospital. She sometimes whips the younger boy, but has never whipped Hugh. Family situation - the younger child is strong and boisterous. Hugh is easily offended and cries easily. Said to have been becoming more selfish. He gives the impression of being irritated by his mother, and when seen at Outpatients in May 1938 volunteered that he would like to go back to school. School - during the Winter before the original attack, he was frightened of one particular teacher who "roared" at him. Otherwise seems to get on fairly well. Does not worry over his lessons.

CASE NO. 44. (cont'd)

FOLLOW-UP

Home visited - 4.9.45. Since leaving school this boy has been working as a ship's carpenter. Since being in hospital he has never had a day's illness and there are no traces of Chorea. He is still of a nervous disposition.

CASE NO. 45.

WILLIAM K.

Admitted to Hospital-2.7.37 Aged 10 (Born 13.6.27)

**History of Illness:-** Four months before admission was diagnosed as suffering from chorea by the School doctor, and was taken away from school. For some months before this he had been nervous, restless and easily tired. Until about a month before admission his mother did not notice anything beyond this. Then he complained of pain in his wrists lasting about a week, fell on two or three occasions without obvious reason. Grimacing and continual movements of both hands were noticed and he was emotional.

**Previous Illnesses:-** Measles at age 1. Whooping cough at age 8. Mumps at age 3, from which he was slow in recovering. Developed a stammer about this time (see "additional note" below)

**Condition on Admission:-** Restless. Moderate choreiform movements. T. (Rectal) 98. P. 104. R. 22. Teeth - good. Tonsils - enlarged red and ragged. Heart - not enlarged. Slight impurity of first sound at mitral area. C.N.S. - N.A.D. except hyperkinesis. Other systems - N.A.D. B.S.R. - 8 mm. in one hour.

**Social and Psychological Background:-** Elder of two, the other a girl of 7 said also to be nervous. Home conditions - probably difficult as the mother has to work out. Father - a farmer who had to give up work 5 years ago on account of rheumatoid arthritis. Drinks too much. Of average to good intelligence and average education. Irritable since his illness. There is a definite antagonism between him and William who is obviously fonder of his mother. The mother - of average to good intelligence and average education. Irritable and over-conscientious. Since the father's illness has had to do outside work and is often very tired. Is nervous when she is tired. Family situation - is very fond of his little sister and protective towards her. Possibly rather jealous of the father-daughter friendship. School - keen about school until a year ago when he went into a new class. Is frightened of the new teacher who is a "shouter". Before he went into this class he was punished by this teacher during the play-hour.

**Additional Note -** William has been "nervous since he was about three years old". This seemed to follow mumps, but at this time, his father was drinking heavily, and the child was terrified. He started to stammer at this time and has done so ever since when excited.

Admitted to Hospital-15.7.38 Aged 9 (Born Sept.1928)

History of Illness:- Four weeks before admission febrile illness with pains all over the body, especially back and ankles. The pains subsided in two or three days, but he complained off and on thereafter of pain in the precordium and L. axilla, especially after eating or exertion. The day before admission choreiform movements of limbs, head, and face were noticed and he was very nervous and restless. During the earlier part of the illness he had a papular rash on the body.

Previous Illnesses:- Measles and whooping cough. Asthma at age 4, but this cleared after tonsillectomy at age 5 until the present illness when he has had three or four mild attacks.

Condition on Admission:- Nervous and restless. Moderate choreiform movements. Nutrition poor. Pale with malar flush. T. (Rectal) 100.6 P. 124. R. 26 Teeth - fair. Throat - clean. T. glands palpable. Heart - heaving impulse. Possibly a little enlarged, over-acting. Systolic bruit at base. Chest - pigeon breast, otherwise N.A.D. C.N.S. - N.A.D. except hyperkinesis. Other systems - N.A.D. Hb. 62% B.S.R. (25.7.38) 22mm. in one hour.

Social and Psychological Background:- Second of a mixed family of six. Home conditions - lives on a croft. Probably pretty cramped. Father - crofter of average intelligence and education. On the whole easy-going and leaves discipline to the mother, but is prone to anxiety. The mother - of average to good intelligence and education. Is definitely the "grey mare", of stable temperament. Family situation - nearest younger sib, a brother, is much livelier, physically and mentally. The mother considers that David, who has always been rather delicate, is definitely jealous of his brother. School - not good at school, "won't do his lessons". Has been told that if he doesn't buck up he'll catch it when he moves up into the next class (i.e. next term). The mistress of this class is somewhat of a "terror". During this term he has been in a classroom next to the one where this mistress teaches. David's elder sister is at present in her class and discusses her at home. In an exam. the week before he took ill, David was bottom. He is usually about the middle.

CASE NO. 49.

THOMAS P.

Admitted to Hospital-22.7.36 Aged 9½

History of Illness:- About three weeks before admission was noticed to be twitching his right shoulder. After a few days right arm and leg were also involved. These movements occur also during sleep and are actually more marked soon after he has fallen asleep than during the day.

Previous Illnesses:- Measles and mumps at age 1. Whooping cough at age 3. Sore throats a few months ago, during the Winter. For a month or so before onset of movements complained occasionally of left frontal headache. For about two months before admission has had scabies. Five brothers - all those at home - have had scabies since the beginning of the year.

Condition on Admission:- Restless, moderate choreic movements of right arm and leg. T. (Rectal) 98.4. P. 100 R. 24. Teeth - some carious. Tonsils - enlarged and inflamed. Heart - not enlarged. Sounds normal. C.N.S. - R.K.J. exaggerated. L. normal. Diminished power right leg and arm, otherwise N.A.D. Discs - normal. Skin - wide spread scabies. Other systems - N.A.D. B.S.R. not done till 18.8.36 when it was 45 mm. in one hour. At this time, he had recently recovered from a peridontal abscess.

Social and Psychological Background:- Youngest of a mixed family of 13. Home conditions - severely over-crowded. Eight of the family in addition to the parents live in the house. Father - farmer of average intelligence and education. Excitable, rather weak. Leaves discipline and decisions to the mother. The mother - of average intelligence and education, and stable temperament. Family situation - said to be spoilt and given in to by his brothers. School - is top of his class (average age). Intelligent, ambitious, and rather anxious. Home lessons do not bother him.

CASE NO. 50.

WILLIAM S.

Admitted to Hospital-24.1.36 Aged 11 (Born 9.1.25.)

History of Illness:- Two to three weeks before admission was in Aberdeen Royal Infirmary where antral drainage was carried out for chronic suppurative sinusitis. Whilst in hospital, he seemed to lose the power of the left arm. Since leaving the hospital eleven days ago, he has dragged his left foot. Right arm unaffected.

Previous Illnesses:- Measles, whooping cough, rubella, chicken pox, scarlet fever at age 9. Tonsillectomy at age 6. Sore throats before this, but not since. Recently sinusitis with headaches. A good deal of E.N.T. treatment.

Condition on Admission:- Restless. Twitching of left arm and leg. T. (Rectal) 99.4 P. 88 R. 22. Teeth - good. Throat - some pharyngitis. Heart - not enlarged. Sounds normal. Lungs - a few coarse rales right base. C.N.A. - N.A.D. except hyperkinesis, especially left side. Other systems - N.A.D. B.S.R. - 25 mm. in one hour.

Social and Psychological Background:- The younger of a family of two, the other a girl one year older. Home situation - two rooms, slum district. But the girl lives with maternal grandfather. Father - has been away in U.S.A. since William was aged 2. Said to be irritable by nature. The mother - of average intelligence and education, works as cleaner in Town House and keeps the boy and herself, of stable temperament. Family situation - sees his sister frequently. They get on well together. He is occasionally whipped, but does not need to be punished much. School - sometimes bullied at school, by one boy in particular last year, near the top of his class.

Additional note - William is a great reader of adventure stories, and very fond of the movies. He prefers them to playing with other boys. Recently he has been ragged a lot by other boys who knock at the window while he is reading.

#### FOLLOW-UP

Home visited - 25.8.45. This boy is now in the Marines and is very fit. On his first examination he was passed A1 and since then he has been examined for the Far East and again was passed fit. He has never had a day's illness since being in Hospital with Chorea.

They live in a very small house - two rooms - but it seems to be fairly clean and well-kept. The father is now dead.

CASE NO. 51.

DERMONT S.

Seen as an Out-patient in March 1939. Aged 7.

History of Illness, Etc. (The original notes in this case are missing except those of the special investigation interview)

Gradual onset and increase of choreiform movements and restlessness during weeks prior to consultation.

Previous Illnesses:- Nothing of significance. Was bitten by a dog a year ago.

Condition on Examination:- Tonsils apparently healthy but T. Glands palpable. Heart and other systems - N.A.D. Hyperkinesis. B.S.R. 12 mm. in 1 hour.

Social and Psychological Background:- Youngest of a family of four. Home conditions - modern council house - two rooms, scullery and bathroom. Father - second engineer on a trawler, of average to good intelligence and average education. Irritable when at home. Mother states that recently he has been bullying her and the child. He shouts and curses at them. The mother - of average to poor intelligence and average education. A stupid but well-meaning person, anxious minded and over-conscientious. Punishment is mostly left to her as the father is mostly away at sea. Smacks the children sometimes, but doesn't "roar" at them. Family situation - the four children sleep in one bed, but evidently don't quarrel much. Dermont is always excitable when he is at home. School - is keen, gets on well and is high up in his class. Likes his teacher.

#### FOLLOW-UP

Home visited - 5.9.45. This boy's mother said that her son had definitely improved since the family removed to their new home where they have more room and where the neighbouring children are less boisterous. For a long time she dosed him herself and now he is quite better, there being no traces of Chorea. He was medically examined about a year ago at Powis School and he was found to be fit. He does very well at school.

CASE NO. 52.

ALEXANDER S.

Admitted to Hospital-21.12.36 Aged 10 (Born 2.6.26)

**History of Illness:-** Three weeks before admission said to have fallen off a chair in a fit. Two days later jerking movements of the right hand were noticed. These continued and after about two weeks the right leg was also affected and his mouth twitched. After that he was unable to feed himself.

**Previous Illnesses:-** Whooping cough at age 3.  
Chicken pox. Tonsillectomy at age 5.

**Condition on Admission:-** Restless. Generalised movements. Looks mentally dull. T. (Rectal) 100.6 P. 110. R. 24 Teeth - fair. Throat - pharyngitis. Heart - not appreciably enlarged. Soft systolic murmur at all areas, most marked at the apex. C.N.S. - N.A.D. except hyperkinesis. Other systems - N.A.D. B.S.R. (5.1.37) 5 mm. in one hour.

**Social and Psychological Background:-** Only child of his mother. Four step-brothers. Home conditions - probably fairly satisfactory. Father - died 5 years ago of lymphadenoma. Said to have been of average intelligence and of stable temperament. He left punishment to the mother, but used to remonstrate with her about whipping Alexander. The mother - of average intelligence but below average education. Works as a charwoman. Excitable and over-conscientious. Unduly strict in discipline. Announced with evident self-satisfaction that Alexander "gets many a spanking." Her sister had chorea. She was aged 44 when Alexander was born. Family situation - the eldest of the step-brothers evidently resented the advent of Alexander who at an early date observed that he was ignored by this brother. The child gets on well with the others, the youngest of whom, aged 17, lives in the same house. School - seemed to get on well when he first went. After a year or two he began to get nervous and diffident in answering, and was thrashed several times. Two years ago was transferred to a "special" school. He sometimes comes back from school with a headache. He is timid and when reprimanded takes refuge in tears.

CASE NO. 52. (cont'd)

FOLLOW-UP

Home visited - 29.8.45. This boy is now in the Merchant Navy and is medically fit. Recently he has been attending hospital with a skin disease on his hands.

When he left school he worked in a saw-mill before joining the service.

There are no traces of Chorea.