CONGENITAL SYPHILIS IN MENTAL DEFECTIVE ADULTS

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THE relation of congenital syphilis to mental deficiency has for long been the subject of numerous investigations. In 1912 Mott ¹⁰ stated that 'if syphilis can produce arrest of development of the reproductive organs there is surely no reason why it should not lead to arrest of development of the most highly differentiated and specialized tissue of the body, viz., the cerebral cortex, or cause pathological variations in its structure and function.'

Since the introduction of the Wassermann reaction in 1906, an extensive literature dealing with the incidence of positive Wassermann reactions in mental deficiency has made its appearance, unfortunately with widely divergent results.

TABLE I

Showing Incidence of Positive Wassermann Reactions in the Blood-Serum of Mental Defectives

Authors	Date	Ages	Number of Cases	Positive Wassermann Reactions	Percentage
Raviart, Breton, ¹⁵ Petit, Gayer, etc. (France)	1908	All ages	246	76	30.8
Dean, H. R. ⁴ (Germany)	1909	do.	330	51	15.4
Thomsen, Boas, Hjort, ²¹ etc. (Germany).	1911	do.	2,061	31	1.5
Fraser and Watson ⁶ (England)	1913	1 to 17	194	91	46.9
Gordon, J. L. ⁷ (England)	1913	All ages	400	66	16.5
Roubinovitch, Baruk, ¹⁸ etc. (France)	1922	2½ to 17	48	15	31.0
Stewart, R. M. ²⁰ (England)	1925	All ages	800	158	19.75
Dayton, N. A. ² (U.S.A.)	1925	do.	9,183	497	5.4
Woodall, C. S. ²² (U.S.A.)	1928	do.	1,314	18	1.37
Bronfenbrenner, A. N. ¹ (U.S.A.)	1930	do.	2,463	134	5.4

It will be seen that the results vary from 46.9 per cent. to as low as 1.37 per cent. It is probable that the relative sensitivity of the Wassermann reaction in different hands, and the method of interpretation, have had their influence. Kline ⁸ mentions the fact that the antigens employed in the majority of precipitation and complement-fixation tests for syphilis contain acetone-soluble adventitious substances 'which not only increase the sensi-

tivity of results, but also cause false positive reactions, especially when cholesterin in any amount is added.' There are also other factors which influence the incidence of positive Wassermann reactions, such as age, type and grade of defective, and even sex, as will be shown later.

PERSONAL RESEARCHES

During 1932 and 1933 it was decided to review the whole subject by a thorough investigation into the incidence of congenital syphilis amongst 2,000 * mental defectives of both sexes and all grades, inmates of Caterham Mental Hospital.

Bronfenbrenner¹ has expressed the opinion that 'statistics on the positive Wassermann reaction do not reflect adequately syphilogenic processes and, therefore, cannot be used by themselves for evaluation of syphilis as a factor in the ætiology of feeble-mindedness.' Our enquiry has been based on the Wassermann reaction and Meinicke macro clarification reaction (M.K.R.) of the blood serum in all cases, as well as an examination of the cerebrospinal fluid in 1,927 cases, by the Wassermann reaction, cell estimation, globulin and Lange's colloidal gold tests. In addition, clinical examinations of all suspected cases were undertaken, and family histories obtained wherever possible. The tests on the blood and cerebrospinal fluid were carried out at the Central Pathological Laboratory of the London County Mental Hospitals by Dr. S. A. Mann, to whom I am indebted for his unfailing courtesy and kind cooperation in this work. The technique employed is fully described in a memorandum by Mann and Partner.⁹ Briefly, for the Wassermann reaction, the figure following the first plus indicates the number of units of complement (1 unit equals approximately 0.01 c.c. of pure guineapig serum) absorbed by 1 c.c. blood-serum or cerebrospinal fluid. The plus following the figure indicates that a further absorption of complement would take place if the range of dilution of serum or cerebrospinal fluid were extended.

For the Meinicke macro clarification test (M.K.R.), four tubes are put up. A positive reaction is indicated by complete clarification of at least one tube.

The method of cell estimation used for the cerebrospinal fluid is only a rough one, 5 c.c. being centrifuged, filmed and stained, and a general expression of the number of cells present given in terms of one to four plus, one plus being equivalent to 15-20 cells per c.mm.; two plus, 20-30 cells; three plus, 30-40 cells; and four plus, over 40 cells. The results of the Pandy reaction for excess of globulin in the cerebrospinal fluid are given in terms of one to four plus, according to the density of the cloud produced, when two or three minims of fluid are dropped into a saturated solution of carbolic acid in a test tube at room temperature.

* Numbered 1-2000 for reference.

Among our 2,000 patients were 402 children of 16 years and under, all of whom had both blood and fluid examined. These formed a special group and were separately dealt with in a paper published in the *British Journal of Children's Diseases* of October, 1933 [Paddle¹³], many items of which I am quoting by kind permission of the Editor.

TOTAL NUMBER OF CONGENITAL SYPHILITICS

The remaining 1,598 adult cases are now reviewed. Of these, 1,492 were found to be serologically negative, and 106 gave various abnormal reactions in their blood-serum, cerebrospinal fluid or both. Excluding 10 cases of acquired syphilis, a full list of results is appended (Tables II—IV).

TABLE II

Congenital Syphilitic Male Defectives

Serial No.	Case No.	Age	Grade	Epilepsy	Cripple	Family History	Physical Signs	Blood-serum		Cerebrospinal Fluid				Remarks
								W.R.	M.K.R.	W.R.	Cells	Pandy	Lange	
1	87	41	Imb.L.	+	—	N.K.	±	+30+	++++	—	—	—	—	
2	138	32	F.M.	—	—	N.K.	±	+30+	++++	—	—	—	—	
3	150	18	Imb.M.	—	—	N.K.	±	+30+	++++	—	—	—	—	
4	464	19	F.M.	—	—	+	±	—	++++	—	—	—	—	
5	1,143	17	Imb.L.	—	—	N.K.	±	—	++++	—	—	—	—	
6	1,205	25	Imb.M.	—	—	N.K.	±	+30+	++++	—	—	—	—	
7	1,232	23	Imb.L.	+	—	N.K.	±	+15	++++	—	—	—	—	
8	1,239	19	Imb.M.	—	—	N.K.	±	—	++++	—	—	—	—	
9	1,251	24	Imb.L.	—	+	N.K.	±	+30+	++++	—	—	—	—	
10	1,261	33	Imb.H.	+	—	N.K.	±	+10	++++	—	—	—	—	
11	1,265	20	Imb.L.	—	—	N.K.	±	+30+	++++	—	—	—	—	Choroiditis
12	1,269	17	Imb.L.	—	—	+	±	—	++++	—	—	—	—	
13	1,278	20	F.M.	—	+	N.K.	±	—	++++	—	—	—	—	
14	1,319	18	Imb.H.	—	+	N.K.	±	+15	++++	—	—	—	—	
15	1,346	24	Imb.M.	—	—	N.K.	±	—	++++	—	—	—	—	
16	1,360	21	Imb.L.	—	—	+	±	—	++++	—	—	—	—	
17	1,376	23	Imb.M.	+	+	N.K.	±	+30+	++++	—	—	—	—	
18	1,382	28	Imb.L.	+	—	N.K.	±	—	++++	—	—	—	—	
19	1,415	31	Imb.L.	+	—	N.K.	±	+10	++++	—	—	—	—	
20	1,424	23	F.M.	+	—	N.K.	±	—	++++	—	—	—	—	Choroiditis
21	1,441	23	Imb.M.	+	—	—	±	—	++++	—	—	—	—	
22	1,504	35	Imb.M.	+	—	N.K.	±	—	++++	—	—	—	—	
23	1,571	18	Imb.L.	—	—	+	±	+30+	++++	—	—	—	—	Mongolian
24	1,581	38	F.M.	—	—	N.K.	±	—	++++	—	—	—	—	
25	1,618	23	Imb.L.	+	—	+	±	+30+	++++	—	—	—	—	
26	1,672	30	Imb.H.	—	—	+	±	—	++++	—	—	—	—	
27	1,714	54	Imb.M.	—	—	N.K.	±	—	++++	—	—	—	—	
28	1,768	29	F.M.	—	—	N.K.	±	+30+	++++	—	—	—	—	
29	1,813	42	Imb.M.	—	—	N.K.	±	—	++++	—	—	—	—	
30	1,827	60	Imb.M.	—	—	N.K.	±	+30+	++++	—	—	—	—	
31	1,845	57	Imb.M.	+	+	N.K.	±	—	++++	—	—	—	—	
32	1,856	64	Imb.M.	—	—	N.K.	±	—	++++	—	—	—	—	
33	1,979	23	F.M.	—	—	N.K.	±	+30	++++	N.D.	N.D.	N.D.	N.D.	Juvenile G. P.
34	64	21	Imb.L.	+	+	+	±	—	++++	+6+	+	++	5555554321	
35	497	62	Imb.M.	—	—	N.K.	±	+30	++++	—	+	—	—	
36	1,151	17	Imb.L.	—	—	+	±	—	++++	—	++	—	—	
37	1,250	20	Imb.L.	—	+	N.K.	±	+30+	++++	+15+	+	+	4433210000	Choroiditis
38	1,339	26	Imb.M.	+	—	N.K.	±	—	—	—	+	—	—	
39	1,612	25	Imb.L.	—	—	N.K.	±	—	—	—	—	—	—	W.R. ++ in 1929

Table IV represents a group of 21 cases, many of which had abnormal fluids, others gave weak positive M.K.R.'s, and in one case a doubtful positive

TABLE III
Congenital Syphilitic Female Defectives

Serial No.	Case No.	Age	Grade	Epilepsy	Cripple	Family History	Physical Signs	Blood-serum		Cerebrospinal Fluid				Remarks
								W.R.	M.K.R.	W.R.	Cells	Pandy	Lange	
1	19	44	Imb.L.	—	—	N.K.	+	+30+	+++	—	—	—	—	{ Deaf mute Choroiditis
2	35	47	Imb.L.	+	—	+	+	+30+	++++	—	—	—	—	
3	43	55	Imb.L.	+	—	N.K.	+	+30+	+++	—	—	—	—	Choroiditis
4	216	19	Imb.L.	+	—	+	+	+30+	—	—	—	—	—	
5	360	27	Imb.M.	+	—	+	+	+30+	—	—	—	—	—	Microcephalic Choroiditis
6	474	19	Imb.L.	+	+	—	—	—	+	—	—	—	—	
7	573	58	Imb.L.	—	—	N.K.	—	+30+	+++	—	—	—	—	Choroiditis
8	608	30	F.M.	+	—	+	+	+30+	+++	—	—	—	—	
9	611	73	Imb.H.	—	—	N.K.	+	+30+	++++	—	—	—	—	Choroiditis
10	610	63	Imb.H.	—	—	N.K.	+	+30+	++++	—	—	—	—	
11	614	41	Imb.L.	—	—	N.K.	+	+30+	++++	—	—	—	—	Hydroce- phalic Blind Choroiditis
12	745	34	Imb.L.	—	—	N.K.	+	+30+	++++	—	—	—	—	
13	756	30	F.M.	+	—	+	+	+30+	++++	—	—	—	—	Blind Choroiditis
14	765	17	Imb.L.	—	—	N.K.	—	—	+	—	—	—	—	
15	774	19	F.M.	—	—	N.K.	+	+30+	++++	—	—	—	—	Blind
16	783	29	Imb.M.	+	+	+	+	+30+	++++	—	—	—	—	
17	791	18	Imb.L.	—	—	N.K.	+	+30+	++++	—	—	—	—	Blind
18	884	45	Imb.L.	—	—	N.K.	+	+15	++++	—	—	—	—	
19	896	44	Imb.L.	—	—	N.K.	+	+30+	++++	—	—	—	—	Blind
20	917	26	Imb.L.	—	—	N.K.	+	+30+	++++	—	—	—	—	
21	955	29	Imb.H.	—	—	N.K.	+	+30+	++++	—	—	—	—	Blind
22	970	20	Idiot	+	—	N.K.	+	+30+	++++	—	—	—	—	
23	994	28	Imb.H.	+	—	N.K.	+	+30+	++++	—	—	—	—	Blind
24	1,050	36	Imb.M.	—	—	N.K.	+	+30+	++++	—	—	—	—	
25	1,923	58	Imb.M.	—	—	N.K.	+	—	+	—	—	—	—	{ Died of Banti's disease
26	1,994	34	Imb.M.	—	—	N.K.	+	++	N.D.	N.D.	N.D.	N.D.	N.D.	
27	41	49	Imb.H.	—	—	N.K.	+	—	—	+	—	—	2222110000	Choroiditis
28	116	17	Idiot	+	+	N.K.	+	+30+	++++	+30+	++	+	4433210000	
29	135	29	F.M.	—	—	N.K.	+	+30	+	+3+	+	+	—	Choroiditis
30	248	45	Imb.L.	—	—	N.K.	+	+30	++++	+3+	+	+	2221100000	
31	569	52	Imb.M.	—	—	N.K.	+	+30	+	—	—	+	0001221000	Choroiditis
32	600	65	Imb.M.	—	—	N.K.	+	+30+	++++	+	+	+	—	
33	613	45	Imb.H.	—	—	N.K.	+	+30+	++++	+30+	++	++	5555443210	Choroiditis { Choroiditis Deaf mute
34	1,351	30	Imb.H.	—	—	+	+	—	—	+6	—	—	—	
35	82	17	Imb.L.	—	—	—	+	—	—	—	+	+	2221110000	Mongolian
36	350	48	Imb.M.	+	—	—	+	—	—	—	—	—	—	
37	801	23	Imb.L.	—	—	N.K.	+	—	—	—	+	+	5554321000	Mongolian
38	619	46	Imb.M.	—	+	N.K.	+	—	—	—	—	—	—	
39	620	21	Idiot	+	—	N.K.	+	—	—	—	—	—	—	

Wassermann reaction of the blood-serum. It is possible that some of these cases may be of syphilitic origin, but on account of lack of confirmatory evidence they have been classed as non-syphilitic. This leaves 75 cases of congenital syphilis, to which must be added three serologically negative cases, two (nos. 619 and 620) with undoubted clinical signs of congenital syphilis, and one (no. 1,612) with previous positive Wassermann reaction of the blood serum, making 78 in all.

INCIDENCE OF CONGENITAL SYPHILIS

Of the 78 cases of congenital syphilis the Wassermann reaction was positive in 43, or 55.1 per cent., and the M.K.R. was positive in 63, or 80.8 per cent. The latter test is, therefore, the more sensitive one. In the special

TABLE IV

Abnormal Serological Reactions in Non-syphilitic Defectives

Serial No.	Case No.	Sex	Age	Grade	Epilepsy	Cripple	Family History	Physical Signs	Blood-serum		Cerebrospinal Fluid				Remarks
									W.R.	M.K.R.	W.R.	Cells	Pandy	Range	
1	31	Male	26	Imb.L.	—	—	N.K.	—	±	—	—	—	—	0012321000	Quadriplegic
2	75	"	43	Imb.M.	—	—	N.K.	—	—	—	—	—	—	—	
3	137	"	44	Imb.M.	—	—	N.K.	—	—	—	—	—	—	—	
4	169	"	26	Imb.H.	—	—	N.K.	—	—	—	—	—	—	—	
5	504	"	19	Imb.M.	—	—	N.K.	±	—	—	—	—	—	—	Diplegic
6	1,168	"	20	Imb.L.	+	+	N.K.	—	—	—	—	—	—	—	
7	1,328	"	28	Imb.L.	+	+	N.K.	—	—	—	—	—	—	—	
8	1,334	"	23	Imb.L.	—	—	N.K.	—	—	—	—	—	—	—	
9	1,358	"	29	Imb.L.	+	+	N.K.	±	—	—	—	—	—	—	Epiloia
10	1,397	"	39	Imb.M.	—	—	N.K.	—	—	—	—	—	—	—	
11	1,476	"	26	Imb.M.	—	—	N.K.	—	—	—	—	—	—	—	
12	1,519	"	20	Imb.H.	+	—	N.K.	±	—	—	—	—	—	—	
13	1,525	"	54	Imb.L.	—	—	N.K.	—	—	—	—	—	—	—	Epiloia
14	1,584	"	35	Imb.M.	—	—	N.K.	—	—	—	—	—	—	—	
15	1,841	"	70	F.M.	—	—	N.K.	±	—	—	—	—	—	—	
16	219	Female	36	Imb.L.	—	—	N.K.	—	—	—	—	—	—	—	
17	233	"	17	Imb.L.	—	—	N.K.	—	—	—	—	—	—	—	Epiloia
18	697	"	17	Idiot	+	—	—	—	—	—	—	—	—	—	
19	699	"	40	Imb.L.	—	—	N.K.	—	—	—	—	—	—	—	
20	1,915	"	55	Imb.H.	—	—	N.K.	—	—	—	—	—	—	—	
21	1,922	"	70	Imb.H.	—	—	N.K.	±	—	—	—	—	—	—	

Idiot = Defective with an intelligence quotient of below 25.
 Imb.L. = Imbecile of low grade with an intelligence quotient of 25-33.
 Imb.M. = " medium grade with an intelligence quotient of 34-42.
 Imb.H. = " high grade with an intelligence quotient of 43-50.
 F.M. = Feeble-minded with an intelligence quotient above 50.
 Family History + = Definite evidence of syphilis in either or both parents.
 " " ± = Doubtful evidence.
 Physical Signs + = Definite signs of congenital syphilis.
 " " ± = Doubtful signs of congenital syphilis.
 " " N.K. = Not known.
 N.D. = Not done.

group of 402 children the reverse was the case. Of the total 1,598 cases, excluding acquired syphilis, the incidence of positive Wassermann reactions works out at 2·7 per cent., that of positive M.K.R.'s at 3·9 per cent., and the total incidence of congenital syphilis at 4·9 per cent.

The incidence of positive Wassermann reactions in the group of 402 children was 6·7 per cent., and the total incidence of congenital syphilis 9·2 per cent. The lower rate in adults reflects the tendency for the Wassermann and parallel tests to fade with advancing age. One must, therefore, suspect that there are many adult congenital syphilitics giving negative serological reactions. The task of identifying such cases is made extremely difficult by the lack of clinical signs, and by increased difficulty in getting personal and family histories.

RELATIVE INCIDENCE OF CERTAIN GRADES AND DEFECTS

An analysis of the various grades of mental defect is given in Table V.

TABLE V
Relative Incidence of Grades

	Free from congenital syphilis		Congenital syphilitics		Percentage incidence of congenital syphilis in total number of cases
	Number	Per cent.	Number	Per cent.	
Idiot	185	8.9	3	3.9	2.2
Imbecile (low grade)	560	36.8	31	39.7	5.2
„ (medium grade)	392	25.8	23	29.4	5.5
„ (high grade)	151	9.9	10	12.9	6.2
Feeble-minded	282	18.6	11	14.1	3.4
Totals	1,520	100.0	78	100.0	

The imbecile group has the highest incidence of congenital syphilis, the idiot group the lowest, the feeble-minded group occupying a middle position. It may be thought that factors such as epilepsy and paralysis would affect the results; that this is not so is shown by the removal of such cases. There were 1,025 defectives composed of 56 idiots, 752 imbeciles and 217 feeble-minded, all free from paralysis and epilepsy. Among the 56 idiots there were no cases of congenital syphilis, the imbeciles had 40 or an incidence of 5.3 per cent., and the feeble-minded seven or 2.7 per cent., the relative incidence thus remaining unaltered. It is of interest to note that the same state of affairs prevailed amongst the group of 402 children, though the numbers were too few to draw any conclusions.

Woodall ²² found precisely the same relation to exist amongst the three grades. After excluding cases of hydrocephalus, microcephalus, paralysis, cretinism, and mongolism, he found the following :—

	Number of congenital syphilitics	Total number	Per cent.
Moron (feeble-minded)	35	537	6.5
Imbecile	31	347	8.9
Idiot	12	216	5.6

Bronfenbrenner ¹ and Dayton ³ have shown that the incidence of positive Wassermann reactions tends to be lower in the lower grades of mental defect. The former thinks that this is due to a 'degenerative phase of syphilis' affecting idiots to a greater extent than imbeciles or feeble-minded, such cases giving a negative Wassermann reaction, and therefore tending to lower the positive incidence in the lower grades of mental defect. This conception has been termed the 'intelligence quotient (I.Q.) gradient of the Wassermann reaction in the mental defective,' meaning that the higher the I.Q. the greater the incidence of positive Wassermann reactions, when large numbers of mental defectives of approximately the same age are examined.

It would seem probable that one of the chief factors influencing the rate of congenital syphilis among the grades in both our group of children and adults is the I.Q. gradient, and that there is a drop in this factor just above the imbecile level.

Congenital syphilis is known occasionally to cause paralysis and epilepsy. A higher rate of congenital syphilis is, therefore, to be expected in the cripple-epileptic class of mental defect. This is shown to be the case in Table VI, the uncomplicated group having the lowest incidence.

TABLE VI
Relative Incidence of Certain Defects

	Free from congenital syphilis		Congenital syphilitics		Percentage incidence of congenital syphilis in total number of cases
	Number	Per cent.	Number	Per cent.	
Epileptics (non-cripple) . . .	347	22.8	20	25.6	5.4
Cripple (non-epileptic) . . .	76	5.0	5	6.4	6.2
Cripple and epileptic . . .	72	4.7	6	7.7	7.7
Uncomplicated * . . .	1,025	67.5	47	60.3	4.4
Totals . . .	1,520	100.0	78	100.0	

* Not cripple or epileptic.

The incidence of congenital syphilis in certain mental defective types and diseases associated with mental deficiency is given in Table VII.

TABLE VII
Relation of Congenital Syphilis to Certain Physical Types and Diseases Associated with Mental Deficiency

	Children	Adults	Total	Congenital syphilitics	Per cent.
Mongolism	29	24	53	2	3.8
Deaf mutism	8	6	14	2	14.3
Hydrocephalus	7	10	17	3	17.6
Microcephalus	12	10	22	2	9.1
Banti's disease	0	1	1	1	100.0
Diabetes mellitus	0	4	4	1	25.0
Epiloia	4	12	16	Nil.	Nil.
Cretinism	2	5	7	—	—
Achondroplasia	1	0	1	—	—
Fröhlich's syndrome	1	1	2	—	—
Choreoathetosis	3	4	7	—	—
Post-encephalitis lethargica	4	6	10	—	—
Meningeal angioma	0	1	1	—	—
Cerebromacular degeneration	2	0	2	—	—
Pseudohypertrophic muscular paralysis	2	0	2	—	—
Schilder's encephalitis	1	0	1	—	—

The numbers are rather small, but the low incidence (3·8 per cent.) of congenital syphilis among mongols should be noted, as it has been suggested that there is a direct causal relationship between the two conditions. For example, Stevens¹⁹ in 1916 found the Wassermann reaction positive in the blood-serum of six out of 18 mongolian idiots, the Wassermann reaction positive in the cerebrospinal fluid in two out of 18, and the gold chloride reaction present in 100 per cent. of the cases. He was of opinion that the serological tests demonstrated beyond question that the condition of mongolism was a result of syphilis, though he thought it probable that the latter acted primarily on some of the endocrine glands, possibly the pituitary body. Riddel and Stewart¹⁶ have since confirmed Stevens' findings with regard to the property of the spinal fluid of mongols to precipitate solutions of colloidal gold in the luetic zone. They examined the fluid of 55 mongols and all except one gave a luetic curve. The Wassermann reaction was, however, negative in all the fluids, and the cells and globulin all normal; only one out of 55 gave a positive Wassermann reaction in the blood-serum. There were 53 mongol defectives (children included) in our series, all of whom had both blood and cerebrospinal fluid examined. The Wassermann reaction was positive in only one case in the blood-serum, and negative in all the fluids; in 52 cases the fluid failed to give any sort of curve with the colloidal gold test (the exception being no. 801), and there was no increase of globulin or cells in these specimens. It therefore appears that syphilis had little to do with the causation of mongolism in our 53 cases.

Banti's disease must be rare amongst mental defectives. Its association with syphilis has been noted by various authors, including Osler.¹² One such case occurred in our series (no. 1,994) of congenital syphilis, which went to a fatal termination, being fully reported upon [Paddle¹⁴].

Rolleston¹⁷ in 1921 referred to the importance of endocrine infections in congenital syphilis. He thought 'it would be remarkable if the ductless glands escaped syphilization.' There was one congenital syphilitic in four cases of diabetes mellitus who after treatment with neoarsenobenzol was able to dispense with daily injections of insulin. Table VII also shows that such conditions as cretinism, choreoathetosis and post-encephalitis lethargica appear to be unconnected with congenital syphilis.

A complete physical examination, including retinoscopy, was made of all the 78 cases of congenital syphilis, the results being given in Table VIII. One notes the comparative rarity of Hutchinson's and Moon's teeth. 52·6 per cent. of cases had other dental deformities such as described by Fournier,⁵ but these defects are not considered by themselves to be diagnostic of congenital syphilis, as they are often met with in mental defectives apart from syphilis.

Bony lesions are fairly common in congenital syphilis. It is not, therefore, surprising to find that 47·4 per cent. of cases showed abnormal carrying

TABLE VIII

Signs Associated with Congenital Syphilis in 78 Cases

	No.	Per cent.		No.	Per cent.
Infantilism	7	8.8	Alopecia	4	5.1
Stunted growth	12	15.4	Pallor	12	15.4
Quadriplegia	1	1.3	Dactylitis	5	6.4
Diplegia	1	1.3	Onychia	5	6.4
Monoplegia	2	2.6	Scars of old ulcers	18	23.6
Hemiplegia	6	7.7	Nodes on bones	12	15.4
Strabismus (internal)	3	3.8	Chronic periostitis of tibia	10	12.8
" (external)	1	1.3	" " of femur	1	1.3
Iridoplegia	18	23.1	Curved tibia	4	5.1
Cataract	2	2.6	Lax ligaments of joints	3	3.8
Iritis	12	15.4	Coxa vara	1	1.3
Interstitial keratitis	18	23.6	Abnormal carrying angle—		
Choroiditis (disseminated)	10	12.8	At elbows	37	47.4
" (diffuse)	1	1.3	At wrist	3	3.8
Atrophied eyes	2	2.6	Scaphoid scapula	1	1.3
Facies syphilitica	10	12.8	Absent ziphoid appendix	4	5.1
Skull asymmetrical	9	11.5	General glandular enlarge-		
Sunken bridge of nose	4	5.1	ment	2	2.6
Frontal bossing	27	34.6	Splenic enlargement	2	2.6
Rhagades	11	14.1	Liver enlargement	2	2.6
Prominent lips	27	34.6	Thyroid enlargement (sym-		
Scarring of palate	4	5.1	metrical)	3	3.8
Teeth : Hutchinson's	4	5.1	Cirrhosis of liver	1	1.3
" Moon's	2	2.6	Birth palsy	1	1.3
" other defects	41	52.6	Unilateral synovitis of wrist		
Fissured tongue	13	16.7	and ankle	1	1.3
Cleft palate	1	1.3	Mitral stenosis	4	5.1
Eighth nerve deafness	16	20.5	Undescended testes	3	7.6
Bilateral dacryocystitis	6	7.7			(of 39)

angles at the elbows. This consisted of a marked outward deviation of the forearm with limited extension in a number of cases.*

In the group of 25 congenital syphilitic boys between the ages of seven and 16, 15 or 60 per cent. had undescended testes ; in the group of 39 male adults, only three or 7.6 per cent. had undescended testes, showing that this condition is really in the large majority of cases one of retarded descent, and not one of permanent arrest in the inguinal canal.

THE CEREBROSPINAL FLUID

Of 1,598 cases, 1,525 had their cerebrospinal fluid examined for increase in cells and globulin and the Wassermann reaction and Lange's colloidal gold test applied. The results are included in Tables II to IV.

Of these 1,525 cases (excluding 10 of acquired syphilis, four of which had abnormal fluids) the fluid was abnormal in 30, or 2 per cent. This compares with 5.2 per cent. in our previous group of 402 children, and 41 per

* I am indebted to Dr. R. M. Stewart for having indicated this sign to me.

cent. of 48 'mentally retarded children' reported by Roubinovitch¹⁸ and his co-workers.

Of the 78 adult cases of congenital syphilis the fluid was examined in 76, and of these in 16, or 21 per cent., it was found to be abnormal. In the group of 37 congenital syphilitic children 12, or 32·4 per cent., had abnormal fluids. Among the 78 congenital syphilitics there was only one case of juvenile general paralysis; his fluid gave a positive Wassermann reaction, a paretic type of curve with the colloidal gold test, and an increase in cells and globulin. Eight other cases gave paretic types of curve, some weak, but none of these cases could on clinical grounds be regarded as juvenile general paralysis.

As already mentioned, the cerebrospinal fluid of 52 out of 53 mongols failed to give any type of curve with the colloidal gold reaction, the exception being a female mongolian imbecile considered on clinical grounds to be a case of congenital syphilis, but with negative Wassermann reaction and Meinicke macro clarification reaction of the blood-serum; her fluid also gave a negative Wassermann reaction, but there was an increase of cells and globulin and a colloidal gold curve of the paretic type. Of the 21 cases of doubtful origin (Table IV) 14 had abnormal fluids, mostly increases of globulin, six showed increase of cells and five gave colloidal gold reactions, mostly in the middle zone. It is difficult to say what these abnormal fluids represent, as no confirmatory evidence of syphilis was available, and no clinical signs to account for the findings. It is interesting to note that case no. 697, an epileptic female idiot, has since died, and postmortem a tumour was found beneath the genu of the corpus callosum, bulging into both lateral ventricles, and obliterating by pressure the foramina of Munro, with consequent internal hydrocephalus. This would account for the large increase in protein and the type of colloidal gold curve found in the cerebrospinal fluid when she was alive. Choroiditis appears to be more common in congenital syphilitics with abnormal fluids than in those with normal fluids, the incidence in the former class being 25 per cent. and in the latter 11·7 per cent.

THE INFLUENCE OF AGE AND SEX

There were 899 males and 699 females, the incidence of congenital syphilis among them being 4·3 and 5·6 per cent. respectively.

If the males and females are separated into age groups (the 402 children being included) and the incidence of congenital syphilis plotted out in the form of a graph, it will be seen that the curves followed by the two sexes are unlike.

The curve for females starts higher than that of the males and is at its lowest between the ages of 31 to 40. It then rises sharply and is once more higher between the ages of 41 to 50, then falls, to rise again after the age of 60. The male curve, starting lower, falls more gradually, being lowest

between the ages of 41 to 50, then slowly rises, being higher again after 60. The initial fall in incidence is mainly due to the fading of the Wassermann and Meinicke reactions with advancing age. The higher incidence among females between the ages of 41 to 50 would suggest the influence of the menopause on these serological tests. Such a view has already been put forward by Nicole¹¹ when dealing with acquired syphilis in the insane. He examined 640 females and 989 males, inmates of Winwick Mental Hospital, and came to the conclusion that 'the menopause does affect the serological

reactions of females,' and 'many of the females examined before 50 give negative reactions, not because they are not syphilitic, but merely because they have not yet reached the menopause.'

SUMMARY

Fifteen hundred and ninety-eight adult mental defectives of all grades and both sexes had the Wassermann reaction and Meinicke macro clarification reaction done on the blood-serum. Fifteen hundred and twenty-five of these cases had their cerebrospinal fluid examined by the Wassermann reaction, Pandey's test, Lange's colloidal gold test, and for increase of cells. One hundred and six cases gave various abnormal reactions in the blood or cerebrospinal fluid, and 1,492 were serologically negative. Of the 106, 75

were considered to be congenital syphilitics, and of the 1,492 serologically negative cases, three were deemed on clinical and other grounds to be congenitally syphilitic—giving a total of 78 cases of hereditary syphilis, or an incidence of 4.9 per cent. The M.K.R. of the blood-serum in adults was more sensitive than the Wassermann reaction.

The incidence of congenital syphilis was higher among imbeciles than idiots or feeble-minded, and higher in cripple-epileptics than in uncomplicated cases. There was no evidence to show that mongolism was caused by syphilis. Conditions such as cretinism, choreoathetosis and post-encephalitis lethargica were unconnected with congenital syphilis.

Of 1,525 cases, excluding 10 cases of acquired syphilis with four abnormal fluids, the cerebrospinal fluid was abnormal in 30, or 2 per cent.

In 76 cases of congenital syphilis the fluid was abnormal in 16, or 21 per cent.

The incidence of congenital syphilis was found to fall with advancing age but differed in the sexes. In females it was highest in children and lowest between 31 to 40, with a sharp rise between 41 to 50, suggesting a menopausal influence on the serological reactions used. At this age the incidence among the males was at its lowest, but there was a subsequent rise.

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