

The heredity of acquired immunity / by J. Foster Palmer.

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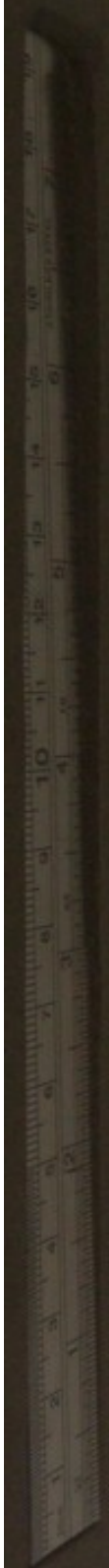
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THE HEREDITY OF ACQUIRED IMMUNITY.

By J. FOSTER PALMER.

ON a former occasion* I referred to the resistance to vaccination in children whose mothers have been recently vaccinated. The matter had hardly been tested, for it had been considered injudicious, if not unsafe, to vaccinate women during pregnancy. Since then an epidemic of small-pox has taken place and many pregnant women have been vaccinated as well as many others just before pregnancy. I have taken my primary vaccinations for a period of about twelve months to see if they give any indications as to the inheritance of acquired immunity. Of 701 primary vaccinations performed from 26th December, 1902, to 7th December, 1903, *seven* cases only (1 per cent.) were absolutely unsuccessful. Of these seven, five (or 71·42 per cent.) gave a history of parental immunity, as follows:—

Mother vaccinated recently	.	.	.	.	.	.	1
" " 12 months ago	.	.	.	.	.	.	1
{ " " 12 " " }	.	.	.	.	.	.	1
{ Father " 18 " " }	.	.	.	.	.	.	1
{ Mother " 2 years ago }	.	.	.	.	.	.	1
{ Father " recently }	.	.	.	.	.	.	1
{ Mother " 16 years ago }	.	.	.	.	.	.	1
{ Father " 2 " " }	.	.	.	.	.	.	1
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							<u>5</u>

* MEDICAL MAGAZINE, for July, 1900, p. 411.

distinct from the body, it should be so readily affected by merely material agencies—such as a blow on the head, a slight loss of blood, or a draught of hemlock.

The remainder of Galen's famous work is of less interest, and has been more imperfectly preserved. We gather that he discussed the physiology of the sense organs, especially those of sight, at considerable length, and criticised Aristotle's explanations of the ideas of time and space, in a manner which, if we may trust later Aristotelians, showed that he had misunderstood them. But these discussions were little more than additions and illustrations to a work the object of which had been accomplished in the first four books, of which the above is a brief outline.

In his later treatises Galen complains of the absence of scientific method among his contemporaries, and recommends his book on the subject with a frequency which, as Prof. von Müller says, seems almost intended to encourage its sale.

His own medical system is the most striking example of the application of his method; for it was logical consistency and completeness which enabled it to dominate the minds of men for more than 1,000 years. This domination finally became a tyranny, but it is well to remember on the other side that "Just as the Roman Church preserved the spiritual unity of Western Europe during the Middle Ages, so did the works of Galen and Aristotle prevent it from falling to pieces intellectually".

NOTE.—It is interesting to find that the first great rebel against the authority of Aristotle, Peter Ramus, attributes his emancipation to Galen's work, *On the Opinions of Hippocrates and Plato*. Had the treatise *On Scientific Proof*, in which the authority of Aristotle is more directly questioned, survived, the revolt might have come earlier, perhaps before men's minds were prepared for intellectual freedom.

In *fourteen* cases *one* vesicle only resulted from *four* insertions. Of these fourteen, eight (or 57·14 per cent.) gave a history of parental immunity, as follows :—

Mother vaccinated	12 months ago	.	.	.	.	.	3
{ " "	12 " "	}	.	.	.	.	1
{ Father " "	12 " "	}	.	.	.	.	1
{ Mother " "	12 " "	}	.	.	.	.	1
{ Father " "	recently	}	.	.	.	.	1
Mother	"	14 months ago (before pregnancy)	.	.	.	.	1
{ " "	18 " "	and }	.	.	.	.	1
{ Also " "	8 years ago	}	.	.	.	.	1
{ Mother " "	5 " "	}	.	.	.	.	1
{ Father " "	2 " "	}	.	.	.	.	1
							8

In twenty-nine cases *two* vesicles resulted from four insertions. Of these twenty-nine, *fourteen* (or 48·27 per cent.) gave a history of parental immunity, as follows :—

Mother vaccinated	during pregnancy (one at 2 months)	.	.	.	.	.	3
" "	just before pregnancy (one primarily)	.	.	.	.	.	2
" "	12 months ago	.	.	.	.	.	1
" "	15 " "	.	.	.	.	.	1
" "	18 " "	.	.	.	.	.	1
" "	2 years "	.	.	.	.	.	1
" "	7 " "	.	.	.	.	.	1
{ " "	5 or 6 years ago	}	.	.	.	.	1
{ Father " "	5 or 6 times	}	.	.	.	.	1
" "	12 months ago	.	.	.	.	.	1
" "	14 " "	.	.	.	.	.	1
" "	19 " "	.	.	.	.	.	1
							14

In fifty-nine cases *three* vesicles resulted from four insertions. Of these fifty-nine, *fifteen* (or 25·42 per cent.) gave a history of parental immunity as follows :—

Mother vaccinated several times	.	.	.	.	.	.	.	.	I
" " 3 "	.	.	.	.	.	.	.	.	I
" " 12 months ago	.	.	.	.	.	.	.	.	I
{ " " 12 " " }	.	.	.	.	.	.	.	.	I
{ Father " 12 " " }	.	.	.	.	.	.	.	.	I
{ Mother " 18 " " }	.	.	.	.	.	.	.	.	3
{ Father " 18 " " }	.	.	.	.	.	.	.	.	
Mother " 2 years ago	.	.	.	.	.	.	.	.	I
{ " " 2 " " }	.	.	.	.	.	.	.	.	I
{ Father " 2 " " }	.	.	.	.	.	.	.	.	
Mother " 4 " "	.	.	.	.	.	.	.	.	I
{ " " 4 " " }	.	.	.	.	.	.	.	.	I
{ Father " several times }	.	.	.	.	.	.	.	.	I
{ Mother " 5 years ago }	.	.	.	.	.	.	.	.	I
{ Father " 12 months ago }	.	.	.	.	.	.	.	.	
{ Mother " a few years ago }	.	.	.	.	.	.	.	.	I
{ Father " " " }	.	.	.	.	.	.	.	.	
" " 12 months ago	.	.	.	.	.	.	.	.	I
" " several times	.	.	.	.	.	.	.	.	I
									15

In nine cases the vesicles, though normal in number, were small in size. Of these nine, eight (or 88·8 per cent.) gave a history of parental immunity, as follows :—

Mother vaccinated recently	.	.	.	.	.	.	.	.	I
" " 12 months ago	.	.	.	.	.	.	.	.	I
" " 2 years ago	.	.	.	.	.	.	.	.	3
{ " " 6 " " }	.	.	.	.	.	.	.	.	I
{ Father " 2 " " }	.	.	.	.	.	.	.	.	
" " 2 " "	.	.	.	.	.	.	.	.	I
Mother had had small-pox	.	.	.	.	.	.	.	.	I
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Of the successful cases also, one had been twice previously vaccinated unsuccessfully. In this case the mother had been vaccinated recently.

If the above figures are not sufficient to prove the fact of hereditary immunity they are, at any rate, sufficient to give a strong suggestion in favour of its existence. The question remains whether the case is one of true inherited immunity, or, as is contended by Dr. Archdall Reid, immunity acquired by the

fœtus through contact with the mother. This explanation may serve to account for immunity when the mother has been vaccinated during pregnancy. The probability of this explanation would seem to be less when the mother has been vaccinated *before* pregnancy, and to diminish in a direct ratio with the length of time which has elapsed since the operation, being reduced to a minimum when the immunity is traceable on the side of the father only. In the above series of fifty cases there are twenty-one at least in which the mother's vaccination took place more than twelve months ago and consequently before pregnancy, and seven in which the immunity can only be referred to the father.

The total number of wholly or partially unsuccessful cases in this series is 118; of these the number traceable to hereditary influence is fifty, the total percentage thus traceable being 42·37. The percentage of complete failures is only *one*; of partial failures 16·54, and nearly half of these are thus traceable to heredity.

THE INHERITANCE OF ACQUIRED CHARACTERISTICS.

A paper read before the Chelsea Clinical Society, Nov., 1903.

By ERIC PRITCHARD, M.A., M.D. Oxon., M.R.C.P. London.

FROM the timid manner in which medical men express opinions on the subject of hereditary disease which can be interpreted as contraventions of the doctrine that "acquired characteristics cannot be inherited" it would be almost justifiable to conclude that they imagine that Weismann's theory of predetermination had actually been proved, and not that it was merely a questionable hypothesis. We should further be led to believe that his doctrine of the uninheritability of acquired characteristics was an essential element in the Darwinian theory. So far from this being the case Weismann's views are, in a sense, antagonistic to Darwin's, inasmuch as they circumscribe to a degree which the author of the *Origin of Species* clearly never contemplated the limits of adaptation. Indeed, if acquired characteristics are not inherited, adaptation can play no part in the phylogenetic development of the animal and vegetable series. Moreover, there is a large and not unimportant section of biologists, among whom Oscar Hertwig, Verworn and Hueppe are perhaps the most important, who take views which are fundamentally at variance with Weismann's conception of ontogenetic and phylogenetic development. It is not, however, my purpose to discuss conflicting theories on development, but rather to offer what are, I believe, substantially sound biological reasons for accepting the view that acquired characteristics, especially those of a pathological nature, can be and are transmitted.

It will not, I imagine, be disputed that the physico-chemical processes of the cell are determined by the relationship obtain-

THE HEREDITY OF ACQUIRED IMMUNITY.

By J. FOSTER PALMER.

IN my previous paper on this subject* the figures were somewhat incomplete owing to the year not having expired when they were brought before the Chelsea Clinical Society to follow the paper read by Dr. Pritchard on the whole subject of functional heredity. I now venture to give the results of two years' observations.

My list from 26th March, 1902, to 26th March, 1904, comprises 1,589 primary vaccinations. Of these cases, fourteen only (1 per cent. as before) were absolutely unsuccessful. Of these fourteen, eleven (or 78.57 per cent.) give a history of parental immunity, as follows:—

Mother vaccinated during pregnancy	.	.	.	.	5
„ „ recently	.	.	.	.	1
„ „ 12 months ago	.	.	.	.	1
{ „ „ 12 „ „ }	.	.	.	.	1
{ Father „ 18 „ „ }	.	.	.	.	1
{ Mother „ 2 years ago }	.	.	.	.	2
{ Father „ recently }	.	.	.	.	
{ Mother „ 16 years ago }	.	.	.	.	1
{ Father „ 2 „ „ }	.	.	.	.	
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* MEDICAL MAGAZINE for January, 1904, p. 20.

far too much the confidential advisers, to the exclusion of their important functions as teachers of the people. If the medical men of this country set themselves the task of enlightening their communities on such matters, it would greatly assist the work of school teachers.

What the seething masses of our population require is education. They crowd into our outpatient departments when the mischief is done, but would it not be wiser to give them the chance of preventing the mischief, and so preserving their own lives and the lives of their offspring to the community and the empire?

In *thirty-one* cases only *one* vesicle resulted. Of these, fifteen (or 48·38 per cent.) give a history of parental immunity, as follows:—

Mother vaccinated during pregnancy	.	.	.	.	4
" " 12 months ago	.	.	.	.	3
{ " " 12 " " }	.	.	.	.	1
{ Father " 12 " " }	.	.	.	.	1
{ Mother " 12 " " }	.	.	.	.	1
{ Father " recently }	.	.	.	.	1
Mother " 14 months ago	.	.	.	.	1
Father " 18 " " (3rd time)	.	.	.	.	1
{ Mother " 1 year ago (4th time) }	.	.	.	.	1
{ Father " 5 years ago }	.	.	.	.	1
Mother " 8 and 18 years ago	.	.	.	.	1
{ " " 2 years ago }	.	.	.	.	1
{ Father " 2 " " }	.	.	.	.	1
{ Mother " 5 years ago }	.	.	.	.	1
{ Father " 2 " " }	.	.	.	.	1
					15

In forty-seven cases two vesicles resulted from four insertions. Of these, twenty-three (or 48·93 per cent.) give a history of parental immunity, as follows:—

Mother vaccinated during pregnancy	.	.	.	.	5
" " just before pregnancy (one primarily)	.	.	.	.	2
" " 12 months ago	.	.	.	.	2
" " 15 " "	.	.	.	.	1
" " 18 " "	.	.	.	.	1
" " 2 years ago	.	.	.	.	4
" " 7 " "	.	.	.	.	1
{ " " 5 or 6 times }	.	.	.	.	1
{ Father " 5 or 6 " }	.	.	.	.	1
" " 12 months ago	.	.	.	.	1
" " 14 " "	.	.	.	.	1
" " 19 " "	.	.	.	.	1
" " 2 years ago	.	.	.	.	1
Mother " 20 " "	.	.	.	.	1
" re-vaccinated in childhood	.	.	.	.	1

In eighty-nine cases *three* vesicles resulted from four insertions. Of these, twenty-three (or 25·84 per cent.) give a history of parental immunity, as follows:—

Mother	vaccinated during pregnancy	.	.	.	.	4
"	" several times	.	.	.	.	1
"	" 12 months ago	.	.	.	.	2
{	" " 12 " "	}	.	.	.	1
{	Father " 12 " "	}	.	.	.	1
{	Mother " 13 " "	}	.	.	.	1
{	Father " 13 " "	}	.	.	.	1
{	Mother " 18 " "	}	.	.	.	3
{	Father " 18 " "	}	.	.	.	3
Mother	" 2 years ago	.	.	.	.	2
{	" " 2 " "	}	.	.	.	1
{	Father " 2 " "	}	.	.	.	1
Mother	" 3 " "	.	.	.	.	1
"	" 4 " "	.	.	.	.	1
{	" " 4 " "	}	.	.	.	1
{	Father " several times	}	.	.	.	1
{	Mother " 5 years ago	}	.	.	.	1
{	Father " 12 months ago	}	.	.	.	1
Mother	" 19 " "	*	.	.	.	1
{	" " a few years ago	}	.	.	.	1
{	Father " " "	}	.	.	.	1
"	" 12 months ago	.	.	.	.	1
"	" several times	.	.	.	.	1
						23

In thirty cases the vesicles were unusually small, although normal in number. Of these, twenty-eight (or 93·3 per cent.) give a history of parental immunity, as follows:—

* This was a very striking case. The appearance of the child's arm was, to me, distinctly suggestive of hereditary immunity. On asking the mother if she had been vaccinated since infancy, she replied that she had not. Before I left the room, however, she informed me, quite casually, that when her last child was vaccinated she had accidentally inoculated herself from it. I examined the place, and found a well-marked cicatrix. It had not occurred to her that this was vaccination.

Mother vaccinated recently	.	.	.	.	.	.	.	.	.	I
"	"	12 months ago	.	.	.	.	.	.	.	I
{	"	12	"	"	}	.	.	.	.	I
{	Father	"	3 years ago	}	.	.	.	.	.	I
Mother	"	2	"	"	.	.	.	.	.	6
{	"	2	"	"	}	.	.	.	.	I
{	Father	"	2	"	"	}	.	.	.	I
{	Mother	"	2	"	"	}	.	.	.	I
{	Father	"	4	"	"	}	.	.	.	I
{	Mother	"	2	"	"	}	.	.	.	I
{	Father	"	recently (unsuccessfully)	}	.	.	.	.	.	I
{	Mother	"	3 years ago	}	.	.	.	.	.	I
{	Father	"	3	"	"	}	.	.	.	I
{	Mother	"	5	"	"	}	.	.	.	I
{	Father	"	2	"	"	}	.	.	.	I
Mother	"	7	"	"	.	.	.	.	.	I
{	"	"	7	"	"	}	.	.	.	I
{	Father re-vaccinated				}	.	.	.	.	I
{	Mother vaccinated	6 years ago	}	.	.	.	.	.	.	I
{	Father	"	2	"	"	}	.	.	.	I
Mother re-vaccinated	.	.	.	.	.	.	.	.	.	I
{	"	"			}	.	.	.	.	I
{	Father	"			}	.	.	.	.	I
Mother had small-pox	.	.	.	.	.	.	.	.	.	I
Father vaccinated 18 months ago	.	.	.	.	.	.	.	.	.	I
"	"	2 years ago	.	.	.	.	.	.	.	4
"	"	4	"	"	(3rd time)	.	.	.	.	I
"	"	4	"	"	(unsuccessfully)	.	.	.	.	I
"	"	6	"	"	.	.	.	.	.	I

In this larger series the total number of wholly or partially unsuccessful cases is 211 (or 13·27 per cent.): of these the number traceable to hereditary immunity is 100, the percentage thus traceable being 47·39. The percentage of complete failures is, as before, *one*: of partial failures, 12·39, of which 45·17 per cent. appear to be traceable to hereditary causes.

ON SOME OF THE RESULTS OBTAINABLE BY PERCUSSION.

A Clinical Demonstration given at the Chelsea Clinical Society on 21st April, 1904.

By WILLIAM EWART, M.D., F.R.C.P., Senior Physician to St. George's Hospital.

(Continued from page 467.)

II.—SPURIOUS RESONANCE, BY CONDUCTION OR "PLEXIMETRY".

LET us now pass to the practical bearing of my introductory remarks. That which can be seen or felt need not be percussed, as, for instance, the apex-beat (but this may require exceedingly careful palpation), or a loose kidney, or the outline of abdominal tumours, or, again, the lower edge of the liver, which is a most difficult object for unaided percussion, and yet quite simple for palpation; and the same applies to other structures. But all the rest is inaccessible except to our percussion; and therefore this requires to be accurate and reliable, if, indeed, any percussor or any percussion can be regarded as reliable after all that has been, and remains to be, said. The best pianist is he who can strike the greatest variety of sounds out of the same inanimate keyboard. The expert percussor likewise is one who can play many tunes on the living instrument before him. You may trust the man as an observer, and trust his main results, but the varied play of his fingers you cannot trust.

Without entering into the details of technique, one or two working principles may be mentioned in aid of the efficiency of our percussion.





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