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HETERO-HAEMAGGLUTINATION STUDIES AMONGST HONG KONG CHINESE.

by

LINDSAY RIDE,

Professor of Physiology, The University, Hong Kong.

Owing to the kindness of Dr. A. S. Wiener of the Dept., of Pathology, Jewish Hospital of Brooklyn, New York, in supplying some stock anti-M and anti-N sera, it has been possible to undertake investigations into the frequency of M & N agglutinogens amongst the Chinese of Hong Kong.

With this sera numbers of individuals were tested, and using blood from local donors thus found suitable, rabbits were innoculated according to the method of Wiener (3) and a large supply of anti-sera obtained with which some thousands of tests have been carried out.

It is intended here to record and discuss the results of testing 1029 individuals with these sera. In the first instance a number of blood samples were tested in order to acquire accuracy in technique. The method employed was the usual open slide method and it was found entirely satisfactory. The data of the trial tests are not included in the following results.

TABLE I.

Group frequencies found amongst Hong Kong Chinese.

Number	Frequency of Types			$m =$	$n =$
	M + N −	M − N +	M + N +	$\sqrt{(M+N-)}$	$\sqrt{(M-N+)}$
1029	342	187	500	.5765	.4263
%	33.24	18.17	48.59	$(m+n)$ = 1.0028	

Wiener has shown that if the M & N agglutinogens are inherited as a single pair of allelomorphs then in a random sample from a homogeneous population $(m+n)$ should equal unity, where $m=$ the frequency of the gene M and $n=$ the frequency of the gene N in that population. The deviation of the actual value of $(m+n)$ from unity is called D; then $D=(m-n)-1$.

He has further shown that the magnitude of D depends (*a*) on the number of individuals examined, (*b*) on the homogeneity of the people examined, (*c*) on whether the sample of the population be a random one or not and (*d*) on the errors in technique.

In these data, 1029 individuals is a large enough number to give an accurate picture of the gene distribution; they were drawn from a homogeneous city population; they included students, in-patients and out-patients from various hospitals, and coolies, all having as far as one could see, only this in common, that they have each come in contact with members of this department, and hence should constitute a truly random sample of Hong Kong's Chinese population (only Chinese are included); and in the tests the possibility of errors in technique and reading were it is hoped reduced to a minimum.

This being so, then the magnitude of D may be taken as a test of the theory of inheritence of these characters. From the above results,

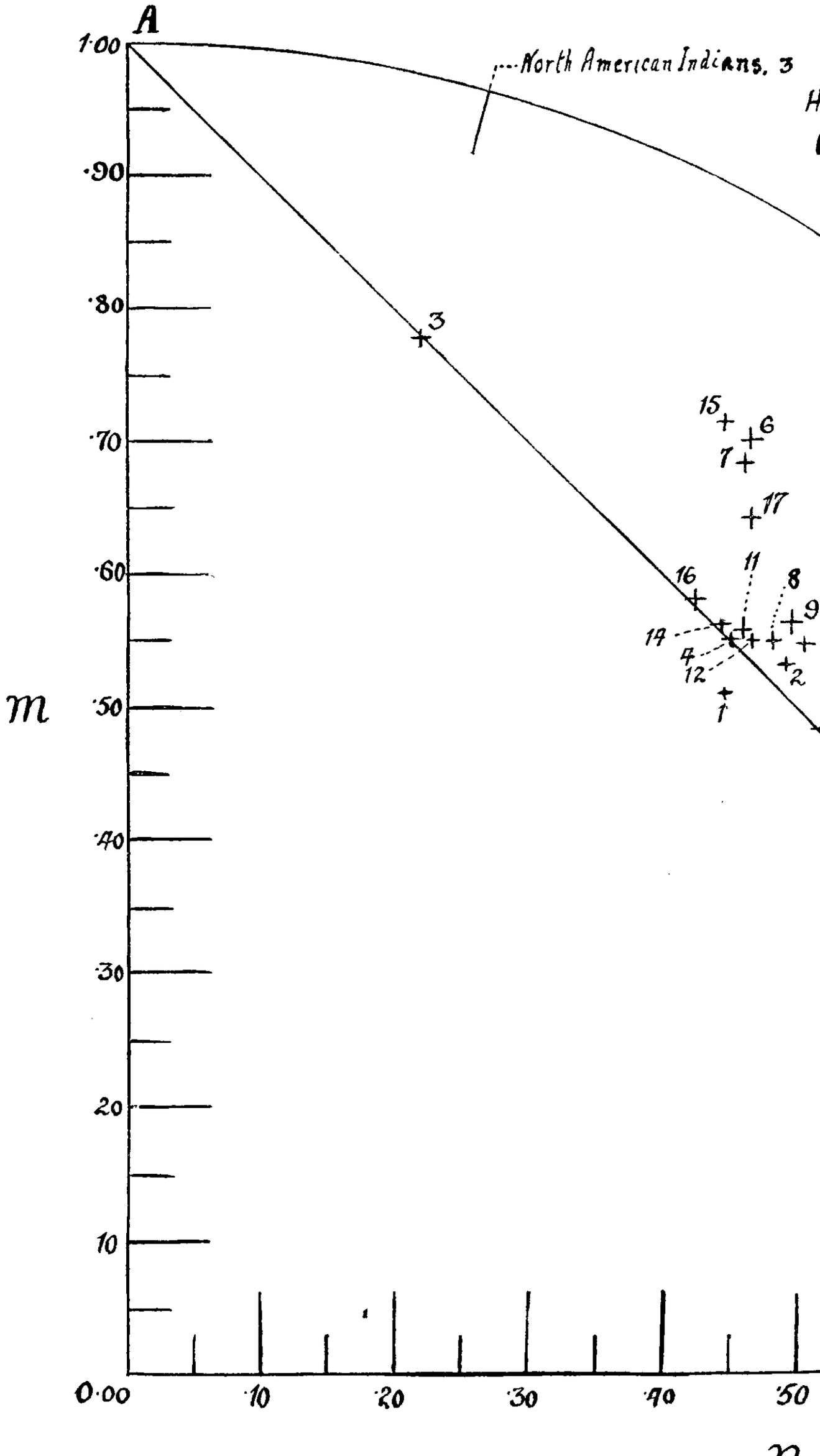
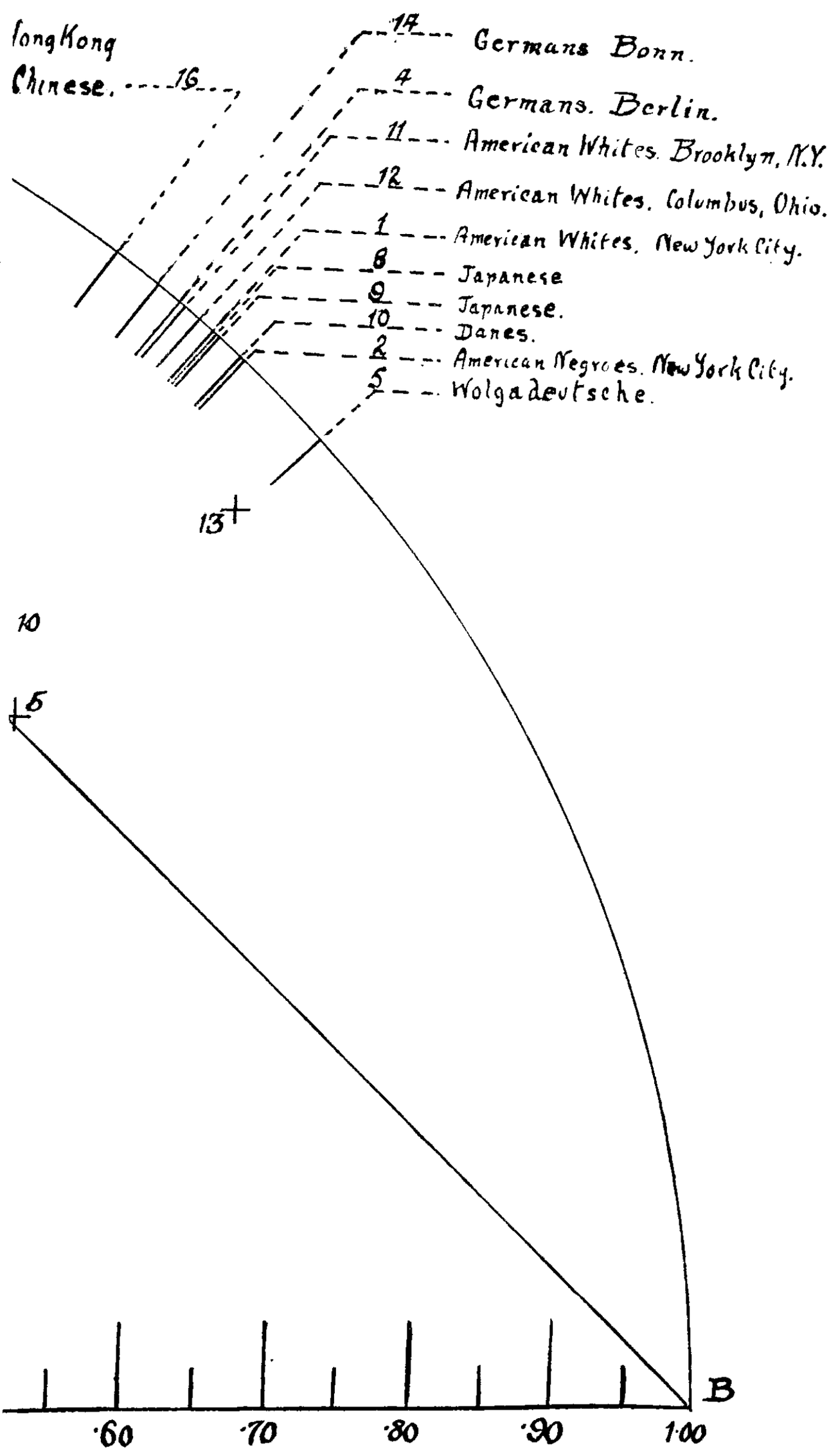


Figure I, in which values of m are plotted against those of n closely with the equation $m+n=1$ are found close to the line AB.



for the racial groups found in Table II. Those data agreeing

TABLE II.

Authors	*Population*	*Number Investigated*	*Percentage Frequencies of Types*			*m*	*n*	*(m + n)*	$D \pm P.E._D$
			M	*N*	*MN*				
Landsteiner & Levine	New York City (*a*) Whites (1)	532	26.1	20.3	53.6	.5112	.4506	0.9618	—.0382 ± .0146
	(*b*) Coloured (2)	181	27.6	24.9	47.5	.5256	.4990	1.0246	+ .0246 ± .0251
	American Indian (3)	205	60.00	4.88	35.12	.7746	.2209	0.9955	—.0045 ± .0235
Schiff	Berlin (4)	1,420	30.14	20.85	49.01	.5489	.4566	1.0055	+ .0055 ± .0089
	Wolgadeutsche (5)	180	23.38	27.78	48.89	.4831	.5271	1.0102	+ .0102 ± .0251
	Japanese (6)	188	48.4	21.8	(31.9)	.6957	.4669	1.1626	+ .1626 ± .0246
Shigeno	Japanese 1st Series (7)	127	45.67	21.26	33.07	.6756	.4611	1.1367	+ .1367 ± .0299
	2nd Series (8)	141	29.78	23.41	46.81	.5457	.4837	1.0294	+ .0294 ± .0284
	3rd Series (9)	61	31.15	24.59	44.26	.5581	.4958	1.0539	+ .0539 ± .0431
Thomsen & Clausen	Copenhagen (10)	442	29.86	25.57	44.57	.5464	.5056	1.0520	+ .0520 ± .0160
Wiener & Vaisberg	Brooklyn, N.Y. (11)	904	30.53	21.24	48.23	.5525	.4609	1.0134	+ .0134 ± .0112
Hyman	Columbus, Ohio (12)	578	30.10	21.97	47.93	.5486	.4687	1.0173	+ .0173 ± .0141
Postmus	Java (13)	568	38.73	45.07	16.20	.6223	.6713	1.2936	+ .2936 ± .0142
Crome	Bonn. (14)	3,800	30.8	19.6	49.6	.555	.443	.998	—.002 ± .0547
Nicoletti	Sicily (15)	300	50	20	30	.7071	.4472	1.1543	+ .1543 ± .0195
Ride	Hong Kong Chinese (16)	1,029	33.24	18.17	48.59	.5765	.4263	1.0028	+ .0028 ± .0195
.....	Japanese Totals (17)	517	40.43	21.86	37.72	.6358	.4675	1.1033	+ .1033 ± .0148

TABLE II. Setting out available M & N data of various populations. The data from Landsteiner and Levine to Weiner and Vaisberg (numbers 1 to 11) are taken from Weiner quoted by Hyman, and that of Postmus, Crome and Nicoletti (numbers 13, 14 & 15) are taken from a paper by Postmus. The total Japanese data (number 17) have been compiled by the author from the above figures.

(Japanese) and of Shigeno (Japanese first series) need careful consideration. In all these cases the loci fall far from the line AB and a glance at Table II will show that in each case the value of D is many times its probable error. In most of them the numbers typed are small, and deviations of such a magnitude warrant confirmation by increased numbers with special attention to random sampling and technique before they can be accepted as evidence against the theory of inheritance.

In our experience, the pitfall in technique does not lie in the actual testing of the corpuscles but in the preparation of the anti-sera, especially in the process of absorption. While in some cases prolonged absorption may lead to marked weakening of the serum titre, insufficient absorption is even more dangerous; for an insufficiently absorbed serum is not specific for the M or N substance alone and hence gives false positive reactions as far as these agglutinogens are concerned increasing the number of M+N+ types at the expense of one of the other two. In order to avoid such mistakes it is advisable to absorb with a mixture of many different samples of cells with only one character in common, namely the absence of either the M or N agglutinogen as the case may be.

RACIAL INDEX.

It is obvious that all points along line AB in Figure I bear a fixed angular relation to the point at the intersection of the axes, and hence an angle thus obtained is characteristic of the group of individuals examined. It is therefore proposed to use this angle as a new serological index of groups of people and thus when such groups are racial in type, we have at our disposal a new racial index which we shall call the MN index.

The MN index (μ^0) of a group of people may be defined as being numerically equal to the angle whose tangent is m/n i.e., $=\tan^{-1} m/n$.

The MN indices thus obtained are set out in Table III but it is obvious, since $(m+n)$ must equal 1, that this index is only applicable to data which approximately satisfy this equation.

DISCUSSION.

Owing to the high values of D for the data from the Netherlands East Indies and from Sicily, it would be better to leave those results out of the discussion until they are confirmed by later work. Considering the rest of Table III we see that the American Indians occupy a position definitely distinct from all others which reminds us of the peculiar position they occupy in racial classifications based on iso-haemagglutination data.

Mongolian races come next between 50° & 60°, with Caucasians, (Germany, American whites and Danes), New York coloured next with the Wolgadeutsch at the bottom of the list.

TABLE III.

GROUP	INVESTIGATORS	μ^0
American Indians	Landsteiner & Levine ...	74° 05′
Sicilians	Nicoletti	57° 41′
Japanese	Schiff	56° 08′
,, ...	Shigeno 1st Series	55° 41′
,, ...	,, 2nd ,, ...	48° 27′
,, ...	,, 3rd ,, ...	48° 23′
,, ...	Total	53° 40′
Hong Kong Chinese ...	Ride	53° 31′
Bonn	Crome	51° 24′
Berlin	Schiff	50° 15′
Brooklyn, N.Y.	Wiener & Vaisberg	50° 10′
Columbus, Ohio.	Hyman	49° 29′
New York City, Whites ...	Landsteiner & Levine ...	48° 36′
Copenhagen	Thomsen & Clausen ...	47° 13′
New York City, Coloured	Landsteiner & Levine ...	46° 59′
Dutch East Indians	Postmus	42° 50′
Wolgadeutsch	Schiff	42° 30′

TABLE III., showing the MN indices (μ^0) of racial groups included in Table II.

The hope is that this index may be of definite value in anthropological studies, but further than that at present we cannot go. Racial data from other parts of the world will be awaited with great interest, for the MN index being based on two variables only, should prove a much more satisfactory index than any of the iso-haemagglutination indices now in use.

CONCLUSIONS.

The hetero-agglutinogens M & N of Landsteiner are to be found in the blood of Hong Kong Chinese with frequencies giving $m = .5765$ and $n = .4263$.

These frequencies and the fact that no sample was found without either M or N present, strongly support the theory of inheritence of a single pair of allelomorphs.

The study of these characters provides a very good basis for a group index, and hence it can, when applied to racial groups provide a basis for racial classification. This index has been called the MN index (μ^0) and is calculated from the following equation, $\mu^0 = \tan^{-1} m/n$.

Even with the sparce racial data at hand, it seems likely that there are three definite groups, American Indians with the highest value, Mongolian races next, and Caucasians next.

SUMMARY.

1. Frequencies for M and N hetero-agglutinogens of Landsteiner amongst 1029 Hong Kong Chinese are given.
2. The frequencies of the genes concerned are used to test the theory of inheritence of these characters.
3. Comparative racial results available in Hong Kong are discussed.
4. A new racial index is suggested and explained.

I wish to record my gratitude for the kindness of Dr. Wiener in supplying the anti-sera and thus making it possible to commence these investigations, and for the help of Drs. K. D. Ling, K. K. Kho, and E. Q. Lim in the innoculation of the rabbits, the preparation of the sera and in the routine testing.

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THE DEVELOPMENT OF INDIVIDUALITY.

A PSYCHOLOGICAL STUDY OF A FAMILY.

by

L. FORSTER, M.A. (Lond.)

Professor of Education, The University, Hong Kong.

It was Dr. Johnson who said that Sir Isaac Newton would have been equally distinguished as a poet if his genius had been exerted in the direction of poetry; it being, he said, as easy for any one to walk to the East as to the West.

This statement contradicts the theory that congenital factors are so specialised, that an individual can only proceed with satisfaction to himself along those lines which such qualities indicate; it asserts that Newton was potentially brilliant and that his genius would have revealed itself in whatever channel it flowed. The course he followed was not preordained by inherent nervous traces, nor by the nature of his instincts, but by the accident of his environment, though the eminence which he achieved was due to the strength of the urge, or the mental force with which nature had endowed him.

This doctrine sounds strange in these days of psychology, for we have come to regard the congenital factors as decisive in life. Intelligence tests measure the degree of intelligence with which each individual enters the world, and further tests classify the types of intelligence—the scientific, literary, the mechanical, artistic and mathematical groups. These are accepted in the same way as the temperaments of the past were accepted, and their existence is assumed to be due to the same cause, the peculiar psychological and physiological configuration which is inherited.

Apart from the difficulty of deciding what is actually tested and what the nature of intelligence is, there is the further consideration that such tests are applied only after the important years of childhood have been passed, and after influence of a varied and most complex character have registered their effect.

It may be that during these years, the most vivid and impressionable of the child's life—because it is then he is making his first conscious contacts with the world—he gets that bias which determines the character of his future activities, and it is also possible that at the same time the inherent power is stimulated and drawn forth by kindly voices which encourage expression, or, on the other hand, fatally dammed up by an unsympathetic and repellant environment. It is only after this has happened in varying degrees in every case that the individual comes under review by the examiner with his mental tests.

If the paideutic genius of Madame Montessori had been available from the beginning of the child's life it is impossible to say whether the so-called intelligence quotient would have been affected or not. It is probable that the innate forces, lying dormant because of being thwarted in their poor environment, would have found an outlet and so altered the whole scheme of the child's life, as well as its quality.

In breeding plants it is possible to arrange matters so that certain qualities are intensified and a species obtained altogether removed in appearance from the type from which it sprang. Thus the clover, by a process of inbreeding, can be made to produce a dwarf species, and yet, if this is crossed with another dwarf species similarly obtained from a different group, the result is a plant of normal size. In dealing with the human being we are concerned with mental powers that depend for their expression and direction on external stimuli. The absence of such suitable stimuli as in the case of the clover may mean that such powers remain dormant and recessive, but there is no proof that they are non-existent.

There is need for further and deeper study of the environmental factors which surround the child in the home and such studies can only be carried on by mothers and fathers who are in close and intimate contact with their offspring. The object of such research would be to enquire whether the balance between nature and nurture, which in recent years has been lost, should not be re-established.

The following contribution is the result of a study extending over a period of twelve years and is published because the hypothesis originally put forward in 1928 seems now to be established for this particular case.

Confucius—Men are near each other at birth
The lives they lead sunder them.

Mary was born in Hong Kong on January 20th, 1919, and was the first child of the family. Though her general health in early years was good, she contracted many childish ailments—measles, chicken pox, nettle rash, paratyphoid and infantile colitis. She survived all these attacks and was able to enjoy the various activities of childhood, but when spectacles had to be worn from the age of four years onward in order to correct a tendency to squinting, she was a little more restricted than others.

As a young child she was very self-contained and found no difficulty in occupying and amusing herself with the dolls and toys that she possessed. She was never dependent on parents or nurse to interest her or to find distraction for her in games, though she did not refuse to learn the nursery rhymes and, later, listen to stories she could understand.

Her imagination was vivid, but became unusually so from the age of three years and four months onward, when she played constantly

with an imaginary friend whom she called Addis—possibly a combination of two names familiar to her—Gladys and Alice.

Addis, whom she never described, was, nevertheless, a real personality to her, and one whom she apprehended vividly and clearly. Addis shared her life and her thoughts, and was frequently quoted, and consulted on the desirability of doing or not doing some particular thing.

At this age Mary got so interested and concentrated in her play that it became difficult to get her to respond to the ordinary rules and laws of domestic life. When asked to return to the house and get ready to go for a walk, she would whisper to Addis, and the request would have to be repeated a little more loudly and emphatically. Then, after hearing the question, she would consult with Addis and say that Addis did not wish to go, and that it would not be very polite to leave her. On one occasion, when her mother insisted that she should leave Addis and come into the house, she said, "But you see, Mummy, we're not here, we're at Oxwix."

Oxwix was the name of an imaginary place she had invented; but how she got hold of this name we have not been able to discover—there were no associations at this age which could suggest it, as far as we knew.

One of her treasures was a white, rough-haired toy dog which to her was very much alive. One day, she announced to her sister, who was thirteen months younger than herself, that Judy had produced six baby pupsies. This event was greeted with much joy and produced very great excitement, and for the next two weeks they were treated as living creatures; fed and looked after, and carefully put to rest each night in a box in a building at the back of the house. One of the first things Mary did each morning was to go to this building and see how the animals were progressing. She would bring one into the house, bearing him tenderly in her arms, and then put him down on the floor. Having secured a real piece of string she would drag it gently after her and say, "Just look at him! Isn't he a darling! He plays with the string so nicely!"

The 'pupsies'—as they were called—were solemnly put into their box one by one each night, but on one occasion when the rite took longer than usual and she had been summoned several times to come into the house to go to bed, she was given a final command in tones that brooked no refusal. At the moment she was holding the last of the six 'pupsies' in her arms. She said she would have to bring him in with her if she had to come in at once. This was agreed to, and she quietly came into the house with her arms bent as though she were carrying a small and tender puppy. When she got to the bath she said, "I can't be undressed with pupsie in my arms. I'll just put him into the bath and let him swim round for a while." She went through all the necessary motions of placing the puppy in the water.

She admired him as he swam round the bath, and when she came to get into the bath herself she looked up with a smile and said, "I can't get into the bath with Pupsie there. I'll just put him on the mat."

This was done. Then Martha the younger sister, who had been standing by while this was going on, entered into the play and picked up the so-called 'Pupsie'.

"Put pupsie down," demanded Mary.

"No," said Martha. Then ensued a bitter quarrel over the 'pupsie' that had no real existence.

One afternoon, when Mary was fully occupied with the 'pupsies', she was called into the house because of the rain; but as the pleasure she was having was much greater than the discomfort of the rain, she pleaded that she might remain. It was pointed out that she would get very wet. She said, "Oh, I'll put on my rain hat," and she then went through the motions of putting on an imaginary hat. Her mother suggested that she had better have on her real hat and a waterproof coat. She finally agreed, and so coat and hat were put on. Then she looked up with a smile and said, "Mummy, you've put it on top of my rain hat." She then carried out the following rather complicated process without any hesitation. She took off the real hat and put it down. She then took off the imaginary rain hat and laid it aside. The real hat was then taken up again and placed on her head by herself. She followed this by taking up the rain hat and putting it on top of the real hat, after which she returned to play with her imaginary friends, the 'pupsies'.

When Mary returned with her parents six months later to the Far East, Addis formed one of the party and was treated as such during the whole voyage.

One day, when the vessel was tied up in the Suez Canal to allow a tank steamer to pass, a merchant in a small Egyptian boat came alongside to sell cigarettes and Turkish delight. In the stern of this rowing boat a small monkey was tethered; it attracted a good deal more attention than the merchant with his wares and it delighted Mary immensely. She danced up and down the dock, calling out, "Monkeys bite! Monkeys bite!" Suddenly she stopped, became thoughtful, looked down at her side, and said, very tenderly, "No, they don't, Addis, I was only teasing."

When Hong Kong was reached, after a time Addis was not considered adequate as a companion, so she was joined by four others who bore the names Trary, Tracy, Tacy and Mincie, all of whom had been mentioned in England, but had not assumed any definite form at that time.

She had sometimes expected visits from them while in England, and she would take her sister to the gate, open it and look both ways,

up and down the road, for the desired guests. On one occasion, while tea was being prepared in the drawing room, she said that Mincie was coming to tea. Her sister Martha, after this announcement had been made, added, very confidently, "But she won't make chums." (crumbs).

In Hong Kong Addis and this bevy of companions were referred to as 'My girls' and they now lived up in the sky. "My home up in the sky" was a frequent phrase in the course of Mary's conversation when she described what Addis and her friends were saying and doing. Occasionally, one of the 'girls' came to tea; a place was then set and tea was duly served for the invisible guests, and conversation was carried on as though such a visitor were actually present. If Mary was informed that it would not be convenient for her friend to come that day, she would go through the performance of pretending to ring up on the telephone and arrange for the visit to be postponed to a more suitable time.

As might be expected the Montessori system made no appeal to Mary, for it was too restricted in scope for her. The liberty which it claims to allow is illusory, for the constructive powers of the child are governed by the nature of the apparatus designed by some one else. The imagination of the child is not allowed that far wide ranging activity which it seeks and needs for its satisfaction, since there is only one thing to be done with the insets, and that is to fit them into their respective holes. The same applies to the cylinders and other things. The apparatus is fool proof and practical, and allows little freedom. It is cold, scientific, efficient and lifeless to the imaginative child. It is wanting in colour, variety and flexibility. Such a system produces the capable, scientific efficient and accurate child, but it makes no appeal to the child dreamer and the poet, for whom nature is a better teacher, being more stimulating, and provocative of thought. The workings of nature—the seasons, seed time and harvest, the birth, growth, and movement of animals, the rich variety of colour, the delicacy of flowers and their tints, the insect world, the song and the flight of birds,—such things embodying as they do the mystery of life, minister to the imagination of the child, and being interwoven with the poetry and literature of mankind lure such a child onward and away from the material everyday world of eating and sleeping, getting and spending. This was exactly the direction in which Mary progressed.

Such children do not approach the subject of reading in any laboured and halting way, for parents by reading to them the fairy stories and other favourites have increased the zest of these children to enter further into that world by their own unaided efforts. The urge being very strong because of the view of the promised land that had already been obtained, Mary made very rapid progress in learning to read, since, owing to her power of concentration, she experienced no difficulty in overcoming the technical difficulties of that art. Her drawings, being spontaneous and fanciful, with many curves, much

movement and plenty of colour, would not have conformed to the requirements of the Montessori system, which disciplines these wild and wayward notions by restricting such efforts at first to the shapes of the letters and the insets.

By the age of five and a half Mary was able to read without difficulty, and so found a new world of fairies who began to share her life and displace Addis, Trary and the others whom she had conjured up out of her own imagination, but whose range of action could not compare with that which was now described for her in the books.

The fairy tales were read and re-read and recounted and dramatised in the course of her sixth year with a wealth of detail that was quite astonishing. Her drawings showed the influence of this kind of reading. Pixies and fairies, and children with wings, were always present. In November, 1925, she attended a wedding. On her return home she drew a picture of the bride and bridegroom, with the pages supporting the train; a type of drawing that fitted in with her idea of Cinderella's wedding, the details of which she well understood.

On her seventh birthday a party was given and sixteen children invited to celebrate the occasion. One of the presents she received was a story book containing the northern legends. With this she was found, when her absence was discovered, ensconced in a corner of the house to which she had quietly retired while the party was gaily proceeding without her.

She naturally liked the idea of God and angels; but at the age of six years and eight months she said, "Are you quite sure about God, Mummy? Because it is difficult, you know; very difficult. When did God begin, and who made him?"

When told that most learned and good people believed God really existed she said, with a smile, "Yes, I'm sure its alright, Mummy, but it's difficult."

Gradually Mary came into closer, contact with the earth in religious matters; for just before her eighth birthday, when she was at Marseilles, she saw some French women in a Roman Catholic chapel kissing the wounds of Christ as represented on a statue.

"Do you think Christ would like those women kissing His statue? I don't think he would, Mummy."

Her mother explained that they meant to be kind and to show their sorrow for His suffering; and that, therefore, Christ would not refuse this sort of worship.

Mary did not agree. A day later she said, "It's alright, Mummy, about those women. Christ wouldn't mind. You see, they are only French. They don't understand."

Just before leaving Hong Kong she showed signs of an extremely patriotic spirit; but it was rather difficult to know how it had been acquired. One day she exclaimed, "England is head of the world, isn't and sweetly said, "But we are King, aren't we, Daddy?"

When it was explained to her that other nations had done great things, and had produced wonderful works of art and beautiful stories, and that other nations had been and were great, she just quite pleasantly and sweetly said, "But we are King, artn't we, Daddy?"

By the age of eight years and four months she was reconciled to the fact that the world was not peopled by fairies and was prepared to accept it as such. Though her imagination was still vivid, and though she looked for wonders everywhere, she was never disappointed if she did not find them.

In the summer of 1927 she was living in the country, and often on her walks with the family she passed a small, dense pine wood. It looked eerie and yet lovely in its dim light, with the sun filtering through and trying in vain to dispel the gloom. The mossy green trunks and the floor thickly carpeted with brown pine needles certainly suggested a home for fairies and pixies.

Yet, one day, when she looked into it, she said, "It looks thrilling, doesn't it?"

When her mother agreed, she said, "But it's not though. When you look at it you think that when you go into it you'll see little bunnies popping up out of the holes and fairies peeping from behind the trees. But they don't, you know. It looks thrilling, but it's not."

In 1924 when passing some barracks she was walking near some soldiers whom she heard speaking in the cockney dialect, and was quite unable to grasp what they said. Her comment was, "Soldiers can talk, you know, Mummy, but they are like the birds; you can't understand what they say."

The second child Martha born thirteen months after her sister, pursued an ordinary course of physical and mental development. Being more robust, and therefore more resistent to disease, she rarely found herself the centre of tender concern. She seemed to be taken for granted, chiefly because she never caused any anxiety about her health. Always more physical in her outlook she could never enter whole heartedly into the fanciful world her sister constructed. Attempts were made, but with little success, and after a time the attempts were given up. Martha's temper was not so equable as that of her sister, though her physical well-being would have suggested greater inner contentment. Her life very quickly took a practical bent, and was in quite the contrary direction to that of her sister's, whose absent-mindedness she had noted. When picnics were arranged it was Martha who remembered the things that were apt to be forgotten.

She collected the baskets at any early age, and felt greatly concerned about property that might get mislaid.

When being driven in an open motor car at the age of five years, a warning was given about hats being blown off. All the occupants of the car, except Mary, put their hands up to keep their hats on. This was noted by Martha who then angrily leaned forward, seized her sister's hat, and took it away. She very early took care of her own property and was very thoughtful about that belonging to other members of the family.

In June, 1927, when Mary was eight years and four months old, and her sister Martha seven years and three months, the family was residing in a pleasant country village. One day, after a picnic along the river bank, Mary was dawdling behind, obviously preoccupied with her own thoughts. On reaching home she went quietly to a table, took out paper and pencil, and sat down to amuse herself while others occupied themselves in the garden. By chance, after a short time, her mother asked casually what she had been doing. She replied that she had been trying to write some poetry. We asked to see it, but she said that she would prefer to read it as she thought she could make it clearer. She then read the following which is an exact copy of the poem :—

Under the apple trees
    Where the grass sways to and fro;
And the wind is but a gentle breeze
    And the sun it will not go.

There we sit in summer;
    Just by the sweet scented flowers.
And the bee is but a 'Hummer'
    Under the apple tree bowers!

Under the apple trees,
    The airs so sweet and nice.
And when we sit upon the grass,
    We hear the wee shroe-mice.

There we see the pretty flowers,
    Right in the Sunny South.
The flowers grow on the bright green grass,
    Far from the river mouth.

Its a sad day when the snow comes down
    And covers the world with white.
Yet Winter is a jolly time,
    Though Spring is a wonderful sight.

She had recited this poem to us in the presence of her sister Martha. We said it was very good, and as a mark of special favour her mother kissed her. The importance of the event was heightened by the presence of her grandmother, as well as by this special mark of approval, as normally her efforts, at this time, in drawings and in poems were not specially noticed apart from a casual word of praise or correction. This incident, however, evidently left a deep impression on her sister Martha who had witnessed the whole proceeding, for when she retired to bed that night she could not sleep. This was a most exceptional circumstance, for the child was obviously ready for sleep after a day's activity in the open air.

Later she shouted for her mother to go up as she had made up a poem on Spring, Summer, Autumn, and Winter, but at the moment she could only give the verse dealing with Winter. She begged that it might be written down for her, in case she should forget it:—

The Apple Trees.

Under the apple trees where the gooseberries grow
We do have some picnics for there is some snow.
And yet we're not to go again
For it is cold shivering rain.

Under the apple tree boughs
Where the flowers are humming bees
And butterflies and birds are twittering near and far.

She was told that it was quite good, but she could not expect to do as well now as she would when she was as old as Mary.

She too received as a reward a kiss of approval, and she then sank back to rest and sleep—this she had been unable to do until she had satisfied her longing for the same sort of praise she had seen bestowed upon her sister.

It was however the last occasion on which she tried to compete with her sister along the lines which her sister had appropriated. She later dissociated herself entirely from this scheme of things, and secured an ally in a boy who lived near, and who joined with her in deriding most of the things in which her sister was interested.

Joanna.

The mental growth of the children here described had received its setting before the third child was born in July 1922 and though this event had little effect upon them, they had considerable effect upon it. They seemed to feel that their position was secure and could not be challenged by any new comer, especially one so small. They

were in league and not separately in opposition in respect to their sister. Their attitude was one of benevolent supervision and not one of latent envy or jealousy as sometimes happens. There was a three years' difference in age between this child and her next older sister. Her health was always robust and never did she have periods in which she reverted to the helpless and cared for state of the infant. Being the youngest for some time she was, because of her winsome ways, very much loved and was always active and happy wherever she was. She was alert, observant and very quick in her movements after she learned to walk. She was entirely self possessed and inwardly contented for the first three and a half years, when she was not self conscious; or perhaps before she became aware of herself in relation to her sisters. She had no sort of idea that they lived in the world that belonged to her, or that she was meant to participate in their world. She was too young to enter into their more mature occupations and yet she became from the age of three and half years onwards acutely aware of her inability to achieve what they could achieve, whether it was in the way of climbing, swimming, runnding or jumping. The recognition of this fact seemed to act as a great stimulus to her in all her doings. From that time, onward she measured herself against her sisters and her companions and seemed determined to excel in whatever occupation she was engaged.

Among the various incidents of her life the following stand out as important.

Almost her first effort at speech occurerd at the age of 1½ years when one of her older sisters and she were chasing each other. She was chased by the big sister across the bedroom and she darted into the dressing room and shut the door. A minute figure quite unable to deal with a situation complicated by door handles she stood quite dumfounded and said 'Shim' (Shame).

At the age of two when she was returning from an outing in her baby carriage she saw that one of the tyres was coming off. She immediately ran into the house and brought out the bottle of gum which she had often used for sticking papers together.

On a later occasion his mother said
"That was a narrow squeak."
What do you mean by that Mummy?

Well I cannot tell you exactly. We sometimes use words that don't really mean what they say. "Oh I see just as when you say it is raining cats and dogs when of course it isn't" was the quick comment of Joanna.

At the age of three years and 3 months she said "I've got a purse. I've got a purse. I've got a Percy Smith. The association of idea in this case was quite clear, apart from the obvious similarity

of words-purse and Percy, for the purse was fat and bulging and so was Percy Smith who was well known in Hong Kong as the fattest man living here.

Further evidence was given of her mental powers, when at the age of five years and one month she took off the loose bows from a pair of slippers she used to wear and exposed the unfaded part of the cloth which stood out in sharp contrast with that round about the place where the bows had been. She was struck by the effect and said "They look now exactly like Mary without her spectacles."

In September 1925, she was taken for walks and on three occasions during the same day she had been caught in the rain and in each case she had had to change her cotton frock which clung unpleasantly to her. On the last occasion she came into the house with the rain dripping from her sun helmet, and the blanco running down her neck, her dress soaked, and shoes and stockings unpleasantly wet also. She could not restrain her anger, which she expressed by saying, "I wish I had a tap I'd turn it on God, and see how he liked it.

At the age of four and two months she learned to swim and also to dive into deep water. She first played about the edge of the water, then with the aid of a cork belt she accompanied Mary and Martha to the raft which lay out about 100 yards from the shore. In this matter as in many others she was always feeling the contrast between her own position and that of her sisters who seemed able to do such things without difficulty. She seemed to put such activities in the same category as walking, something that had to be learned and done sooner or later. Because of the immediate example before her and because of the sense of inferiority through being restricted to the shore she determined very early and with encouragement to go out to the raft. When at the raft she saw her sisters jumping in, she again decided to follow their example. No new development however in this direction occurred without considerable mental strain. She would stand for a long time debating with herself whether she should attempt this and finally it seemed that the desire to triumph became stronger than the fear of the consequence. She obviously was not enjoying the prospect of jumping in, but she knew that if once she did so she would be established much higher in her own esteem, because she would be approaching the achievement of her sisters in the water.

The same anxiety showed itself when she was pursuaded to try without the belt and again the urge towards equality, in this matter overcame her fears. From that time onwards she gained confidence and soon became quite as skilful in swimming as her sisters.

There was no doubt however that the success she achieved in this sphere was almost entirely due to the passion for recognition. There was not the same sort of enjoyment, the sport was not an end in itself, but rather a means by which she asserted herself. It was only

afterwards when her supremacy was established that it became so. Her sisters did not resist these efforts for there was no sense of competition as far as they were concerned. They gave the encouragement that was natural to a sister three years younger much in the same way as they had given sympathetic encouragement to her first efforts at walking.

Joanna was always resolute in her views and quite obstinate in maintaining them, even when corrected by her mother.

If as very rarely happened she did not grasp a rule in arithmetic and after much laborious working produced sums that were wrong, she got extremely angry, or when she approached a subject for the first time in company with others who had had longer experience in the matter, she was very impatient and hesitated to attempt the mastery saying it was silly and stupid, and blamed the instructions or the teacher for not being more explicit in her explanations. How could anyone understand it? After a time of course when the matter was clear and she could by her own efforts make progress, she devoted herself to the study with the same energy that she bestowed upon all her other subjects.

The attention bestowed upon her youngest sister who was born when she was three years old deprived her of the distinction she had enjoyed as the youngest child, and contributed in no small measure to strengthen her determination to surpass every one around her.

In July 1925 when she saw her youngest sister for the first time she said "What a teeny weeny horwid face!" and a week later she shouted to her sisters to come and see her shouting at the same time. "She's just like a monk. (monkey)". But there was no malice in this, it was a natural tendency to despise something that was demanding so much care and attention, and so subtracting the interest that was formerly centered in herself as the youngest.

The whole setting for her was changed. From the centre of the stage she moved to the side, but she evidently determined from that point onward to regain her lost importance.

When at school at the age of seven in Hong Kong she adopted the role of protector to her sister as this gave her an added importance and furthered her sense of responsibility and independence, but she did her part also exceedingly well, because she had a great affection for her. This was was brought out in 1929 the same year when the youngest sister accidently fell out of a motor car, which was travelling at a considerable speed, owing to the door being insecurely fastened. The child was not seriously hurt, but Joanna who like the other members of the family who were much distressed at what had happened, openly blamed herself for not exercising sufficient care and for not catching her as she rolled against the door.

She went to a Kindergarten at the age of four and made very rapid progress, for she was keen and always bright; little escaped her eyes, and with a quick understanding she grasped quite easily the rudiments of learning.

In 1927 she was taken back to England and in Oxford she attended a Kindergarten, one of the best in the city; her sisters attending the Junior department of the same School. Though the instruction and discipline were on modern lines, and the equipment was of the usual type, Joanna who had been entirely happy in her previous school was quite despondent and obviously unhappy in this one; nor did the situation improve as the months went past. No child ever went so unwillingly to school or would more eagerly seek for excuse to avoid going. When accompanied she sauntered along very slowly, and wearily, but when released at mid-day she ran back home as fast as she could.

The explanation of this behaviour escaped us for a long time. There was no harshness on the part of the teachers; there was no sense of shame due to failure in connection with the Kindergarten work on the part of the child. Every element of happiness seemed to be present and yet she failed to take advantage of her opportunities. She definitely made no progress for she was not and could not be induced to take any interest in the school.

The solution of the problem appeared later, when she was transferred at the age of six to another school in the North of England. Here she was admitted because of her superior knowledge and age, to the Junior school into the same department as her sisters had gone in Oxford. From the moment of enrolment she was supremely happy and a complete change came over her attitude towards school work. Her interest quickened; her enthusiasm returned and her mental progress was greatly accelerated. The secret was that her self-respect had been restored. In the Kindergarten school in Oxford she had been asked to do what made little or no tax on her powers, and only studies that she regarded as trivial. She had travelled and seen much of the world, and in addition to that she had also associated very closely with her older sisters. Although in the first Kindergarten school she was in a different class she was not very far away from her sisters, the distinction between them not being seriously marked by space or by organisation. She suffered a sort of degradation when, in Oxford, she was classified with the babies, for she despised them and their activities. Frequently she would say to her mother afther she became a pupil in the northern school. "I wpnder why they put me in the Kindergarten School in Oxford Mummy! ! ? School she regarded as a serious institution where her sisters did advanced work in reading Arithmetic and such things and she did not wish to be delayed in her onward march by the trivial play, and games with sticks, colours,

plasticine, balls and other apparatus. Nor did she find the experience of the infants corresponded in any way with her own. The only friends she made in Oxford were from America. They were twins who had some sort of relation to herself because of the wider outlook gained from travel.

Her competitive nature was and is exceptionally strong. It furnishes her with the power to concentrate and to practise assiduously whatever study she is pursuing. To excel is her object and not excellence for its own sake. We always had the impression that she would do most things well, because the glamour of beating others was the stimulus to all her activity. Her efforts were therefore far beyond the normal whether in the games field or in the class room. She did not like to be shown how to do anything, or to find out that her work was wrong. Whether it was French or music, arithmetic or history she strove ardently always for praise, and was bitterly disappointed if she failed, but failure in such cases was rare for the fear of it was so hateful to her, that she took every precaution to avoid it. Like the trees in East Africa, she competed with the taller ones beside her for the sun, and because of this her mental growth was greatly stimulated, so that by the age of eight she was at least two years in advance of her physical age in intelligence! At the age of four and a half she was reading simple books and continually asking if she was as good as her sister.

In cricket she batted and played with fervour and great concentration and was loath to relinquish the bat if she had not scored a lot of runs off the bowler with the tennis ball. This was at the age of five. She has not yet exhibited any particular taste, for she has found it difficult to express herself along any line that is not already appropriated. She has no particular aptitude, no creative power in art, or poetry like her eldest sister Mary, nor is she particularly fond of domestic work or sewing like her next sister Martha, but in learning she distinguishes herself by the great facility she has in understanding and remembering what is placed before her, so that in examinations her results are always much higher than those achieved by her sisters, and moreover they are consistently good; but no subject stands out apart from the rest except that of sewing which is the only subject below a very high level of marks.

She has significantly mentioned that she would like to be a doctor. Now science has never been a strong feature of the school activities of her two sisters, and it seems to suggest that her ambitions lie along this new channel, because it offers the best possible road to wealth, position and distinction. When she discussed this matter at the age of nine with her mother she was already thinking of herself as established in Harley Street as an eye specialist while she added she would marry a doctor, but he would not be missionary. Obviously she was not inclined to the self sacrificing and frugal life of the latter but rather to the

spacious opulent life of the specialist. She had had acquaintance with the establishments of both types. She is now twelve years of age and is still pursuing her school course which as yet distinguishes her in no particular way, except in all round excellence.

* * *

The explanation of their marked differences of intellectual interests, which are present in the average family, is by some attributed to the hereditary factor. In the one child, the acquisitive instinct is strongest, in another the instinct of curiosity, while in a third, the instinct of self-assertion is dominant. So the strength of their several instincts determine the interests and activities of the child from the beginning.

According to this view the path of development must lie in the direction which will give greatest satisfaction to the inherited tendency if the character and personality are to reach the fulness implicit in the germ. These instincts, then, must be gratified in their natural form or in some sublimated form which is acceptable to the individual and the community. Thus Hadfield following Jung asserts that our professions and occupations are merely means whereby we find expression for our innermost desires.

The preacher, teacher or actor, according to this view, is an exhibitionist for whom the self-assertive instinct is fully gratified only when the maximum amount of limelight is obtained, while the engineer is one in whom the constructive and creative instinct is dominant. The explorer and the research student gratify the instinct of curiosity by probing into the unknown regions of the earth and of earth's problems. The surgeon is one in whom the sadistic element is present, and the saint, ascetic and martyr are masochists or persons who are most content when they are called upon to endure suffering for the advancement of their cause.

Because of these inherited traces, and the facilities which are provided for their expression, there is something inevitable about the child's development. This is the germ view, the doctrine revived by Rousseau, and put into practice by Pestalozzi and Froebel, who liked to think of teachers merely as gardeners who tended young plants, kept them healthy and vigorous, and brought them to the full flower of youth, always being guided in their technique by the knowledge derived from a study of the nature of the child himself.

These facts it is said are sufficient to account for the variety of our interests, and afford an adequate explanation of the bewildering number of occupations and activities which exist in the world, and which furnish by their performance a gratification to the individuals concerned.

Economic pressure and the necessity of satisfying the greatest of the instincts namely, self-preservation, in many cases compel a worker

to perform tasks which are irksome and do not satisfy his other instinctive cravings, and to that extent his inner life is largely repressed. This however does not affect the general principle.

If this view is the whole truth, it would be natural to suppose that members of the same family would exhibit a tendency towards greater similarity of tastes and interests, and that there would be among them a more common agreement with regard to professions, traders, hobbies, and general outlook; for the children of the same family come from the same stock and are born into an environment, which has many factors in common for them.

There is the probability, of course, that a hereditary factor which was recessive in the case of one child might be active in the case of another of the same stock, and thus the possibility of variation within the same family is no doubt considerable. The complexity of the problem, because of these elusive mental factors, makes it impossible to reach the same sort of scientific definiteness as we do in the case of the simple physical qualities, which are reproduced according to the Mendelian laws. But if there is any similarity of intellectual interests and of character, we should expect to find it in the family rather than anywhere else. Yet those who have children and have watched them grow up note that those who are closest in age to each other do not approximate to each other in their outward behaviour. They differ profoundly and often make one feel they do not come from the same stock. In outward physical appearance there may be a striking resemblance, as in the case of Mary and Martha, but in activity, in mental attitude, and in temper, there is a world of difference.

The fundamental aim in mental growth is the achievement of a personality, something that is distinct and recognisable as different from any other. Adler regards this instinct of self-assertion as the mainspring of human activity. It provides the energy for all to achieve this goal, and therefore is common to all though its expression, of necessity, must take different forms. It is a general reservoir of power put at the disposal of the growing child, and capable of providing streams of efforts to be utilised in any direction.

The first child, more than the succeeding children, comes as a pioneer into a family circle where he or she must of necessity feel inferior in the literal sense of the word; as he or she is the smallest in the circle and must look up to the adults. This relative position of being below others is frequently made use of in the adult world, where students sit at the feet, or at least below the level, of their teacher. The process of 'looking up' to older people in a physical sense has its counterpart in the social sense also. We see the same idea in the Court of Justice, where the judge occupies the highest position. The child's physical weakness is soon apparent to him or her, for she realises

how easily she is picked up and carried by her parents, and how difficult it is for her to do the things she would like to do.

Then there is the small amount of knowledge at the child's disposal, and the bewildering corrections and readjustments which have to be made as she extends her enquiries. In the meantime, however, she finds it impossible to control the factors in her environment and so she turns in, often, upon herself and takes refuge in her imagination; out of which she builds up a scheme of things that she can master and direct in accordance with her desires, and thus minister to her craving for power and significance.

In the present case the tendency above outlined would be reinforced by the child's sense of relative isolation in her rather unusual environment with Chinese servants and Chinese amah. These would, when the parents were absent, make the child seek to create this imaginary world, independent of the alien elements, which she quickly came to realise could not be incorporated into her daily life. Two types confronted her—two sorts of food, two kinds of dress and language, two different facial and skin characteristics; in fact, two entirely different modes of living. These would tend to confuse the child at first and make her look for harmony and unity in another direction. The trend would also be further strengthened during the periods covered by the ailments which during convalescence left a great deal of time to be occupied with mental rather than with physical activity. When spectacles had to be worn at the age of three years and eleven months she was naturally prevented from indulging with abandon in those games which ordinary children play.

Spectacles do not prevent children from playing, but they have an unconscious effect upon a child. In this case Mary had of necessity to exercise greater caution, especially with balls games, and, moreover, she was looked upon by others as being rather more delicate and was therefore treated with greater consideration. This again tended to make the child withdraw from society, and to seek, through reading, the sort of recreation and adventure which is obtained by others in the real way.

These, however, were additional factors, stimulating a movement that was already there. Martha who grew up beside her sister, did not react in a similar way to her environment. Mary's environment at first consisted of the persons A.B.C.D.—and a constant material element, Y. Martha's envirinment consisted of the persons M.A.B.C.D. —and the element Y.

The environment of no two persons (e.g. that of Mary and Martha) in a family can be the same at any time; for Mary reacts to Martha +A.B.C.D.+Y, while Martha reacts to Mary+A.B.C.D.+Y. Thus

while there are many factors in common there are important differences.

The so-called constant elements will not, of course, exert the same influence on each member of the family; for it will depend on the interest and attention which the individual pays to them, and how he responds to them. Martha, therefore, came into a world which provided real companionship when it was needed. Her imagination was not stimulated to the same extent. She kept closer to the earth and so from the beginning her path of mental development followed along different lines. This again was probably assisted by the fact that her physical well-being enabled her to enjoy the physical acts of eating, drinking, sleeping and movement generally at first and in games afterwards. There was no sort of impediment to prevent this enjoyment.

The companionship between Mary and Martha then followed its normal course, the younger following in the wake of her sister and trying as far as possible to share the play life which the other mind controlled. When Martha reached the age of four she became from that time onward more and more self-conscious and realised the need for asserting her claim to grow up as an independent individual. This is an important epoch in every child's life, for as we have said, the object of every human life is to achieve a definite individual and personal position in the world among his fellows. At this self-conscious stage Martha perceived that certain modes of expression had already been appropriated by her sister. She realised that certain lines of advance had already been marked out and claims staked, and this made her feel that it would be unprofitable to proceed along that road; for the competition would be very severe owing to the disparity of age. Martha wished for peace of mind and desired to live in harmony with the other members of the family. To attempt a mode of expression which her elder sister had adopted would have invited comparisons that could only wound this self esteem. She had to avoid this, and so unconsciously she sought for an outlet through which her energy could flow and so bring to herself the maximum satisfaction. This was soon discovered.

We have seen how anxious Martha was to secure the approval of her parents in her struggle to produce a poem. This, a specific incident, was described to show how intense is this craving of a child for praise and recognition. It is characteristic of childhood. Such praise and blame are the only guideposts the young child has in ordering its behaviour, set up as they are by those whom they, above all, respect and love.

By these means the child soon learns that certain lines of conduct are strongly disapproved. Other activities can be carried on which excite no comment, and are therefore permissible, while in other cases things are done which earn special words and acts of commendation,

and are the means of gratifying this longing for exceptional and discriminating treatment.

In this case Mary was praised for much of her work; for her drawings, her little poems, her wide reading and descriptive powers. But she was blamed for certain failures. As she expended her mental powers in these directions she tended to forget instructions, to lose her belongings, and to be too preoccupied with her own thoughts and was censured in varying degrees of severity for carelessness in general. Here Martha saw an opening for winning approval. The defects and failures of her sister became the occasion for her to win praise by making a point of attending to such matters as failed to rouse the interest of her sister. This then brought into existence in the household the Martha and Mary types. The practical, useful person, much busied about the necessary things of this life, and the imaginative, introspective and philosophical person who tends to escape into an ideal world.

What first provided the opportunity of personal distinction for Martha continued to be an open field for her in later life. Her knitting and sewing in which she was and is very much interested have proved to be of practical value to her and are superior to that done by her sister. She knows how to manipulate a sewing machine and has cut out and made her own frocks. She is also skilful with the hammer, the screw-driver, and the saw. She took a keen interest in, and has a desire to play the piano well, this being a subject which Mary had not attempted to learn, but which, like her sewing and knitting, she has recently added but merely as accessory to her main subjects. The fact, however, that she has threatened to enter this field has stimulated Martha's activities still further and made her more anxious than ever to maintain her lead.

Further evidence in this particular case is furnished by the school reports where Martha manages to do well in mathematical subjects, but not very well in the literary side of her work, whereas her sister reverses the process and scores heavily in the literary studies, but not so well in the mathematical.

Mary by her early and extensive reading possesses a considerable vocabulary, and by practice in verbal expression she has gained a ready control over language. She is thus able to express her thoughts clearly and freely, and because of that she has a ready confidence when associating with strangers.

Language has little meaning apart from the power it gives to us of associating with others, and for that reason man has been described as an animal possessing speech as well as a political animal.

This power of language is of very great value, facilitating as it does this intercourse with ones' fellows which is so desirable. In

this intercourse the relations are easier and smoother for the individual in proportion to his control of language he possesses, for on this mastery his confidence depends.

This power of embodying thought in language for the purpose of communicating it has the advantage over other modes of expression in that it is always present with the person, whereas the artist and craftsman need apparatus and material for their purpose. Those who have not this facility of language feel thwarted at times and either have to repress their feelings altogether or give expression to them in an exceptional way by using words which are commonly forbidden, as symbols of the feelings they cannot otherwise express, or else they use the words they can make use of with a vehemence that would not he necessary if they had greater verbal power.

This difference was, and is, very noticeable between Mary and Martha though the difference of temper is not entirely due to this cause. In this case the elder child was more frequently the centre of attention and received more consideration because of these frequent ailments, whereas Martha because of her more robust health, caused no sort of anxiety. Her irritability and uneven temper are a protest against being merged into the general setting of the home. Her resentment is a natural method of asserting her presence and a claim not to be ignored. There was some justice in her attitude, just as there was in the case of the older brother of the prodigal son, for whom no fatted calf was ever killed.

The placidity and tranquillity of mind Mary possesses is also due to a partial withdrawal from the world of fact, which in such a case comes to be regarded with disdain. Food and clothing are subordinate matters and property does not arouse any strong feeling. The satisfaction that is found in the world of imagination allows an attitude of trust and indulgence towards one's fellows, who are reflections of the perfect and tractable folk with whom the imagination is concerned. This calm and contentment are not available for the child such as Martha who is continually reminded by the hard facts of experience that the environment requires understanding if it is to be controlled and made to subserve the needs of human beings.

Such an individual then becomes alert, anticipates, after a time, the pitfalls that are likely to occur and so avoids them. Failure and defeat cause irritation and bad temper because considerable importance is attached to worldly matters, and to the need for the smooth working of the home. Hence the display of feeling on Martha's part when Mary ignored the request to look after her hat in the motor car. This type of child soon grows sceptical and quickly discards the fairy story and Santa Claus, for the difficulty of conjuring up that world and understanding its workings are just as great to the practical child as the

difficulty of understanding the complex everyday world is to the imaginative child.

Martha never entered into the fairy world with any zest. She was never at home and was greatly relieved when her suspicions were confirmed that it had no existence. This attitude was carried forward into learning, for literature which, in order to be appreciated requires imaginative powers, made little appeal to Martha. Likewise with regard to religious matters; the role of Martha was definitely hers and not that of Mary.

It is not then that the second child is incapable of pursuing the same intellectual interests. There may be no mental superiority of the one to the other, but the mental energy tends to go in that direction which will afford a source of personal well-being and not a sense of personal inferiority.

The members of a family are too intimate, too much thrown into relief one against the other, and the details of their achievements are much too prominent to be ignored. The contrasts and comparisons of their respective efforts if directed into the same channels would be a constant source of irritation to the one, a constant source of pleasure to the superior one, and would be damaging to the character of both.

The authority of the parents in the home is so arranged that the power of the husband does not encroach upon nor challenge that of the wife. 'Ubi tu es Gaius, ego Gaia' still prevails in married life, and produces for the family an illustration of co-operation and not of competition. The father derives his influence from his activities and his earning power in the outside world, while the mother performs the domestic duties, and exercises her authority in the home, and so brings about that balance and unity, which to a very large extent characterise family life in every part of the world.

In such an atmosphere then there is no encouragement and no stimulus given to the children of the family to pursue the same end in competition with one another, for such a spirit would destroy the foundations of balance, unity and harmony upon which the home has been constructed. In the distribution of material things the parents aim at equality and justice, and in all directions they seek to avoid strife, bullying and unfairness.

The competitive struggle for the child begins after he passes from the home into the school, when he measures himself against his fellows and is not restrained, but rather encouraged by the prevailing conditions which are in certain respects in contrast with the home.

By this time however the direction in which he can assert himself has probably been fixed for he has had to find the channel best suited to him in the home, and this trait he carries with him into his new life at school.

The general atmosphere of affection then which pervades the home tends to eliminate competition between the children; and to substitute a form of co-operation by which the efforts of the one serve to supplement those of the other. Thus the family organisation makes for diversity of interest and diversity of attainment, by laying stress on harmony and mutual help. In this way, and through this medium, it provides for the growth of personality by encouraging the assertion of, and by affording expression to the individual mind.

There is also at work within the home as in social life the law of balance and symmetry. The healthy human mind desires tidiness, unity, and sanity, and therefore it criticises individuals and institutions not for the virtues they possess but for the absence of those qualities which are desirable. A movement too much in one direction, tending to emphasise one or more aspects of the intellect, has a reaction and is corrected by encouraging the building up of the neglected qualities, in order that the architecture of the home and society should reflect the whole of human needs and not merely a special section of them. The desirable qualities that are present are after a time taken for granted, and no special credit is accorded to the child who possesses them, whereas there is often in the family a reference to the defects, and the desirability of cultivating those virtures which are noted as absent, and which are sought for by those who wish to win merit. In the economy of life it fortunately happens that no single type can comprise all the desirable traits, exhibits all the virtues, and possess all forms of intellectual attainment, but that, on the contrary, the possession of some seems to imply the absence of others. The characters of Martha and Mary cannot find expression in their highest form in the one individual. The pursuit of one line of development and expression implies the neglect of another, and even renders one unfit to acquire the qualities which attach to that other.

The view here put forward then does not support those who hold the doctrine of psychological predestination. It would give a far greater share to the influence of environment and to the circumstances which occur within that environment, though it acknowledges the existence of a very powerful innate force which urges the individual towards his or her place in the sun. It strengthens the opinion that the first years of a child's life are decisive and govern the succeeding years. It is within this period that there comes with the dawn of self-consciousness the necessity for making a choice of direction or of submitting to the call that is made by circumstance.

It is also clear that within the family circle, or in groups where there is strong social feeling, the competitive spirit is expelled, for though a child loves the praise, and enjoys the elation that comes from winning, it hates still more the sense of inferiority due to losing.

The best atmosphere in which a child can grow up is that of the family, where during the years when the sense of inadequacy is present this background of sympathy and affection encourages the tentative efforts at self-realisation, and where by intelligent guidance, and by the provision of various forms of activity the mental resources of the child can be tapped and so find a pleasing outlet.

The family through the parents ought to provide an atmosphere which is charged with certain ideals, the attainment of which ought to be encouraged by them. Through this the children acquire a sense of values and shape their conduct accordingly. The home is a conservatory or forcing house where affection provides the warmth and generating power for the different members of the family to use their inherent gifts along lines indicated for them. The opportunities and the encouragement the children find will depend on the qualities of their parents; that is, on their capacity and ability to enrich the environment with ideals and principles that are worthy of acceptance, otherwise the energy may be diverted into unworthy channels; or, if the appropriate stimulus is lacking and the child's mental powers are not released, though they clamour for expression, then it will be the duty of the skilful teacher at a later period to provide a means which will discover and set free the repressed forces but this will be difficult.

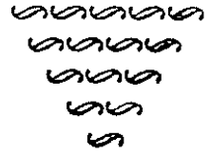
The importance, however, of the early years cannot be overstressed, nor can the transcendent influence of the home, the scope it offers, and the responsibility of parents in maintaining harmony, variety and richness of opportunity, together with a vision of what is best and highest, be ignored when considering the mental growth of our children.

Too much importance has been attached to the instincts as determinants of mental development. This theory has over simplified the problem, and made it appear that neither home, parents, school nor teacher has much power in moulding or in directing the child through the various phases of its development. Overwhelming confidence in this respect has in recent years given way to excessive timidity, because parents are informed that interference is fraught with the gravest dangers. The formation of complexes must be avoided at all costs; and so the parent and the teacher are now reduced to a position which the child occupied last century. They have become passive.

It is impossible to estimate in most cases the weight that should be attached to inborn traits, and equally difficult to measure the influence of the environmental factors. The analogy between the development of the mind and that of the seed or plant, or that between the mind and a piece of wax or a white sheet of paper, is merely a crude attempt to simplify a very complex problem, and too much value is attached to these analogies if they are regarded as adequate explanations, for the problem of mental growth cannot be satisfactorily expressed

or explained by the agency of physical things. To regard the mind as a piece of wax or a white sheet of paper, upon which experiences are recorded, thus moulding or forming the mind and giving it character, is to forget that there is an interplay between the individual and his environment, that it is not 'actio' but 'reactio' which describes the process.

The infant is neither a seed with all his future lying implicit within the germ, and developing inevitably along lines already determined by his inner nature, nor yet a plastic substance entirely dependent for his future adult mental shape on the forces which act upon him in his environment, but rather a blend, or a product of these two forces, the subjective and the objective interacting, the former varying in strength and quality with each individual, but depending for its direction, satisfactory expression and development on the nature of the objective world in which it happens to find its setting.



STERILITY AND FERTILITY

by

Lindsay Ride.

Professor of Physiology, The University, Hong Kong.

In an earlier paper (1) mention was made of some possible causes of depopulation amongst certain tribes of British North Borneo. These possible causes included the practices of contraception and abortion and the occurrence of a high frequency of sterility. The percentage of sterile matings ranged from $16.3\% \pm 4.1$ to $36.7\% \pm 3.7$, according to the tribe considered. It is very doubtful whether contraception and abortion are large contributory causes. On referring to the literature available, it seems that most writers agree that the natives of North Borneo are fond of children and are very keen on having families. In fact the proof of the possibility of a fertile mating is often demanded before the parents will consent to the marriage, and the absence of children seems to provide good grounds for divorce, or at any rate, good grounds for a man to divorce his wife. Adoption of children is common—it was observed last century and recorded by Ling Roth—and hence it may reasonably be argued that however important native methods of contraception and abortion are in limiting the *size* of a family, they are very much less likely to be important causes of sterile matings.

The first striking fact concerning sterility and fertility which these data bring to light is that sterility as well as fertility is purely relative and that sterility is merely an expression of zero fertility. The relative character of sterility is shown by the fact that there are a number of cases where a woman has been a partner in two, three, or even four different sterile matings, only to be followed by the occurrence of a pregnancy in a succeeding mating.

It would seem advisable, therefore, to restrict the term sterile in its absolute sense to those individuals either male or female who can be shown to be incapable of producing offspring. But when dealing with matings in which no pregnancies occur, (and for which condition no medical reason can be assigned), the term sterile should be applied to the mating, and each individual can only be described as sterile or zero-fertile, relative to the other partner in the mating.

The fact that some individuals may be sterile in relation to one mate and fertile to another, suggests that the fertility of a union may depend on the relation certain characters of one mate bear to those characters of the other mate. It is suggested in this paper that the characters which can influence the fertility of a union may be the agglutinogen content of the body cells of the male and the agglutinin content of the body fluids of the female.

It has been shown that agglutinogens are not confined to blood cells, that for example, if a person's corpuscles carry the A agglutinogen, then his other body cells will also be capable of being clumped by α serum. The question of agglutinins is not quite the same. If agglutinins be present in the blood serum, their presence or absence from body secretions depends on the ability of the membrane cells concerned to allow the agglutinin to pass through, and this ability is apparently an inherited character.

If we apply these principles to spermatozoa on the one hand and secretions found in the vagina or cervix on the other, we come upon some very interesting possibilities. Let us consider how spermatozoa from an individual of haemotype B may be affected by secretions in the vagina or the uterus of an individual of haemotype A. The blood serum of the female will contain β agglutinins and the other body fluids will or will not contain these agglutinins, according to whether the female possesses the character of allowing agglutinins to pass into secretions or not.

If the former be the case, then the fluid in the female genital tract will contain agglutinins capable of clumping the spermatozoa, and this clumping may possibly affect the chances of fertilization. If the latter be the case, the spermatozoa will not be agglutinated and the relative haemotypes of the mates should have no effect on the chances of the ovum being fertilized.

If this hypothesis be true, we should be able to demonstrate in matings involving certain haemotypes, a tendency to reduced fertility. We should not expect zero-fertility in all these cases because the viscosity of the genital secretions may tend to prevent complete agglutination, and further, even if the viscosity had no marked effect, all the spermatozoa would not be agglutinated, for we know in the haem-agglutination test, 100% of the corpuscles are never agglutinated at one time. The variation in agglutinin titre of the female secretions would also be a factor involved in the degree of agglutination of spermatozoa, and hence this hypothesis may not only account for certain cases of zero-fertility but also for fertility variations.

There is only one way of getting direct evidence on this possibility and that is by examining the effect of such secretions on spermatozoa. Unfortunately no opportunity has yet presented itself of testing this theory by the direct method, but the family data collected in North Borneo do make it possible to apply an indirect test.

DATA AND DISCUSSION.

The 873 matings recorded were classified as either fertile or sterile, a mating being designated sterile if no pregnancy had occurred after 2 years had elapsed from the time of marriage. To start with, such a

classification must be considered as only approximate since accurate histories of abortions, misconceptions, etc., were hard to get. Of the 873 matings 688 were fertile, 185 sterile according to the above method of classification.

It is obviously impossible on expeditions such as those conducted in North Borneo to carry out examinations of any sort to establish the cause of the sterility, and as mentioned above, although "civilized" or "scientific" methods of contraception are not used, there is a definite possibility that the natives may have and may practice their own methods.

But although factors such as contraceptive practices or pathological changes in the reproductive system, do contribute to sterility, they will tend to contribute equally in all groups of the population subdivided by any method that is in no way correlated to such factors. Such a method of subdivision is the grouping according to haemotypes, and in Table 1 all the matings are set out grouped according to the haemotype of the male and female mates.

TABLE 1.

MALE TYPE	FEMALE TYPE									
	O		A		B		AB		?	
	+	−	+	−	+	−	+	−	+	−
O	101	32	33	11	43	8	11	0	112	24
A	26	9	6	6	19	5	1	0	25	7
B	44	12	17	4	31	10	5	2	50	10
AB	5	1	2	0	7	3	0	0	3	5
?	84	19	23	5	37	12	3	0	—	—

Table 1.—Showing the blood groups of parents in 873 matings of Borneo natives; the numbers of each type of fertile mating are given in the columns headed +, those in which no pregnancies occurred are shown in the columns headed —.

All the matings given in Table 1 can be divided into two big classes as follows:—All matings in which the male cells could not, on blood grouping evidence, be agglutinated by the female serum, were placed in one class and described as *serologically concordant matings*, while those in which the male cells, by similar tests, could be agglutinated by the female sera were placed in the second class and described as *serologically discordant matings*.

In all 590 matings could be classified thus, 436 being concordant and 154 discordant, and the fertile and sterile matings in each class are set out in Table II.

TABLE II.

	Total	Fertile	Sterile	Sterile %	Standard Error of Percentage.
Serologically Concordant Matings.	436	343	93	21.3303	±1.96
Serologically Discordant Matings.	154	120	34	22.0779	±3.34
Total.	590	463	127	21.5254	±1.69

Table II, in which 590 matings are classed according to whether the male cells could not be agglutinated by the female serum (serologically concordant) or whether the male cells could be thus agglutinated, (serologically discordant).

The frequencies of sterile and fertile matings occurring in each group are given together with percentage frequencies of the former and the standard errors of these percentages.

The difference between the sterile percentages in each group is ·7476% and the standard error of this difference is 3.88% and hence this observed difference is not significant. These data, therefore, do not support the assumption that sterility is in any way dependent on the relative haemotypes of the individuals. This can be seen in another way for, using the figures of the concordant matings as standards, the expected frequencies of discordant matings are:—fertile, 121.15 (observed = 120), and sterile, 32.85 (observed = 34). The small differences between these calculated and observed frequencies substantiate the finding that sterility is equally frequent in concordant and discordant matings.

These results however, cannot be said to have disposed of the possibility altogether. They have shown zero-fertility to be independent of the above haemotype classification, but it may still be that variations in *fertility* are so dependent, and to investigate this it will be necessary to inquire into the distribution of size of family in the two big mating groups, concordant and discordant.

A further reason why these results do not dispose of the possibility altogether is that all causes, known and unknown, of sterility contribute to the sterile numbers, and discordant haemotypes may be such a minor

cause that its effect cannot be detected when the other causes are included. Before deciding finally against the theory here put forward, it will therefore be necessary to apply this comparison to matings in which all other causes have been eliminated as far as is practicable.

Conclusions.

1. Sterile, referring to persons, is a term which can only be applied in its absolute sense to individuals who can be proved to be incapable of producing offspring.
2. Individuals involved in a non-fertile mating, who cannot be proved incapable of producing offspring, are only relatively sterile, relative that is, to the other member of the mating.
3. Sterility is thus one of the variations of fertility, viz :—zero-fertility.
4. The sterility of one person relative to another has not been shown to be dependent on their relative haemotypes.

Summary.

1. The difference between the causes of small families and of sterile matings is discussed.
2. It is shown that the terms sterile and fertile, as applied to matings, are purely relative.
3. It is suggested that variation in fertility may depend on the relative haemotypes of the mating individuals.
4. To test this hypothesis, the incidence of sterility in serologically concordant matings is compared with that found in serologically discordant ones. No significant difference was observed.
5. These data do not support the assumption that sterility depends on the relative haemotypes of the persons concerned, but comparative data on size of family will be necessary to show a similar independence of fertility.

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