

MENTAL SCIENCE.

Brain-Growth and Body-Growth.

THE late Dr. Parrot of France was, at the time of his death, collecting anatomical material for a study of the progressive development of the several parts of the body as measured by such characteristics as size and weight. Some of this material has been arranged by Mlle. Jeanne Bertillon, and presented by her to the Anthropological Society of France. The problem there discussed is the ratio of increase in weight of the brain to the increase in weight of the body as a whole, of the height, of the heart, and of the spleen. This is ascertained for the two sexes and for the various ages, especially for the first years of life, when growth is at its maximum. As will be seen, the results given are founded on a sufficiently large number of measurements to make them generally reliable.

Expressing the weight of the body, of the heart, of the brain, of the spleen, and the height, as 1,000 at birth, their condition at several periods up to the sixth year is given in the following table:—

Age.	Weight of Body.		Weight of Heart.		Weight of Brain.		Weight of Spleen.		Height.	
	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.
0 to 1 month	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
1 month to 3 months . . .	1,190	1,124	1,179	1,135	1,246	1,348	1,280	1,286	1,066	1,036
3 months to 6 months . . .	1,596	1,486	1,487	1,499	1,666	1,579	1,852	1,860	1,202	1,128
6 months to 1 year	2,257	2,150	2,280	2,191	2,170	2,137	2,321	2,153	1,356	1,315
1 year to 2 years	3,200	2,921	3,189	3,095	2,756	2,647	3,230	3,390	1,540	1,513
2 years to 4 years	4,341	4,229	4,022	3,849	3,210	3,202	4,570	4,210	1,744	1,683
4 years to 6 years	5,367	5,480	5,167	5,160	3,435	3,461	5,330	5,560	1,971	1,960

Thus it appears that at the end of this period the height has about doubled, the brain a little more than tripled in weight, and the weight of the body, as of the heart and spleen, more than quintupled. In another table is considered how much of this growth of the first five years has been contributed by each of the several periods of age above specified. From such a comparison, it appears that the brain develops sooner and more rapidly in early life than even the height. The percentage of the growth of the first five years, that takes place in the first six months, is, for the body-weight, only 13.66 for females, and 10.82 for males; for the heart, 11.43 and 11.88; for the spleen, 19.7 and 19.0; for the height, 20.8 and 11.40; while for the brain it is as much as 27.41 and 23.51; the first figure referring to the females, and the second to the males. The same fact is more clearly brought out by saying that at the beginning of the second year the female brain has already increased by 72 per cent of all the increase it will have made within the first five years, while the body-weight has not reached 50 per cent of the development it will have at the sixth year. Expressing the total progress at the opening of the second year in terms of the total progress at the opening of the sixth year, the following table shows in detail the relative amount of growth attained by the several parts:—

	Body-Weight.	Weight of Heart.	Weight of Spleen.	Height.	Weight of Brain.
Female	50.36	52.54	51.50	55.53	72.33
Male	42.86	50.46	52.50	45.70	66.85

The striking fact here is the advance of the female above the male. This, it has been suggested, is what one ought to expect, on the theory that the female organization is nearer the primitive type than the male, for savages (and animals) are marked by a more rapid march to maturity than civilized man. In actual weight and height, however, the male, as is well known, exceeds the female;

and on the average during the first five years, taking the female weight (and height) at 1,000, the male weight (and height) is shown below. It may be noted that the brain-ratio between the two sexes is larger than that of any other part.

Body.	Heart.	Brain.	Spleen.	Height.
1,073	1,077	1,096	1,087	1,030

Greater changes take place within the first three months than within the period from the third to the sixth month, but the maximum of growth takes place in the latter half of the first year.

The sexual differences in these respects are very marked throughout. The disparity diminishes within the first four years, to reappear in from the fourth to the sixth year with the same intensity as in the first months of life.

With which of the four measurements does the growth of the brain in weight keep the most constant ratio? Omitting the weight of the spleen as unimportant and variable by pathological and other causes, a glance at the following table will show that the body-weight and the height give no such constant ratio.

Age.	1,000 Grams of Body to 1 Gram of Brain.		100 Centimetres of Height to 1 Gram of Brain.	
	Number of Cases.	Ratio.	Number of Cases.	Ratio.
0 to 1 month	196	166.6	94	726.5
1 month to 3 months . . .	88	186.9	46	865.7
3 months to 6 months . . .	104	175.8	56	1,006.0
6 months to 1 year	120	163.1	60	1,220.0
1 year to 2 years	202	147.4	142	1,174.0
2 years to 3 years	115	128.7	95	1,371.0
3 years to 4 years	60	118.1	48	1,531.0
4 years to 5 years	44	92.8	34	1,279.0
5 years to 6 years	22	101.8	22	1,205.0
6 years to 7 years	17	100.6	13	1,264.0

If, however, we compare the weight of the brain with that of the heart, a more constant ratio is found, which Dr. Parrot would dignify with the name of the 'encephalo-cardiac' index to take rank with other anthropological indices. The constant decrease of this ratio with age is thus shown, taking 10 grams of heart to 1 gram of brain.

Age.	0 to 1 m.	1 m. to 3 m.	3 m. to 6 m.	6 m. to 1 yr.	1 yr. to 2 yrs.	2 yrs. to 3 yrs.	3 yrs. to 4 yrs.	4 yrs. to 5 yrs.	5 yrs. to 6 yrs.	6 yrs. to 7 yrs.
Ratio	230	257	257	235	216	192	173	158	151	151
No. of cases	185	90	90	114	206	117	71	39	22	19

It is probable that after the sixth year the ratio would tend to remain constant. Be this as it may, Dr. Parrot has pointed out an interesting line of research, and one calculated to shed much light on the normal development of children.

THE SAVAGERY OF BOYHOOD.—Mr. John Johnston, in an article in the October issue of the *Popular Science Monthly*, brings home the forcibleness of the analogy between the traits of savages and that of developing civilized mankind. He cites a case of wanton cruelty recorded, by a boy without any apparent feeling for the cruelty of the act. Mr. Johnston, opposing the sentiment that pervades much of the literature that is supposed to be written for boys, does not predict for this boy a life of sin, but gravely contemplates the trait as a step in the normal development of youth. Pity is a late factor in moral evolution, and

a really 'good' boy is morally precocious or diseased. This view does not lower one's estimate of a boy's virtues, but accents those that are suited to his years, as well as the importance of the gradual and timely appearance of the several instincts and emotions without which civilization would be impossible.

HEALTH MATTERS.

Chest-Expansion and Consumption.

IN *Science*, ix. No. 221, we gave a *résumé* of the views held by G. W. Hambleton, licentiate of the King's and Queen's College of Physicians, Ireland, on the origin and prevention of consumption. These views were presented last year at a meeting of the British Association for the Advancement of Science. Since then Mr. Hambleton has been engaged in certain experiments upon this important subject, and during this research his attention has been drawn to the fact that the size and shape of the human chest vary according as he varied its conditions. So constant was this variation as to make him doubt the present accepted theory of the inheritance of chest-types.

Taking a well-marked example of the so-called inherited consumptive chest, he subjected it to conditions that tend to develop the lungs, till it corresponded in size and shape, first with the town artisan, then with that of a man of the privileged class, and finally with that of a man of the best class of insurable lives in America. By subjecting the same chest to conditions that tend to reduce the breathing capacity, he brought it back through the same types to nearly that with which he commenced; and he claims to have produced similar results in other chests within a period measured by months. At birth the average male child of all classes has the same type of chest, but at maturity he has that of the class to which he belongs. The types of chest, Mr. Hambleton claims, vary with the conditions to which these types are subjected. Thus we have the type of chest of those who use wind-instruments, and another type of those who compress their chests in their work or by a corset. In these no one raised the question of inheritance. This variation of the chest is not peculiar to it: it is true of all other parts of the body. The shape of the head may be altered by direct pressure, and the shape and size of the feet in the same way.

According to this theory of Mr. Hambleton, the type of man after birth is solely produced by the conditions to which he is subject: hence the formation of race by man's continuance under the same conditions, and its subsequent divisions into sub-races and families by his migrations into new conditions and the minor differences therein. The field which is opened up for investigation by these views is, as Mr. Hambleton states, a wide and important one. When we have ascertained what the conditions are that produce these differences in man that together make a class or type, we shall be able to produce that class or type; and we shall also be able to tell what type of body is best suited for a given occupation, and for residence in a given country. "Then we shall train men so that we shall no longer send them into occupations with types of body unfitted for the conditions of that occupation, and consequently we shall be spared the misery and loss of those numerous breakdowns from unsuitability of type that are now daily brought before us."

These views have been referred to a committee of the association, with instructions to investigate them; and in a letter which we have received from Mr. Hambleton, he requests that they be thoroughly tested by scientific men in this country. It will, we are sure, be apparent to our readers, that, if all that is claimed for these opinions is true, a most important and valuable contribution to human knowledge has been made; and, if the practical results which are stated to have been obtained in isolated instances can be made general, the improvement in the human race which is certain to follow will be beyond all computation. We shall be glad to open our columns to those who desire to discuss the question, or have any facts bearing upon it.

FOODS CONSUMED IN WINTER. — In no particular does the difference between the customs of the people of the present day and those of their forefathers show itself more distinctly than in the amount and character of the food which they consume during the winter months. The diet of fifty years ago was characterized by

simplicity, and want of variety: that of to-day is just the opposite. This is largely due to the improvements in the processes of food-preserving, by which every form of plant and animal life is as available at one season of the year as at another. Some of these processes are so simple that there is no reason for substituting questionable methods for them, while others require so much time and attention that packers are constantly on the alert to discover a way to shorten the time and lessen the necessary watchfulness. With this object in view, chemistry is often appealed to, to solve the problems which are constantly presenting themselves. It is in this way that chemical products of various kinds find their way into the food-supply. The improvement which takes place in coffee when it is transported in sailing-ships is, now that a quicker method of transportation is employed, counterfeited by polishing and coloring; and to avoid the trouble of long treatment by heat of some vegetables and fruits, and their consequent deterioration in appearance, preservatives of various kinds are employed. One of the most commonly used of these is salicylic acid. The effect of this acid upon health has been thoroughly investigated in France, and its use in foods and drinks has been prohibited in that country since 1881. Prof. E. H. Bartley, of the Long Island College Hospital, Brooklyn, has recently examined this question with great care, and in an article which appears in the *American Analyst* his views and those of other authorities are given in full. In the use of this acid in the treatment of rheumatism, clinical observation shows that it cannot be continued for a long period of time without impairing digestion, and in its elimination it passes out undecomposed through the kidneys. It has been recognized that under these circumstances it not only irritates but inflames these organs. In preserved food we have to do with smaller quantities of the acid, as a rule; though that this is not always the case is shown by Professor Bartley's figures. He says, "The quantity of salicylic acid usually employed in wines is from six to eight grains per gallon, and in beer from twelve to fifteen grains per gallon; or, in the case of beer, from one to one and a half grains to the glass. As many men habitually drink twenty-five glasses during the day, they take from twenty-five to thirty-seven grains of the acid per day. The medicinal dose is usually stated to be from ten to twenty grains." He also calls attention to the fact that nursing mothers are frequently recommended to drink ale, porter, or beer, with the idea that it stimulates the mammary gland, and to the additional fact that temporary renal disease is frequent during the first weeks of lactation. In conclusion, Professor Bartley says, "I should state that another serious objection to the use of salicylic acid is the fact that many samples found in the market contain more or less carbolic acid. It is now almost entirely manufactured from this very poisonous substance, and, unless great care is exercised, an appreciable amount of it is left in the finished product. Indeed, some writers think that some of the fatal accidents recorded from the use of salicylic acid have been due to the presence in it of carbolic acid. If the use of this acid is to be countenanced, impure articles will be used, and greater damage may be done than could come from the pure article. From a careful consideration of the whole subject, I am compelled to regard the use of salicylic acid in foods and drinks, and especially in lager beer, as at least open to serious objections. If it be harmless to healthy adults, the evidence of its deleterious action upon the aged and certain other classes of the community is too strong to be disregarded by sanitary authorities, and should prohibit its use for this purpose."

ETHNOLOGY.

Dwarfish Races.

A. DE QUATREFAGES has recently published an historical review of the ancient and modern reports on dwarfish tribes. While formerly the descriptions of ancient geographers were considered not trustworthy, many of them have been confirmed by recent explorations. Among these are the tales on the pygmies. Aristotle and Pliny state that a dwarfish people lived near the swamps of the upper part of the Nile. De Quatrefages considers this tribe identical with Schweinfurth's Akka, who at the present time live a little farther south. Pomponius Mela mentions dwarfs who inhabited the neighborhood of the Red Sea. This report was confirmed by