undivided support from the scientific world, no less than from owners and masters of vessels, marine insurance companies, and, indeed, from the general public, for who is not interested in lessening the hazards of the sea? The relations which have grown up and the interchange of data now carried on between this office and other scientific bureaus of the government, no less than the recognized value of this most appropriate work for naval officers in times of peace, mark a new era in naval administration, the permanency of which should be guaranteed. The people of the United States are quick to recognize good work, and nothing can strengthen confidence in and support of the navy more than the assured permanency of the praiseworthy work of the Hydrographic Office.

THE GROWTH OF CHILDREN.

THE systematic measurement of the several parts of the human body, together with the testing of their functions, has developed into the science of anthropometry. The plan of establishing an anthropometrical laboratory, where, for a small fee, any one can have himself weighed, measured, and his powers tested, which Mr. Galton has so often and so ably advocated, seems about to be realized. The results of such measurements, when widely taken and ably compared, will be to practical biology and hygiene what statistics, in the present use of the term, are to economical science, — the experimental basis of their practical application. As in the latter, so in the former, the stating of these results in accurate form at once opens up a number of questions never before considered, and at the same time helps to solve those that have been brought to notice. In this department of study no field has been cultivated with so much zeal as the study of the growth of children, mainly because this is a field where the practical lessons can be most effective. In a recent number of a German scientific journal, Professor Gad of the University of Berlin, sums up the recent studies upon the growth of children, and thus makes accessible some very interesting facts.

About one-fourth of a human life is spent in the period of growth; and this implies not merely addition of material, but assimilation, re-formation. It involves, too, in some cases, the enlargement and change of form of elementary cells, but in most cases the formation of new cells by cell-division. We know more about the growth of the skeleton than about that of the soft parts of the body; but a more detailed knowledge of the growth of its several parts is highly desirable. The height and weight of the entire body are the most readily observed, and about them the information is most accurate. The female child weighs, on the average, 3, and the male 3.5 kilograms. At the fifteenth year the weight has become twelve times this amount. The greatest changes occur in the first year. At the end of the second year, the body weighs three and a half times its original weight, and about one-fifth more than at the end of the first year. In the third year it increases by one-tenth its weight; and from then on, the increase is tolerably constant up to the eighth year for girls, and the tenth year for boys, at about 1,500–1,800 grams per annum. The increase in height takes a parallel course. The greatest changes occur in the suckling. At birth the height is 50 centimetres, which is about one-third that of the adult. At twelve months it has increased by 20 centimetres (40 per cent), more of this increase going to the lower than to the upper half of the body. In the second year the increase is 10 centimetres (15 per cent); in the third, 7 centimetres (8 per cent); and from then on, it is about 5 centimetres annually. At five years the height has doubled, and at fifteen tripled itself. This for boys. Girls are smaller, and reach their maximum earlier. The maximum height of army recruits falls between the twentieth and the twenty-second year, and is 170.5 centimetres. If in growing the body retained the proportions of the several parts, the weight of the adult would be twenty-seven times that of the new-born child, inasmuch as the adult is three times as tall as the babe, and the volume is as the cube of the height. As it is, the adult weight is only twelve times the original, and this difference shows how much more the growth is in height than in any other direction.

The usual method of obtaining these average results is to measure groups of children of certain ages, and take the mean result. Another method is to observe the same children, and measure and weigh them for many years. The latter is the more troublesome, but the inference from it is more immediate; though the former, when based on sufficiently large numbers, gives reliable results. Dr. Landsberger has been measuring a large number of children in Posen, Germany, and always the same children, since 1880, — a period of six years. The measurements have been made always between the 5th and the 15th of May, at the same time of day, in the same place, and with the same instruments. The average period covered is from the sixth to the thirteenth year. One curious result is, that the social factor as between the rich and the poor is a much more important one than the racial as between Poles and Germans. The rich children come to school taller and heavier than the poor ones, though their increase after getting to school is not more rapid. This long-lasting effect of early care is much more conclusively shown by the figures of another observer, Russow, who has tabulated the heights and weights of children from their second to their eighth year, distinguishing between those that were naturally suckled and those that were artificially reared, and throughout all this period shows a balance in height and weight in favor of the former.

Perhaps the most original investigation in this field is that of Dr. Malling-Hansen, director of the institute for the deaf-and-dumb at Copenhagen; the measurements being made on the children of that institution ranging from nine to fifteen years in age. The weights of these children show three marked periods in each year: there is a period of maximum growth in weight extending from August to the middle of December, a period of mean growth in weight from then to the first of April, followed by a period of minimum growth in weight back to August again. During the period of maximum growth in weight, the daily increase is three times as great as during the period of mean growth; and almost all that is gained in the latter period is lost in the period of minimum growth. With regard to height, these periods are equally evident though not coincident. In Copenhagen the period of minimum growth in height is from August to the end of November; the mean period, from then to March; and the maximum period, from March to August. In the maximum period the daily increase in height is two and a half times as great as in the mean period, and in the latter two and a half times as great as in the minimum period.

The period, then, at which the general increase of the body is going on is from the end of March to December; and within this period there is a period of maximum increase in height and a period of maximum increase in weight. During the period of most rapid increase in weight, the increase in height is the slowest of any in that period, the times of mean growth of height and weight about coincide, and the period of maximum growth in height is a period of comparative rest for the weight. The height-periods begin and end about fifteen days before the weight-periods. The height first has a period of minimum growth, then a period of mean growth, then its maximum growth, and then suddenly falls back again to the minimum rate of growth. The weight, however, begins with a minimum rate of growth, passes at once to its maximum, and then slowly falls through the period of mean growth back to the minimum again. The growth in weight varies more than the growth in height. An increase of 1 centimetre of height corresponds to 2.84 kilograms during the period of maximum growth in weight, but only to .48 of a kilogram in the period of mean or minimum growth. The increase of weight in the maximum period is essentially a growth in stoutness, and the loss of weight during the period of minimum growth is a decrease in stoutness. In the period of maximum increase in height the increase in stoutness is at a minimum, and during the period of least increase in height is at a maximum. A practical lesson to be derived from the knowledge of these periods is to have as large as possible a share of the period of general greatest growth fall into the vacation time; for then the body has less strain upon it, and is in general in the best condition for growing. The Swedes and South Germans are accordingly right in giving their children two or two and a half months vacation, from July to the middle of September, thus including a good share of the greatest growth period.

Dr. Malling-Hansen has also attempted to make out shorter periods of twenty-five and seventy-five days of variations in growth,

which he regards as due to the changes in the climatic conditions, but this is not as yet securely established. His study of the height reveals some very interesting points. It is well known that we are longer when we lie down than when we stand up, and this difference may be as much as a centimetre. So, too, after a long walk, when the weight of the body has compressed all those parts that furnish room for contraction, the height is smaller. Twenty-two boys, thirteen to sixteen years old, were measured at different times of day. During the hours of leisure, from 6 to 8 A.M., a boy lost, on the average, 4 millimetres in height; while resting on the school-bench, from 8 to 9 o'clock, he gained .3 of a millimetre; during the instruction, from 9 to 10, he loses 1 millimetre; during the recess, from 10 to 11, the loss in height was 3 millimetres for each boy; from 11 to 12 during school-hours the body expands by 2 millimetres, but in the next hour in school loses .4 of a millimetre; in the leisure time from 1 to 5 o'clock the body loses 3 millimetres. In general, from 6 A.M. to 5 P.M. there is a loss of 9 millimetres; from 5 to 9 P.M. there are variations; and from 9 P.M. to 6 A.M. there is a gain of 9 millimetres. These measurements were taken during the winter months. The daily variations in weight were also observed. From the end of the chief meal, at 2 P.M., until 9 o'clock, each boy loses .13 of a kilogram, and from 9 P.M. to 6 A.M. there was a loss of .57 of a kilogram: of this, .28 of a kilogram was due to perspiration and exhalations, and the rest to excretions. From 6 A.M. to 1 P.M. there was a gain of .11 of a kilogram, and dinner added .59 of a kilogram. It is very much to be hoped that the custom of taking a variety of this kind of measurements will become widespread, and systematic attempts be made to extend and collect such observations.

SCARLET-FEVER REPORT.[1] — IV.

S. H. DURGIN, M.D., Boston, Mass., health commissioner, reports that the law of Massachusetts requires reports of scarlet-fever to be made by both the attending physician and the householder. Boards of health should verify the diagnosis, and cause strict isolation and thorough disinfection to be practised. Dr. Durgin believes that isolation can best be carried out in hospitals. Inasmuch as these measures are often successful in preventing the spread of the fever in schools and families, he thinks they would be equally efficacious in preventing its spread in a community. He thinks the use of drugs to prevent well persons from contracting the disease to be nonsense.

Mary B. Moody, M.D., New Haven, Conn., relates the following incidents, which have come under her personal observation, as showing the communicability of scarlet-fever: 1. Two children received a call from a little playmate who was affected with scarlatina. The disease was so light that it was not recognized for some days. The exposed children suffered from the anginose variety, but did not come down for six weeks. They were very ill, and attacked within a few hours of each other. 2. A young physician, male, called upon a lady directly after attending a scarlet-fever case, and without ablutions or change of clothing. She had unmistakable scarlet-fever two weeks later. Dr. Moody believes that in hyposulphite of sodium we have an agent which will protect well persons from contracting the fever when exposed. She says, "Hyposulphite of sodium in solution has appeared in two cases, at least, which came under my observation, to have sufficient protective power to enable a sister to attend the funeral of a brother dead of the disease, and to enter his two-roomed house, which was infected by it. She went against protest into what seemed certain exposure, was sixteen years of age. All the other children of the family had it, four or five of them within two months of the first case. The late Dr. Thomas F. Rochester of Buffalo related to his classes in college instances he had personally known where contagion of scarlet-fever was carried in clothing. One lady wore a wrapper to assist in caring for the daughter of a friend where she was visiting, who was ill with scarlet-fever. When her visit was ended, she put the wrapper in her trunk and went to the house of another friend, who had a daughter about the same age of the one to whom she had recently ministered. There were no cases of scarlet-fever in the vicinity, nor had there been for a long time. She wore the wrapper soon after her arrival. In a few days the little girl sickened with scarlet-fever and died."

Fred. K. Smith, M.D., Calumet, Mich., says, "I have seen repeatedly successive cases, occurring in families at intervals of a few days or one or two weeks, where it has apparently been communicated from one to another. In one case which I observed, a young lady, having a mild attack in Michigan at a place where it was epidemic, went home to Ohio about two weeks after the beginning of the attack. Within two weeks after her return, her sister was attacked with the same disease, no other cases existing in the neighborhood at that time. The weight of evidence indicates that a scarlet-fever patient may communicate the disease to others for a period of six weeks from the beginning of the disease, and, if complete disinfection is not then accomplished, for an additional period from virus retained on the skin and clothing." Dr. Smith thinks that placards should be affixed to houses in which scarlet-fever exists, and that the occupants should not be permitted either to make or receive visits.

D. L. Phares, M.D., Agricultural and Mechanical College, Agricultural College P.O., Miss., narrates a case in which a gentleman spent about a week helping to nurse a case of scarlet-fever. When the patient died, he rode about twenty miles, taking his clothing with him, to spend some days with his sister and her children. In a few days the children took the disease, and part of them died. No other means could be discovered of taking the disease.

W. W. Daniells, Madison, Wis., reports the following case: "A lady nursed her sister's children in a house adjoining mine, and when she went home (after a thorough bath) wore no clothing that had been near the house where the sickness occurred; yet her own child, who had not been otherwise exposed, took the disease, the germs having been probably carried in the hair, which had not been cleansed."

Charles Schäffer, M.D., Philadelphia, Penn., reports the case of a young nephew of his, less than a year old, who contracted the disease in a house where a death had occurred three months before, and was supposed to have been disinfected. In another instance two children of a friend died from the disease after returning to their home several weeks after the recovery of another member of the family from the fever.

Charles N. Chapin, Providence, R.I., superintendent of health, makes the following statement as showing the practice of the health department in that city: "At present we placard houses; exclude children of household from school, Sunday school, etc.; distribute circulars of information; forbid public funerals; and fumigate with sulphur. We should, in addition, fumigate all textile fabrics, etc., with steam, and have a hospital for the treatment of those cases which cannot be isolated at home. Our rules are fairly well complied with; and it is possible, that, if they could have been strictly enforced at the beginning of this epidemic in August, it might have been stopped. But I do not feel at all sure but that the only way to prevent the spread of this disease is to remove every case to a hospital, or else put a guard around every infected house, and prevent every possible contact with the community. I shall be pleased to give you the results of our efforts later in the season, whether they are favorable or not. Thus far the cases reported per week have been as follows: —

	August.				September.				October.				
Date	6	13	20	27	3	10	17	24	1	8	15	22	29
Cases	0	4	4	7	9	3	8	33	49	58	56	37	34

"Reports of cases should be made by physicians, because they are cognizant of the majority of cases, and because they can recognize the disease. Physicians should be licensed by State boards of health. The physicians should be paid for this service by the local government. When a physician is not employed (and perhaps in all cases), the head of the household should be obliged to report. This is the law in this State. But it is by the rules of the board of health in this city that the reporting by physicians is made compulsory. They are not, however, paid for this service. About ninety per cent of all cases are reported by physicians. We learn of the others through the assistance of school-teachers chiefly. Probably very few cases now escape us."

[1] Continued from *Science* of Jan. 13, 1888.