ical lecture on Ulcerative Endocarditis with Embolism of Brain, by Henry Thompson, M. D., in which he says: "Its consequences are embolism or blood infection, or both together. . . . I am bound, however, to warn you that by many authorities ulcerative and infective endocarditis are regarded as commensurate and synonymous terms. Nor is this all. Pathologists have brought to light the so-called material of infection, the presumed blood poison itself, in the several shapes of micrococci, vibriones, bacteria, leptothrix, filaments and the like, — a motley assemblage of molecular organisms, which may be briefly designated microzymes. . . . Unfortunately no one can tell where these strange beings are born, whether *within* the heart or *behind* the heart in the course of the circulation, whether they are indigenous or exotic, central or peripheral, in origin. Cases are on record which one would unhesitatingly refer to an extraneous source. On the other hand, there are undoubted examples where no distant point of departure was *discovered*, but in this connection it must be borne in mind that the same thing is true of unequivocal pyæmia. Over and over again, you know, in pyæmia we find no aboriginal focus of infection, whether anything of the kind exist or not.

"In all my own more recent cases, three in number, post-mortem examination revealed nothing to warrant the assumption of an extraneous source."

I have given the records of certain cases of pyæmia and septicæmia which are classed by some authorities as "spontaneous" in their origin.

In my own case the possible causes, such as bad air, impure water, defective drainage, tainted food, previous poor health, were all thoroughly investigated, with negative results.

These histories seem to justify the belief that cases of pyæmia and septicæmia occur in which the cause cannot be traced. The word "spontaneous" indicates that the origin cannot be explained, but does not necessarily commit one to the belief that there was a "spontaneous generation."

Further than this I have no theory to offer in regard to these cases; they are still too few in number to warrant any conclusions being drawn from them.

My desire in the presentation of this paper is that it may elicit discussion now, and the publication, hereafter, of other cases similar in their history.

HUMAN GROWTH.

BY CHARLES SEDGWICK MINOT, M. D.

As Dr. Bowditch's researches on the growth of the school-children of Boston have excited a very widespread and general interest in the matter, it is desirable to call attention to the independent investigations of Professor Pagliani, of Turin, which have confirmed and supplemented Dr. Bowditch's results. Pagliani's last paper¹ gives a general *résumé* of the whole subject, based upon his own statistics and the observations of others. It is the chief object of the present article to give an abstract of this important memoir.

Formerly the principal authority on human growth was Quetelet,² who, having adopted a very arbitrary

method of research, arrived at results which are erroneous in important respects, as both Bowditch and Pagliani have pointed out. It is strange to find that even in the third edition of Foster's text-book of physiology, the best and most recent manual of this science, Quetelet's errors are still repeated. It is therefore desirable to report the new researches, since the general authorities are very incorrect.

Quetelet's error arose from his measuring twenty picked individuals for each age, ten of each sex, selecting those he supposed to be fully and symmetrically developed. In order to get at the real course of growth it is necessary to take the average of a very large number of measurements, excepting only individuals with positive deformity or disease, because the variations are both extensive and numerous, and the growth of an individual rarely, if ever, conforms exactly to the average.

The best measure of growth is unquestionably the weight, because it represents the total growth independently of its being principally in height or diameter. The stature shows some peculiarities, which the weight alone cannot bring out, namely, in the proportionate rate of increase of stature and bulk, which are subject to definite and different variations.

The time of growth may be divided into four tolerably distinct periods, as follows:—

(1.) *Formative period*, comprising the first two months of the foetal life, during which the tissues are differentiated, and the omphalo-mesaraic circulation is maintained.

(2.) *Period of embryonic completion*, comprising the rest of the foetal life, with placental circulation.

(3.) *Period of development*, from birth to puberty.

(4.) *Reproductive period*, from puberty onwards.

There is a sufficient distinction between the first and second as well as the second and third periods, but that between the third and fourth depends upon the determination of the age of puberty. No precise determination in the case of boys has yet been made, there being no readily recognizable sign. It is, however, to be hoped that valuable results may be obtained, as Bowditch has suggested, by accurately recording the time when the voice changes, and also when hairs are developed on the pubic region, both changes approximately coincident with puberty. In the case of girls, the first menstruation and also the enlargement of the mammæ, which usually somewhat precedes the first monthly flow, afford an obvious and sufficient indication of maturity. Numerous observations upon the first menstruation have been made. In Boston, according to Dr. Chadwick, the average age is fourteen years and five months. The exact epoch varies with race, climate, and circumstances of life. According to Joulin, in warm climates there is a larger number of first menstruations at twelve years than at any other age; in temperate climates at fifteen years; in cold climates at sixteen. But these data are very uncertain, as is shown by the fact that in Denmark Han-nover found from 2129 cases the average age to be 16.91 years, while Raun, from 3840 cases, found it to be 15.84.

The statistics must therefore be gathered before they will yield sufficiently accurate means. Menstruation begins in the majority of girls between the thirteenth and eighteenth year, both inclusive, a period of nearly six years, over three or four of which the cases are distributed about equally, so that there is not one year

¹ Luigi Pagliani, *Lo Sviluppo umano per Eta, Sesso, Condizione sociale ed etnica, studiato nel Peso, Statura, Circonferenza toracica, Capacità vitale e Sforzo muscolare*. Milan, 1879. 8vo, pp. 79, Tav. I.-IV.

² Quetelet, *Physique sociale*.

during which menstruation usually begins. This is instanced by the following table, obtained at Professor Tibone's clinic in Turin:—

Age.	Cases of First Menstruation.
10	2
11	13
12	89
13	222
14	359
15	316
16	306
17	198
18	177
19	54
20	48
21	13
22	12

The causes of such variation are not surely recognized. In Germany, according to Meyer (six thousand observations), menstruation is earlier, 15.51 years, in the daughters of well-to-do parents; later, 16.50 years, among the poor; while it has been found that in cities the first menstruation occurs two to three months earlier than in the country. A much more important indication is afforded by the color of the hair, according to Pagliani: the lighter the color, the earlier the menstruation.

This conclusion rests only upon seventy-one observations by Dr. Bianco, of Turin. Since it is so important to decide this point by further research, Pagliani's table is here reproduced, to make comparisons easier:—

Year of the first Menstruation.	COLOR OF HAIR.		
	Blonde. No. of Cases.	Brown. ¹ No. of Cases.	Black. No. of Cases.
12	3	2	2
13	8	5	3
14	5	10	4
15	3	5	9
16	3	1	3
17-18	1	2	2

It is to be hoped that those physicians who have opportunity will make notes upon this point.

The season of the year also appears to have a marked influence. The first menstruation, according to one hundred and thirty-seven observations by Bianco, occurs in the spring in thirty-four per cent. of the cases, but the proportion is much larger (forty-five per cent.) in the country than in the city (twenty-three per cent.).

If these conclusions are all correct, then if a girl is brought up in the country, in easy circumstances, has blonde hair, and was born in the spring, she combines the circumstances favorable to early menstruation, and *vice versa*. The bearing of these facts on the course of growth will be considered directly.

Concerning the growth of the fetus the observations are few, and often unsatisfactory. Moleschott has

Age in Weeks.	Length in mm.	Weekly Increase.
2	2.2	
3	4.5	2.3
4	8.0	3.5
5	12.0	4.0
6	16.0	4.0
7	20.0	4.0
8	30.0	10.0

¹ Called "*castagni*" in the original.

calculated the following averages for the length, but his figures progress with great irregularity, as is shown in the table.

Even more irregular and unsatisfactory is Pagliani's table of fetal growth in length and weight from the second to tenth month. What little value these statistics might otherwise have is lost by the omission of the references to the original authorities, and also of the number of data from which each average is taken. According to the tables, the rate of growth is twenty times more rapid during the third month than during any subsequent one, and somewhat more rapid than during any previous period excepting the first and second week. Such a strange irregularity we necessarily suspect to be accidental, and until we have a large number of accurate data it cannot be considered fairly established.

Concerning the weight at birth there are of course very numerous statistics, referring especially to the weight. These Pagliani has compiled, but as he again omits the number of observations it is impossible to calculate the average. At the Hôpital de la Maternité in Paris the mean of twenty thousand observations, not divided according to sex, was 3.06 kilogrammes. According to various observers the male children are born one tenth to one twelfth heavier than the female. During the first two days the child *loses* about one sixteenth of its initial weight if nursed by the mother, but if fed from a bottle the loss continues five days or more, and amounts to ten per cent.

According to Banchaud, the child increases from 3.250 kilogrammes at birth to 8.950 at the end of thirteen months, but during that whole period the rate of growth rapidly diminishes. Thus, during the second month the increase is 750 grammes, but during the thirteenth 200 grammes only.

For the period which now intervenes before the fourth year of age there are recorded only the few unsatisfactory data of Quetelet and Zeising.² Pagliani gives the averages of his observations for three or four years, but as he omits to state how many measurements have served to determine those averages, though from the context it is evident the measurements were few, we must place less confidence in his figures than in those of Quetelet, whom Pagliani severely criticises for his imperfect method. For the period from five years to twenty the very extensive data collected by Dr. H. P. Bowditch in Boston are by far the most valuable we have. Dr. Bowditch was the first to establish the correct curve of growth, and to point out Quetelet's error. His results were confirmed by the synchronous and independent investigation of Pagliani, they both finding that the period of most rapid growth immediately precedes puberty. They differed, however, in that Bowditch found girls to grow fastest during the eleventh and twelfth years, Pagliani during the twelfth and thirteenth. This discrepancy Pagliani now explains by a difference in the age of puberty, which he assumes to arrive earlier in Boston than in Turin. He found that when the first menstruation takes place the rate of growth suddenly diminishes, the most rapid growth being prepubertal. He bases this conclusion upon observations by Dr. Bianco on thirty-nine girls, extending over five years, a small number of data, but all confirmatory, as is shown by the following table:—

² Zeising neue Lehre von den Verhältnissen der menschlichen Gestalt, etc. Leipzig, 1854.

No. of Obs.	Year of First Menstruation.	Annual Increment of Stature in Millimetres at the Age of						
		10	11	12	13	14	15	16
4	12	66	98	31	30			
12	13		63	60	36	29	14	
11	14		48	71	66	35	34	3
12	15			52	58	142	29	7

It must be noted, however, that though the growth in stature falls off very rapidly in the menstrual year the growth in weight diminishes much less, a fact which is undoubtedly the result of the rounding out of the figure at that period.

Dr. Pagliani also studied the development of the thorax by measuring the circumference of the thorax in the male and the biacromial diameter in the female. He further studied the development of the muscular force (but strangely omits to state what means he employed to measure it), and finally the capacity of the lungs. I reproduce his general table, which gives a summary of his various results:—

GROWTH OF BOYS. ANNUAL INCREMENTS.

Age (years).	Weight (kilos.).	Stature (cm.).	Circumf. Thorax.	Capacity Thorax.	Muscular Force.
7-8	1.3	5.7		165	6
8-9	1.7	5.6		235	10
9-10	2.4	2.5	0.91	250	11
10-11	1.8	3.0	0.47	205	10
11-12	2.7	4.3	0.97	260	11
12-13	3.7	5.9	3.72	145	9
13-14	3.6	5.8	1.50	115	10
14-15	5.2	6.5	3.90	330	14
15-16	5.4	6.1	3.35	210	8
16-17	5.5	2.0	2.85	480	6
17-18	1.3	0.8	0.53	60	4
18-19	1.2	0.8	0.85	50	6

GROWTH OF GIRLS. ANNUAL INCREMENTS.

Age (Years).	Weight (kilos.).	Stature (cm.).	Biacromial Diameter (cm.).	Capacity Thorax (cc.).	Muscular Force (kilos.).
7-8	1.3	6.4	1.8	250	3
8-9	2.9	5.2	0.8	195	7
9-10	2.8	6.5	2.5	200	7
10-11	2.2	4.2	0.7	140	4
11-12	2.6	5.2	1.0	115	8
12-13	5.0	5.9	0.9	180	8
13-14	4.0	7.0	3.7	200	8
14-15	4.3	3.0	0.0	200	5
15-16	1.9	1.4		40	2
16-17	1.8	1.0		80	1
17-18	1.1	0.0		25	

An inspection of these tables shows how greatly and in what respects these various measures of growth differ among themselves and in the two sexes, matters into which Pagliani enters at some length.

The relation of growth to the circumstances of life is a subject of very recent scientific study, for the vague opinions formerly upheld, and even now sometimes repeated, are valueless. It is now established statistically that poverty, accompanied as it is by hard and incessant labor and insufficient nourishment, greatly impedes growth, but it exerts only a slight if any influence on the size of the new-born child; during childhood the difference between the child of well-to-do and of poor parents constantly increases, though according to Pagliani the poor girls lose at first more than the poor boys; in both sexes, however, the difference ultimately becomes nearly the same, the poor children weighing about eighty per cent. of the weight of well-to-do children of the same age and sex. Pagliani

points out that in his tables the difference is greatest at the time of puberty, but his figures are based on too few observations for it to be safe to draw that conclusion. The same untoward effects of poverty are shown by the growth in height, in the capacity of the lungs, and in muscular force.

The influence of the circumstances of life is well shown in a comparison of girls of the upper Italian classes educated at an institute in the country near Turin with charity girls in a most unfortunately constructed building in the midst of the city. At fifteen years the country-bred girls averaged 45.6 kilogrammes in weight, the charity girls 37.1, or eighty one per cent. of the former. The difference in stature was, however, less.

Sufficient and regular exercise does a great deal to assist growth. A certain number of boys in the schools of Turin are annually selected on account of their gymnastic aptitude, and are given three extra lessons in gymnastics per week. Ninety-four of these boys were measured before and after three months of this drill, and it was found that the average increase in the capacity of the lungs was two hundred and twenty-eight cc., the average annual increase for other boys of the same age being two hundred and twenty cc. The lungs of the boys who exercised enlarged *more in three months* than those of other boys in a whole year. The same phenomena are shown by the increase in muscular power.

Wretling found in Göteborg that going to school impeded growth, for he discovered that the children grew much more rapidly during vacation than during school-time. There were three months' vacation, nine months' schooling, so that if the growth was constant then the children would grow one third as much during vacation as during term-time; but this was nowise the case. Indeed, at fifteen the increase was actually more during the vacation than during all the rest of the year. The following table shows these facts:—

GROWTH OF BOYS. WRETTLING.

Age.	No. of Observations.	INCREMENT; WEIGHT IN KILOS.	
		Three Months' Vacation.	Nine Months' School.
7	121	1.19	3.77
8	239	1.69	3.86
9	368	2.01	4.07
10	452	2.52	4.50
11	499	2.73	5.81
12	483	3.57	7.29
13	506	4.93	5.95
14	487	4.67	7.13
15	299	4.61	4.08
16	159	3.25	3.58
17	34	3.21	1.00
	2647		

Even when the influences unfavorable to development have acted several years, if the child is placed in better circumstances its growth takes a start. This is shown by a charitable farming school, the pupils of which, taken from the lower classes of Turin, were examined by Pagliani. At the school they were well fed, and worked out-of-doors a good deal. When the boys enter the school their *physique* begins to improve. During the first year the increase of weight is most prominent, but the greatest rate of growth in stature does not take place until the third year, while the most rapid increase in the circumference of the thorax, the capacity of the lungs, and muscular force falls in the second year after entering the school.

Finally, the course of growth varies according to

race, but unfortunately the want of statistics prevents the drawing of any definite conclusions concerning the factor of race.

It is much to be regretted that Dr. Pagliani's interesting and valuable memoir is seriously marred by his unaccountable and inexcusable neglect in not giving the number of observations from which many of his averages are compiled, so that his figures cannot be added to, or even properly compared with, those of other observers. He also omits to give references to many of his authorities, rendering it impossible to verify his citations. Who, for instance, would look for "*Chadwick (Boston)*" as an authority for the period of menstruation under Bowditch, except he were already familiar with Dr. Bowditch's article on the growth of children?

RECENT PROGRESS IN THE TREATMENT OF DISEASES OF CHILDREN.

BY D. H. HAYDEN, M. D.

ATTACK OF COLD (DU COUP DE FROID).¹

THE subject was suggested by the rigorous temperature to which the population of Paris was exposed the previous winter, and the resulting noxious influences upon young infants. When the cause of a disease is given as *having taken cold (un refroidissement)* this ætiology is not always accepted without discussion. "How," exclaims the mother, "can my child have taken cold! Before taking it out I had it warmly wrapped up; and when it was in the carriage all the windows were closed." At other times they will declare, what is perfectly true, that the child has not been out of the house for several days, and that it has been in one room, thoroughly warmed, all the time. One should never be affected by arguments of this sort.

A child under six or seven years of age cannot endure a long walk without injury when the temperature is low. It becomes quickly tired, and is then very sensitive to the action of cold, which strikes it immediately on stopping or when it passes abruptly from a sheltered spot to a street swept by a cold wind.

In the interior of the apartment the causes of catching cold are still more difficult to avoid; and the accidents resulting therefrom are more frequent.

In a young child the skin is but slightly sensitive and incompletely educated to outside influences, and consequently but little vigilant. It gives warning very tardily and in an imperfect manner of dangers threatening. For in rooms the most shut up there are produced, inevitably, draughts, and these are the stronger the larger the fire in the grate; so that if a room where there is a fire is heated by itself, and is explored carefully, it will be found to be traversed by a certain number of waves of cold air, which converge from various orifices towards the chimney. The direction of these currents of air is very variable. They are formed more often in the lower regions, having their origin in the spaces between the doors and the floor. Little children, which pass of their own accord a part of the day playing on the floor, are very much exposed to these draughts.

The time of greatest danger for a child is on entering the house, after having been playing and running out-of-

doors. When he is warm and often perspiring, his outside garments are removed, and he remains in a room insufficiently heated, and quiet from the fatigue of his play. His temperature becomes necessarily lowered in a rapid manner, and a liability to catch cold is established. The same dangers exist for infants at the breast. On going out they are clothed with robes, gaiters, and veils, and finally over these is a cloak, which of itself would suffice to protect them from the severest cold. Thus wrapped up they rest for two or three hours in their nurses' arms, who supply in addition heat from their own body. Their faces are nearly always red and covered with moisture. On returning to the house they are placed asleep on their cradle having previously had their outside garments removed. There ensues a notable and rapid fall of temperature, the effects of which are often manifested very quickly. These sometimes show themselves shortly after such exposure and with great intensity; sometimes, on the contrary, they appear more tardily and with much less severity. To illustrate the first class: An infant between two and six years old, which has been out during the day, and which has afterwards taken its meals and had a sleep, without the slightest indication of having taken any cold while out, wakes suddenly towards eleven at night, anxious and frightened. It has a croupy cough; the countenance is animated, the neck swollen, the skin warm and covered with perspiration, the pulse frequent. In one word, it has an assemblage of symptoms which characterize stridulous laryngitis. That it has during the day taken cold is indubitable. Another infant, younger, at the breast, in the evening of a day when it has been out, after having slept peaceably wakes, in a state of uneasiness, as shown in its face. It is pale; its eyes look excavated; one would think that it was going to fall into a condition of syncope; its mouth is opened, as if nauseated; every position is uncomfortable to it, and it moans continually. It finally vomits abundantly, appears relieved, goes off to sleep, and often all is terminated by a few diarrhœic stools. But at other times the face becomes red, the skin very hot; the pulse beats with frequency, and it begins to cough; and at the end of a time of variable length all the signs of a bronchopneumonia are demonstrable. In these cases the intervention of a *coup de froid* cannot be questioned. In cases where the results of a cold appear more tardily and in a manner less blustering, it is not until the next day that the first symptoms make their appearance. These vary. The fever is the most constant symptom; at other times there is a loss of appetite, or a cough, which attracts the attention. Very quickly the situation emphasizes itself, and the localization of the trouble becomes apparent. With some it is a "herpetic or pultaceous angina." With others a nasal discharge, redness of the eyes, sneezing, and a frequent cough leave no doubt as to the nature of the trouble. Often the Eustachian tube and middle ear become inflamed, and there can follow a painful abscess in the latter region. Finally, in certain cases, it is the intestines that are affected, as it is easy to see by the colic and diarrhœa.

These are far from being all the pathological consequences of a *coup de froid*, but they are the most frequent. They can come singly or more or less associated together; and as they hold a prominent position in the pathology of infancy they should be always borne in mind, and an exploration made to put one in the way of their discovery. For example, after care-

¹ Lecture delivered by Professor M. Parrot at the Clinique of the Hospice des Enfants assistés. Progrès médical, March 13, 1880.