most unsuspected element, what other surprises may hide in equally common things? The twitching of a dead frog's leg a hundred years ago started a train of discoveries in electricity that have revolutionized the world. But Galvani was not the first anatomist who used the frog as illustrative material. Science knows no ultimate limits beyond which she may not go. The mountains of Colorado are not yet exhausted of their precious metals, nor has nature yet thrown up her hands as a signal that she no longer resists the uncovering of all her treasure.

I bear to you the congratulations of the Mother of State Universities, and the wish that this institution may be an intellectual light attracting the youths of Colorado, and a glory to this great Commonwealth.

Henry S. Carhart.
University of Michigan.

THE GROWTH OF FIRST-BORN CHILDREN.

During the year 1892 I made arrangements for a series of measurements of school children, one of the objects of which was the determination of any existing difference between the growth of first-born and later-born children. The measurements were taken in Toronto, under the direction of Dr. A. F. Chamberlain, and in Oakland, Cal., through the kindness of Professor Earl Barnes. The following table contains the results of the observations taken in Oakland.

The columns named 'Differences' gives the amount to be added to the average stature and weight in order to obtain the statures and weights of first-born and later-born children. The figures printed in parenthesis designate the numbers of individuals measured.

Statures of Boys in Millimeters.

Ages. Years.	Average Stature.	Differences Between Average Stature and Stature of First Born Children.	Second Born Children.	Third Born Children.	Fourth Born Children.	Later Born Children.
6.5	1137 (145)	+ 7 (30)	+ 7 (39)	−13 (25)	− 2 (16)	− 5 (33)
7.5	1180 (197)	+11 (49)	− 4 (42)	+13 (31)	± 0 (24)	−10 (46)
8.5	1249 (234)	− 3 (57)	− 7 (54)	− 1 (32)	−18 (25)	−21 (61)
9.5	1283 (220)	+ 2 (57)	− 2 (47)	+ 5 (38)	+ 5 (23)	+ 1 (46)
10.5	1334 (243)	± 0 (66)	+33 (49)	−18 (41)	−15 (35)	− 8 (47)
11.5	1379 (208)	− 1 (58)	+ 1 (39)	+16 (32)	−13 (27)	− 1 (45)
12.5	1426 (230)	+20 (66)	− 1 (47)	− 4 (38)	− 5 (36)	−19 (41)
13.5	1482 (184)	+16 (54)	+10 (43)	+16 (28)	−31 (26)	−25 (30)
14.5	1556 (163)	+11 (46)	−19 (40)	+ 4 (27)	± 0 (25)	+ 8 (24)
15.5	1632 (118)	+ 6 (35)	+ 8 (29)	−18 (22)	−14 (15)	+ 4 (17)
16.5	1668 (116)	−19 (29)	+17 (30)	+21 (18)	−20 (13)	± 0 (25)
Average Differences.		+4.5	+4.0	+1.9	−7.9	−6.9

Statures of Girls in Millimeters.

Ages. Years.	Average Stature.	Difference Between Average Stature and Stature of First Born Children.	Second Born Children.	Third Born Children.	Fourth Born Children.	Later Born Children.
6.5	1125 (113)	+11 (32)	± 0 (28)	− 9 (15)	−16 (10)	− 1 (28)
7.5	1175 (199)	+ 8 (49)	− 1 (40)	+ 3 (44)	− 4 (24)	−11 (42)
8.5	1226 (221)	+14 (52)	−11 (46)	− 9 (43)	+13 (19)	− 4 (61)
9.5	1277 (252)	− 4 (65)	− 3 (57)	+14 (47)	−17 (21)	+ 5 (50)
10.5	1335 (224)	+ 7 (59)	− 2 (46)	+15 (28)	− 6 (26)	−11 (59)
11.5	1389 (226)	+12 (52)	+10 (41)	− 3 (32)	+ 3 (34)	−14 (61)
12.5	1450 (283)	+ 3 (65)	+14 (56)	− 1 (55)	+ 7 (40)	+ 8 (67)
13.5	1516 (222)	− 3 (62)	+ 9 (48)	−19 (38)	+ 6 (29)	+ 9 (45)
14.5	1566 (241)	+ 9 (61)	± 0 (68)	− 8 (38)	−17 (23)	− 1 (49)
15.5	1577 (170)	− 2 (42)	+11 (36)	− 6 (32)	− 1 (19)	− 5 (41)
16.5	1597 (127)	+15 (30)	−38 (28)	− 3 (23)	− 1 (14)	−18 (32)
17.5	1597 (99)	+10 (30)	−21 (19)	− 8 (19)	± 0 (15)	+14 (16)
18 & older	1602 (82)	+12 (27)	− 5 (20)	−25 (10)	−10 (9)	− 1 (16)
Average Differences.		+7.1	−2.8	−4.5	−3.3	−2.3

WEIGHTS OF BOYS IN POUNDS.

Ages. Years.	Average Weight.	Difference Between Average Weight and Weights of				
		First Born Children.	Second Born Children.	Third Born Children.	Fourth Born Children.	Later Born Children
6.5	47.7 (147)	−0.3 (28)	+0.7 (38)	+0.1 (26)	−0.1 (18)	−0.5 (35)
7.5	51.7 (191)	+1.1 (48)	−0.6 (42)	+0.1 (32)	−1.0 (21)	±0.0 (44)
8.5	57.3 (229)	−0.3 (58)	+0.2 (52)	+0.5 (32)	+0.7 (26)	−0.6 (57)
9.5	62.2 (212)	−0.4 (57)	+0.1 (45)	−0.2 (36)	−0.2 (22)	−0.1 (43)
10.5	69.0 (235)	−1.6 (64)	+5.4 (47)	−2.1 (39)	−1.4 (36)	−0.1 (44)
11.5	74.8 (206)	+1.0 (58)	−0.9 (38)	+1.2 (33)	−0.9 (27)	−0.3 (44)
12.5	81.6 (224)	+2.1 (64)	+1.2 (46)	−0.4 (37)	−2.6 (34)	−1.8 (41)
13.5	89.1 (185)	+2.0 (50)	+2.3 (46)	+4.1 (28)	−8.9 (32)	−2.5 (32)
14.5	105.1 (160)	+1.6 (47)	−0.7 (38)	−0.2 (26)	−1.4 (23)	+0.5 (25)
15.5	119.5 (114)	+3.0 (33)	−1.7 (27)	+0.1 (21)	+0.8 (15)	+1.8 (17)
Average Differences.		+0.82	+0.60	+0.32	−1.58	−0.44

WEIGHTS OF GIRLS IN POUNDS.

Ages. Years.	Average Weight.	Difference Between Average Weight and Weights of				
		First Born Children.	Second Born Children.	Third Born Children.	Fourth Born Children.	Later Born Children.
6.5	45.7 (123)	±0.0 (31)	+0.9 (30)	−1.0 (15)	−1.2 (10)	+0.4 (32)
7.5	49.6 (186)	−0.1 (45)	+0.6 (37)	−0.1 (42)	−0.5 (23)	+0.1 (39)
8.5	55.7 (217)	+0.6 (50)	+0.3 (45)	−1.1 (42)	+0.8 (21)	±0.0 (59)
9.5	60.0 (242)	−1.5 (64)	+0.3 (57)	+2.1 (48)	−3.1 (22)	+1.0 (46)
10.5	66.8 (221)	+0.4 (57)	−0.8 (45)	−1.8 (28)	+2.5 (25)	−1.0 (60)
11.5	74.3 (222)	+2.1 (50)	−1.2 (41)	+0.4 (31)	+0.7 (32)	−1.2 (62)
12.5	84.2 (280)	+1.2 (67)	+2.6 (56)	−3.2 (54)	−0.4 (39)	−0.2 (64)
13.5	94.2 (220)	−0.9 (62)	+3.9 (47)	−2.6 (37)	+0.3 (29)	−1.2 (45)
14.5	105.8 (235)	+0.4 (60)	+1.3 (64)	−4.2 (35)	−1.4 (25)	+1.7 (49)
15.5	110.7 (165)	+0.1 (41)	+0.1 (32)	−3.5 (33)	+2.4 (19)	+1.2 (40)
16.5	116.5 (124)	+7.9 (29)	−1.5 (27)	−3.9 (22)	−7.5 (14)	−0.1 (32)
17.5	117.4 (99)	+1.9 (30)	−0.5 (18)	−3.2 (19)	+4.1 (15)	−1.2 (16)
18 & older	118.3 (82)	+2.4 (27)	+0.4 (20)	−0.1 (10)	−6.0 (9)	−1.1 (16)
Average Differences.		+1.12	+0.48	−1.71	−0.72	−0.12

It appears from these four tables that first-born children exceed later-born children in stature as well as in weight; that this difference prevails from the sixth year until the adult state in females, and from the sixth year to the fifteenth in males. The material is not sufficiently extensive to show if the same is true of the adult males. Although the difference is not large, it occurs with such regularity that there can be no doubt as to the reality of the phenomenon. The available material is not very extensive, and the subdivision into five classes makes each class so small that the existing irregularities are not surprising. A preliminary investigation of the Toronto material is entirely in accord with the results derived from the Oakland material, the difference in favor of the first-born being, if anything, more marked.

We are, therefore, justified in grouping the measurements into two classes: first-born individuals and later-born individuals. This increases the difference of stature of the two groups to 10 mm. in girls, to 7 mm. in boys, and the differences of weight to 1.6 pounds in girls and to 1.2 pounds in boys. The tables seem to indicate that second-born children exceed somewhat later-born children in stature and weight, but the material is not sufficiently extensive to allow us to make a safe deduction on this question.

It would seem likely that the greater

vigor of the mother at the time of birth of the first child and the greater care bestowed upon the first child during its early childhood may be the cause of the phenomenon. The cares of the increasing household tend to weaken the mother and to decrease the amount of motherly attention devoted to later-born children. It is remarkable that the relation of size existing at the time of birth should be reversed in later life; it having been shown that the weight and length of new-born infants increases from the first-born to the later-born children.*

A comparison between the above table and others shows that the children of Oakland exceed those of all other cities of the United States in which measurements have been made, in height as well as in weight.

Franz Boas.

Washington, D. C.

CURRENT NOTES ON ANTHROPOLOGY (V.).

SUBDIVISIONS OF THE STONE AGE.

Those students who make use of Mortillet's excellent manual 'Le Préhistorique Antiquité de l'Homme,' now a little out of date, will be glad to learn the subdivisions of prehistoric time as taught this winter in his courses at the École d' Anthropologie, of Paris.

He divides the Stone Age into three 'periods,' covering six 'epochs.' The oldest is the eolithic, beginning with the 'Thenaysienne,' referring to the rather doubtful flints from the station of Thenay. Above this is the 'Puycournienne,' based on the finds at Puy-Courny. The palæolithic epochs remain the same as given in his manual, to wit: beginning with the oldest, the Chelleenne, the Acheuleenne, the Moustérienne, the Solutréenne and the Magdalenienne. Then follow two epochs which fill in the 'hiatus' which he formerly taught existed between the palæolithic and neolithic periods. They are the Tourassienne and the Compignyenne, referring to stations on the upper Garonne and the lower Seine. These bring us to the Robenhausienne, of Zurich, and so on.

The changes indicated are significant. I have before referred to those of similar character in the scheme of M. Salmon (see Science, p. 254). A leading question has been whether we can trace the oldest historic population of Europe in an uninterrupted culture-development back to the rough stone age (*pace*, Messrs. McGuire & Co.). This would seem now to be the case; and this carries with it the increased probability that the cradle of the Aryan or Indo-Germanic peoples was in western Europe.

THE ORIGIN OF LANGUAGE.

Some years ago the Society of Anthropology of Paris passed a resolution to reject all papers written to show the origin of language; believing that all discusssions of that subject are fruitless and time-wasting. One has but to look over the historical sketch of the hypotheses advanced, written recently by Professor Steinthal under the title 'Die Ursprung der Sprache,' to become convinced how much nonsense has been poured out concerning this theme. Among others, he represents a full analysis of the theories of Ludwig Noiré, showing at once their acuteness and the vicious circle of reasoning, arriving nowhere, in which the author involves himself.

Nevertheless, Noiré has found admirers in this country, and the Open Court Publishing Company of Chicago has printed a pamphlet of 57 pages, 'On the Origin of Language and the Logos Theory, by Ludwig Noiré." It will be found an excellent presentation of his views for those who wish to learn them.

There is but one scientific method of approaching this problem, and that is not the *a priori* style adopted by most writers, but

* H. Fasbender in Ztschr. für Geburtshülfe und Gynäkologie, Vol. III., p. 286. Stuttgart, 1878.