A Case of Microcephaly. By D. W. Dennis.

The subject of this sketch is Edward Basse. He is an inmate of the Institution for Feeble-Minded Children at Fort Wayne, Ind. He was born July 13th, 1883, in Germany. His father died at the age of 49. His mother lives at Garrett, DeKalb County, Ind. He is the sixth child of a family of eight children. Of these six are said to be well formed. One other, Mary, who died at the same institution at the age of fourteen, in 1895, was microcephalic. His parents were second cousins. The following table gives the size of the cranial portion of his head in comparison with nine other microcephals reported by Carl Vogt in 1866:

	Age.	Greatest Length of Skull.	Greatest Width of Skull.	Height from Meatus Auditorius Externus.	Circumference.	Cubic Contents.
Louis Racke (skull at Eichburg)	20	140	122	93	480	622
Gottfried Maehre (skull at Halle)	44	150	112	98	400	555
Conrad Schüttelndreyer (skull at Goettingen)	31	137	117	74	404	370
Edward Basse	14	133.5	110	86	390	?
Michael Sohn	20	131	100	75	370	370
Jena (skull at Goettingen)	26	127	98	75	365	358
Marguerita Maehler (skull at Wurtzburg)	33	125	105	70	361	296
Frederick Sohn (skeleton at Berlin)	18	122	100	78	360	460
Jean Moegle (skull at Tübingen)	15	113	96	75	350	395

It will be seen by the table that Basse ranks fourth in the list by three of his measurements and third by one. His measures are all very close to those of Michael Sohn and Conrad Schuttelndreyer, whose skull-contents were 370 c. c. The measurements taken on Sohn and Schuttelndreyer were taken from the skull, however, while the measurements of Basse were taken from the living head covered with thick and not closely cut hair.

Several factors not represented by maximum measurements affect the cubic contents of the skull: the shape of the floor, the amount of surface for which maximum thickness stands, the thickness of the bones, etc. The second of these factors is against the size of Basse's cranial capacity being large, for the maximum is in the region just over the ear, while the frontal and post-parietal and occipital lobes fall rapidly off. I do not think his cranial capacity can be more than 400 c. c. The normal capacity of a

child of his age should be 1,350 c. c.; that is, the real capacity is to what it should be as 8 to 27. Thirteen anthropoid apes measured by various observers had an average capacity of 450 c. c. The capacity of Basse's skull, then, is distinctly less than that of many anthropoid apes.

The second anatomical peculiarity to which attention is called is that his head is not in equipoise. The distance from his chin to his throat is as great as my own, namely, 55 mm. The line from his occipital protuberance to his inter-scapular vertebræ is almost a straight line; that is, there is almost no backward projection of his head from his neck. From his meatus auditorius externus to his eyebrows is 80 mm., to the back of his head from same place is but 54 mm.; while in a normal boy measured, the first distance was 88 mm., and the last 94 mm.; that is, in Basse the meatus is 26 mm. nearer the back than the front of his head, when in a normal boy it is 6 mm. nearer the front than the back. The weight of his large face in front is unbalanced by any backward extension of the head. The command which he hears oftenest is "stand up straight, Eddie;" but his anatomy will forever forbid his obeying for long at a time. His forehead recedes in the center 19.7 mm. for a height of 42 mm.; while just over the outer portions it recedes more rapidly still. The greatest transverse diameter of the skull is just over the ear in the postero-frontal and antera-parietal region; forward of this manifest ridge which reaches from ear to ear, the frontal portion of the cranium lessens rapidly. Back of this ridge there is a depression more marked on the right side than the left, which has a depth of about 6 mm., while back of the ridge which forms the posterior border of this depression the skull again narrows very rapidly. The application for his admission to the institution has the clause. "Face of good size, forehead recedes and back of head very small."

His features, including the form of his head, are so monkey-like that it astonishes, if it does not shock, everyone who sees him for the first time. The boys call him "the little monkey face," and when I asked him, at the suggestion of his attendant, "Where is the little monkey face?" he at once pointed to his own face. Once when Santa Claus was distributing presents, a toy monkey was among them; some one asked a little boy who articulates poorly, what it was, and he, after vainly trying to say monkey, pointed to Basse.

There is not in his face a trace of the meaningless vacuity or idiocy which one always notes in the features of the feeble-minded. He has the satisfied, the benevolent, the sleepy, the lazy or sometimes the animated

look of the mastiff or the monkey. He is a general pet among the boys, as an animal would be; they can calculate on him; a given treatment to produce a given result; they understand him often better than the attendants do.

He cannot speak a single word; he utters two articular grunts which are slightly modified by lip action; one sounds more nearly like "boo" than anything else; his teacher of speech thinks this means "boy," but the director of his division is equally certain that it means "baby." His tongue, teeth and vocal organs are not at fault at all; the trouble is cerebral.

He hears well and understands simple directions, but he is generally at a loss unless the direction is accompanied by gesticulation. Prof. Von Jagemann's trained mastiff "Bob" had, I think, as large an ear vocabulary and he obeyed with much less hesitation.

Basse's eyesight is good, and he depends largely on it, watches keenly the lips of anyone speaking to him. His transcendant power is imitation; it is the one thing in which he is at home. He will repeat any number of simple things done before him. In an athletic bout (at least in a good-natured one) he meets a stroke with a similar stroke. He will throw kisses if they are first thrown to him. To try him with something new, I adjusted my nose glasses and then handed them to him; he adjusted them to his nose, without the least hesitation, manipulating them exactly as I had done. When I held up one finger he held up one; when I held up two he held up two; this was as far as he could go. He tried several minutes to hold up three, but he could not succeed. While these simple operations were going on, he took all the interest of a specialist in his own hobby. As a retriever will bring back for the hundredth time a stick from the pond with unabated satisfaction, so his pleasure in doing over and over again the same thing never reached a climax; his only condition precedent to perfect happiness seemed to be understanding on his part and continued interest on mine. He has learned to sew buttons on by imitation; but once when the attendant was not there to give him another button he continued sewing without getting a button, although a box full was at hand. So far as I could learn or see, he is incapable of doing work that requires intellectual variation, or that offers alternatives. He can dress himself, but if he happens to button consecutive buttons in alternate holes he cannot (or at least, he could not in one instance) rectify the mistake. His attendant, at my request, asked him to dance; instead of obeying, however, he offered her his hands. She tried every way to persuade him to dance

alone; he was evidently not accustomed to solos. He danced with his attendant. In dancing or walking his gait is unique, characterless; he drags his feet or even puts his toes down first.

What, now, is the meaning of Basse's case? Two theories offer themselves. One is that intra-uterine disease of which we can not or at least do not know the cause, produced this malformation or deformity precisely as a child is sometimes born with an undeveloped arm. Hydrocephalus, it is said, is a disease; so also is microcephalus, and beyond this it is both meaningless and causeless except as disease has a meaning and a cause.

A theory for the cause of the disease, so called, of microcephaly, charges it to early ossifying sutures; the following table, taken from Vogt and Montane, shows that this can not always be the case:

	Racke.	Maehre.	F. Sohn.	M. Sohn.	Schüttelndreyer.	Jena.	Maehler.	Moegle.	Jean.	Jacques.	Gall, No. 79.	Dumoutier, No. 1.	Dumoutier, No. 2.	Patix.	Gall, No. 190.	Dumoutier, No. 3.
Suture, coronal	....	....	....	....	....	....	....	....	....	....	.....	....	.....	....	....	....
Suture, sagittal	....	A	A	A	A	....	....	....	....	....	A	....	A	....	....	....
Suture, lambdoidal	....	....	....	....	....	....	....	....	....	....	.....	....	.....	....	....	....
Suture, squamose	....	....	....	A left	....	A	....	....	....	....	A on left.	....	A on left.	....	....	....
Suture, basilar	A	A	A	A	A	A	A	....	....	....	.....	A	A	A	....	....

NOTE.—This table shows the state of the sutures in sixteen cases. A means suture ossified. Five are children under fifteen years of age, and none of the sutures of these are ankylosed; and of the remaining eleven none are ankylosed that would not ordinarily be in normal skulls.

A cure founded upon this theory has been tried, generally, at least, without success. The sutures are opened to give the brain room to grow, but it refuses to grow, and the tendency in re-ossification is to diminish instead of increase the cavity.

Eddie Basse is not sick, as the hydrocephalic patients are. He is healthy, hearty, comfortable, perfectly satisfied with the world as he finds it, and perfectly incapable of conceiving that the order of things might be otherwise. In nothing that has been said is it claimed that there are not microcephalics who are sick, or whose malformation has not been caused by sickness; it is simply maintained that Basse is not. The other

theory supposes that microcephaly is atavistic. Atavism does not require that some abnormal organ like supernumerary nipples shall be grown; it equally applies to the suppression of growth in any particular organ, provided that this suppression has left its subject in the normal condition of some adult ancestor.

It is the common property of all students of embryology, that the developing human brain passes through a stage when it has no brain mantel whatever; that is, no cerebrum; and that when the cerebrum begins to grow as diverticula from the fore-brain, its growth is forward, upward and backward until it has covered successively the fore-brain, mid-brain and hind-brain completely. During this backward growth the cerebrum gains also greatly in height and in complexity in many ways, but especially with reference to convolutions. It is equally well known that these successive stages of the growing human brain are represented by the adult stages of the brains of mammals. Now by this theory Basse's brain has been arrested in its development at an anthropoid stage. He cannot speak because his speech centers have not been developed. He cannot reason because his brain stopped in its development before it reached the human stage. This negative statement of the case is not all, however. His power of imitation far transcends that of normal or weak-minded children; that is, he has not stopped in his development merely at somewhat the level of the ape, but he has developed until it is more than human the physiological trait that has given the ape his name, imitation. It is admitted that a rudimentary tail is atavistic; that additional ears on the side of the neck (relicts of the gill-slits that point back to an ancestry that is aquatic) are; but to admit these things and deny a similar significance to Basse's lack of brain and abnormally quickened imitative powers, and his other accompanying animal traits, is like asserting that the chief characteristic of man is lack of tail instead of brain capacity and power of thought.

Everyone has seen cases of atavism which point back to father and grandfather; and it is said that in the most ancient families of Europe, that have in their possession paintings of their ancestors for many generations back, evidence of atavism often appears in children and is a thing to be proud of. But can it point back for thousands or even for millions of generations, if there are so many? Among animals and plants it can, and assent is universal. I have had a lemon brought to school with a perfect sector of the rind a bright green, when all the rest was the

usual lemon yellow. The meaning was not far to seek: this part of the rind is reverting back to its ancestor the leaf; the green sector is atavistic. Atavism can also be geological, as Vogt points out; the millionth colt is born with the three toes of the hipparion; but the horse is recent and the hipparion is tertiary.

Atavism explains Basse's case in every particular: his small cranial cavity, his lack of speech, his great imitative powers, his ambling gait, his unbalanced head, his unabated interest in the hundredth repetition of the simplest act, his inability to think.

His sister, Mary Basse, was more animal-like from all reports than he. She had to be waited on as a child, her frame was much more stooped, and she always walked with bent limbs. A detailed study of her skeleton would be of the highest scientific value. But I have not as yet been able to obtain it.

The Relation of Geography to Natural Science and to Education.

By Chas. R. Dryer.

[Abstract.]

Geography is a subject which has points of contact with the whole range of natural science from physics to anthropology. It has intimate relations with a large portion of the work done by the State Department of Geology and Natural Resources, and by the Academy of Science. It is the only natural science which is taught in all the schools of the State. Its presence in the school curriculum furnishes a line of least resistance along which scientific nature study may be introduced into schools of all grades. The personal interest and attention of every member of the Academy was invited to the opportunity here offered for the promotion of scientific education and for the improvement of geographic teaching.