

THE SPEECH OF MONKEYS.

As our acquaintance with nature grows more intimate, some nameless force attracts us into closer terms of fellowship with all living creatures; the slender threads of vital synthesis unite into a net-work of consanguinity; the voice of generic antipathy becomes a feeble echo, and that great Sahara, spreading its waste across the plain of life, is dotted with oases of vital unities. The conditions of life in a great city are such that all intercourse with nature in her normal mood is cut off. Hence, to one thus reared, all animated nature is only a huge pantomime. But to one who has lived among the denizens of the field and forest life cannot be a mere panorama of dissolving views.

Have you ever travelled alone, through a strange, wild country? If so, you must have observed how your horse became attached to you, and how the feeling of attachment grew upon yourself until you felt a pleasure in his dumb society; even yet, perhaps, there is a thrill of pleasure when you recall the journey. The cavalry soldier who has spent the lonely hours of midnight on the outpost, watching the camp-fires of the enemy on the distant hills, and the lone courier daring the storm and having in charge, perhaps, the fate of an army—they can tell you what an honest love this is, although it is born of a sense of mutual dependence, which is only realized when relieved of the complex conditions of life in populous communities. Such have been my experiences, and on such occasions I have often wished that I could talk with my horse, and he seemed to reciprocate my desire to converse with him; indeed, we did in some way seem to exchange thoughts and understand each other. This is one of the many tributaries which, flowing into the current of my life's dream, have drifted me into the harbor of the "simian tongue," which is one of the bays along the coast of the great sea of speech. As my friendship with the simian race ripens into intimacy, I cannot but wonder all the more why man has so long remained a stranger to this kindred type of speech. I do not mean kindred in the sense of grammatical affinity or structural unity, but kindred in phonation and holophrasis. Surely the

intellect of man is equal to the task of translating the sounds and signs of those inferior forms of speech, no matter how remote may be their degree of kinship.

Why should it be regarded as strange that monkeys talk? Do they not enjoy the senses and faculties of man in all things else? Then, why should speech be the one faculty withheld from them? They experience pain and pleasure, to express which they cry or laugh, just as man does. They see, hear, love, hate, think, and act by the same means and to the same end as man. If the voluntary sounds they make do not mean anything, why may those creatures not as well be dumb? If they do mean anything, let us determine what the meaning is. It is true their language is quite meagre, and adapted only to a low plane of life, but it may be the cytula from which all human speech proceeds, or it may be at least the inferior fruit borne upon the same great tree of speech.

In a former article I mentioned the name of Pedro, the little capuchin in the Washington collection, and stated that I had taken a fine record of him. We are still the best of friends, and when he sees me he screams and begs for me until I go to him, when he kisses me with all the affection of a child, and caresses me in a most devoted manner; he even cries for me, and shows every sign of an attachment which seems to have sprung from a sense of gratitude. He begs so hard for me not to leave him that I really regret to part from him when I have to do so. The record I have made of him is unusually good and gives me a great display of sounds. I held him in my hand while making the record, and placed the tube quite near his lips while he was talking. I study this record with special care and pleasure, because I know that it was addressed to me in person; and feeling that the little monk was talking so earnestly to me, trying to make me understand him, I am the more anxious to learn just what he really said to me.

A short time ago I borrowed from a dealer in Washington a little capuchin called Puck, and had him sent to my apartments, where I have a phonograph. I placed his cage in front of the horn which I had adjusted to the machine on which I had placed the record of my little friend Pedro. I concealed myself in an adjoining room, where I could watch the conduct of my subject through a small hole in the door, about one-eighth of an inch in diameter. I had a string attached to the lever of the machine, and drawn taut through a similar aperture in the door, so that I could start the machine at any desired mo-

ment, and at the same time avoid attracting the attention of the monkey either by my presence or by allowing him to see anything move. After a time, when everything was quiet, I set the machine to work and treated him to a phonographic recital by little Pedro, whose chatter was distinctly delivered through the horn to Puck, and from his actions it was evident that he recognized it as the voice of one of his tribe. He looked at the horn in surprise, spoke a sound or two to it, glanced around the room, and again uttered a couple of sounds, as he retired from the horn, apparently somewhat afraid. Again the horn delivered some exclamations in a pure capuchin dialect, which Puck seemed to regard as sounds of much importance. He cautiously advanced and made a feeble response; but a quick, sharp sound from the horn seemed to startle him, and, failing to find any trace of a monkey, he seemed to regard the horn with some suspicion and scarcely ventured to answer any sound it made. When I had finished the record I entered the room again. This seemed to afford him some relief.

A little later I adjusted my apparatus for another trial, and at this time I also hung a small mirror, about seven inches square, just above the mouth of the horn. Then retiring again from the room I left him to examine his surroundings, when he soon discovered the new monkey in the glass, and began to caress and chatter to it. After a while I started the phonograph; and when the horn again delivered its simian speech, it seemed to disconcert and perplex Puck. He would look into the glass and then into the horn; he would then retire with a feeble grunt and a kind of inquisitive grin, showing his little white teeth, and acting as though he did not know whether to regard it as a joke or treat it as a grim and scientific fact. His voice and actions were exactly like those of a child declaring with its voice that it is not afraid, and betraying fear in every act, and finally blending its feelings into a genuine cry.

Again Puck would consult the mirror; but it was evident that he did not believe the monkey which he saw there was the one that was doing the talking. He repeatedly put his mouth up to the glass as if caressing it, and at the same time showed a grave suspicion and some concern about the one he heard in the horn, and tried to keep away from it as much as possible. This was a source of some surprise to me, as the sounds contained in the record were all uttered in a mood of anxious, earnest entreaty, which, to me, seemed to contain no sound of anger, warning, or alarm, and which in a collective and general way I had interpreted as a kind of love scene; but it must have been a gen-

eral complaint against those monkeys in that other cage, who had made life a burden to little Pedro. One thing was evident, and that is that Puck interpreted the actions of the monkey he saw in the glass in one way, and the sounds he heard from the horn in quite another.

Of course I do not think their language is capable of shading sentences into narrative or giving detail in a complaint, for I have never found anything as yet among them which could justify one in attributing to them so high a type of speech; but in the terms of general grievance, it may have conveyed to Puck the idea of a monkey in deep distress, which he may have wished to avoid. I do think, however, that their present form of speech is developed far above a mere series of grunts and groans, and that some species among them have a much more copious and expressive speech than others do, and some have higher phonic types than others do. I feel almost assured of having traced some slight inflections which modify the values of the phones. I find that some monkeys do not make some of these inflections at all; in others they differ slightly; while in some few cases, long and constant contact seems to have unified their dialects in some degree, very much the same as like causes blend and unify the dialects of human speech. I have found one instance where a capuchin acquired two sounds which strictly belonged to the tongue of the white-face, and another instance in which a young white-face cebus acquired the capuchin sound for food. This latter case occurred within a month, and the monkey continued steadily to improve in its manner of uttering the word. As I regard this as a most remarkable feat, and attended by peculiar conditions, I will relate it in detail.

In the room where the monkeys are kept by a dealer in Washington there is a cage containing a young white-face cebus of rather more than average intelligence. On the same shelf and in an adjacent cage is the little capuchin Puck. They can easily see and hear each other through the open wire partition which separates them, there being no other obstruction. I visited Puck for many weeks almost daily, and always supplied him with food after requiring him to ask me for it in his own language. Having but little interest in the white-face, who was very shy of me, I rarely showed him the slightest attention until I observed him trying to utter the capuchin sound for food, which always secured for Puck a banana or some nuts. Seeing that Puck was always rewarded for uttering this sound, the little white-face began to try it, and as soon as I discovered his purpose I began to reward him in the same way, and I thus saw one step taken

by a monkey in the mastery of another tongue. At first his effort was quite poor and I could not at once decide what he meant; but practice soon developed in him great proficiency, and now he speaks it almost as plainly as the capuchin himself. This was doubly interesting to me, in view of the fact that I had long believed that no monkey ever acquired the sounds of another species. I frankly admit that this one instance is alone sufficient to cause me to recede from a conclusion rendered untenable by such certain proof, the cogency of which is emphasized by the short time in which it was accomplished; but I still regard it as a rule that monkeys do not do so.

While writing this article I have by me a little capuchin named Nellie. She is gentle, affectionate, and one of the most intelligent of her species that I ever have seen. As the special province of this paper is the speech of her race, I must forego telling some intensely funny things with which she entertains me, except in so far as they are relevant to speech. A frequent and welcome visitor to my study is a bright boy about six years old, for whom Nellie entertains an inordinate fondness, as she does also for my wife. At the sight of the boy Nellie goes into perfect raptures, and when he leaves her she calls for him so earnestly and pathetically that one cannot fail to pity her. On his return she laughs audibly and gives every sign of joy. She never tires of his company, nor gives any part of her attention to others when he is present. I must tell you how I first became acquainted with her. When she arrived at the dealer's, I was invited down to see her. After I introduced myself, she showed no inclination to be formal, and we were soon engaged in a chat about something to eat, the subject above all others that will interest a monkey. On my second visit she was like an old acquaintance, and we had a fine time, and on my third visit she allowed me to put my hands into the cage and handle her at pleasure. On my next visit I took her out of the cage and we had a real romp. This continued for some days, during which time she would answer me when I would use the words for food and drink. She grew quite fond of me and allowed me any liberty. About this time there came to Washington a little girl who was deaf, dumb, and blind; one of her greatest desires was to see a live monkey—that is, to see it with her fingers. She was accompanied by her teacher, who acted as her interpreter, and the dealer sent for me to come and show the girl the monkey, as I could handle her for the child. I took her from the cage, and when any one except myself would put hands on her she

would growl and show temper; but when I stroked the girl's hair and cheeks first with my own hands and then with the monkey's, she looked up at me inquisitively and uttered a soft, flute-like sound a few times, and then began to pull at the ears and cheeks of the child. In less time than a minute they seemed like old friends and playmates, and for nearly an hour they were a pleasure to each other, and it was with reluctance that they separated. The little simian acted as if she was conscious of the sad affliction of the child, and was at perfect ease with her, though she would decline the tenderest approach of others, and the child appeared not to know that monkeys could bite at all.

The following day, by an accident in which I really had no part except that of being present, Nellie became so frightened at me that my very presence would make her scream. It was mainly on this account that I had her removed to my apartments, where I have supplied her with bells and toys, and fed her on the fat of the land. So we are gradually knitting together again the broken bones of our friendship. I have taken some good records of her voice, and have succeeded in getting two sounds which are common to the species, which I never before succeeded in recording. I have several times elicited from her the negative sign, which I have recently discovered, and will explain below. I am now trying her taste for colors. I find that bright colors and polished metals generally attract her very much.

I have recently devised means for trying the skill of monkeys in numbers, and will soon announce the methods by which I am trying it and the result of my work. I am quite sure of being able to present some very interesting facts. Monkeys know singular from plural, much from little, and many from few; some of them count three, and show that they possess the simple rudiments of reason and method. Though I doubt if they have any ideas in an abstract form, I think that as the concrete must have preceded the abstract idea in the mind of man, there is no reason to ignore it as a step in the development of simian intelligence.

I have just succeeded in eliciting from Nellie the sound of "caution" or monition. I tied a long thread to a glove and placed it in a corner of the room at a distance of several feet from me, but without letting her see it. Holding the end of the string in my hand, I drew the glove obliquely across the room towards her cage. Her quick eye caught the first motion, and she began to warn me. Standing almost

on tiptoe, her mouth half open, she peeped cautiously, and then in a low whisper said "*egck*," and every few seconds repeated it, at the same time glancing at me to see whether I was aware of the approach of this goblin. Her actions were almost human, while her movements were as stealthy as those of a cat. As the glove came closer and closer, she was more and more demonstrative, and when at last she saw the monster climbing up the leg of my trousers, uttered the sound aloud, and tried to get to the enemy. Having done this a few times with about the same results each time, I relieved her fright and anxiety by letting her examine the glove, which she did with deep interest for a moment, and then turned away. I tried the same thing over and over again, but failed to elicit from her the slightest interest.

As long as the light is kept burning Nellie cannot be induced to retire, and although it is now two o'clock in the morning she is wide awake and playing with her toys. To avoid disturbing her rest, I drew heavy curtains around her cage, lapped them over, and pinned them down in front. I turned down the light and kept quiet to allow her to go to sleep. After a little while, I slowly turned up the light and resumed my writing. In an instant I heard the curtains rustle and saw her little brown eyes peeping out, while she parted the curtains with her little black hands. When she saw what it was causing all this, she chattered to me in her soft, rich tones, until I removed the curtains so that she could look around the room. To see her holding the curtains apart and talking to me suggested a real flirtation. Only those who have experienced these attachments can know how warm and sincere they become. When once you enjoy the confidence of monkeys, nothing can shake it but some act of your own, or one at least that they attribute to you. Their little ears are proof against gossip, and their tongues are free from it.

Among my many friends of the simian race, I must not forget to mention Dolly Varden, a large white-face who was intensely fond of me, and would laugh and play with me by the hour, but never uttered a sound. I do not know whether she was dumb or not, but I sometimes think she was. I never even heard her growl, though I have tried in many ways to induce her to talk. She would laugh in the most human-like way, except that her laughter was silent, and while it is not unusual for monkeys to laugh in that way, it is quite common for them to laugh aloud when very much amused.

I will describe some experiments with the phonograph by which I have been enabled to state with certainty that monkeys laugh aloud. It

has been said by some that this is not really laughter, but only a kind of good-natured growling. If this is correct, the same is true of human laughter, for I have converted each into the other, and have deceived the very elect of musicians and philologists. I simply take a record of a monkey laughing, while the cylinder is revolving at the highest rate of speed I can attain, and by reducing it to a very low rate I lengthen the sound-waves and lower the pitch to that of human laughter, and find them to be identical in all respects except volume. Then by taking a record of human laughter at a very low rate of speed and increasing it to a very high one, I simply shorten the sound-waves and raise the pitch to that of the monkey, and find that it is identical except in volume. In this manner I have analyzed the voice sounds of man and monkey, and have constructed some devices to imitate the voices of monkeys. By this means I am trying to determine the exact phonic elements contained in the sounds made by different species. To make it plainer, I will detail an experiment tried with the rhesus sound for food. I took a record of the sound on a cylinder revolving at the rate of two hundred revolutions a minute. Then I reduced the speed to fifty per minute, and at this rate reproduced the sound. It will be easily seen that this lengthened the sound-waves fourfold; so that if the original wave was a , the reproduction was equal to $4a$. By thus magnifying the wave, any variation of tension in the vocal cords could be easily detected, and the inflections thus produced could be followed with comparative ease. By this means I brought the sound within easy reach of the human voice, and with my own vocal organs imitated it to a cylinder revolving at fifty and reproduced it at two hundred revolutions per minute, by which I obtained an almost perfect imitation of the sound.

I must here take occasion to say that the difference of pitch, quality, etc., in sounds does not appear to me to depend alone upon the length of the sound-waves or over-tones, but there seems to be a difference of *ultimate form* and *mode of propagation*, which have much to do with the *contour* of the developed sound. These terms express vaguely an idea I have received from analyzing a great number and variety of sounds, which suggest to the mind various geometrical figures. In one case the fundamental sounds suggest an infinite number of eccentric arcs; in another, a sphere, with no fixed size or surface, but composed of countless concentric spirals; in another, an oblique, annulated cylinder, blended in all directions with vacuum. Others break into segments of ever-widening circles. One impression which

has fixed itself deeply in my mind is that all sound-waves, if made visible, would have the form of a convolute spiral. I have recently been aided by Prof. John B. De Motte in reducing these sounds to a visible condition with the phoneidoscope, and found some of them almost exactly as I had imagined them. The test is not crucial, however, and I am now preparing a new series of very novel experiments embracing many sounds of the human voice, of monkeys, birds, machines, and musical instruments, with the hope of ascertaining the real character of the fundamental sounds.

So far I must say that I have found no intrinsic difference between the vocal sounds of man and simian. Their voices differ in compass, pitch, and flexion, but not in their mode of propagation. In fact, I think if human speech were divested of the accretions of social culture and contact, it would not be so unlike the simian speech as popular belief regards it. Notwithstanding the countless centuries of phonetic growth and decay through which the human tongue has passed, there are still fragments of a primitive form of speech which cling to us through all vicissitudes. Many of our sounds are not expressed by the letters of our alphabet, and many of them are not reducible to any literal expression, except by a species of malpractice in which we flex and mar the protophones into a mould differing utterly from the vocal matrix in which they were created. As an example, let us take the sound which we very poorly represent by *umph-humph*, ending with a rising inflection and frequently accompanied by a nod of the head, and we find that this sound and sign are widely used to signify assent; while, on the other hand, the sound *umph-ugh*, ending with a falling inflection and usually accompanied by a shake of the head from side to side, seems to be almost a universal sign of negation or dissent. It is true that the sounds used by different tongues and races of man vary widely, but the signs are almost universal, and are almost, if not quite, the first definite expression used by infants. I have extended my search for these signs far beyond the limits of local inquiry, and up to the present time I have found only few exceptions among all the races of man, and those few exceptions are among Caucasians and chiefly in southern Europe. I have heard that among certain island tribes of Polynesia these signs are reversed, but I have been assured by two officers of the English navy and two of the United States navy who have visited the islands in question that such is not the case. Among the Indians, Mongolians, and Negroes I have found no noteworthy exceptions.

Now, my reason for stating these facts in detail is that I have found the same thing among the simian races. Some months ago I expressed the opinion that no simian dialect contained any negative term, except resentment. Since that time, however, I have found some facts which indicate that I was mistaken in that conclusion. A year ago, in Charleston, when the children who own the little capuchin Jack assured me that he would say *no* by shaking his head, I thought he had been trained to do so, and that the sign did not really signify to him anything at all. Several times the children said to him, "Jack, you must go to bed," at which he would invariably shake his little black head as if he really did not wish to comply. To believe that he understood the words was beyond the limits of my faith, although it was certain that a repetition elicited from him each time the same sign, which indicated that he recognized it as the same sentence, and gave it the same reply each time. I concluded that he had been taught this sign by one sound such as "bed"; but since that time, I find this sign used intuitively among them as a negative sign and generally accompanied by one or the other of two sounds, the one a soft, plaintive, piping sound, and the other a suppressed clucking sound. I have subjected this to many tests, and have met with uniform results. In this I believe I have found the *psycho-physical basis of expression*, and the fact of its being common to man and simian I regard as more than a mere coincidence. Seeking a source from which this sign may have originated, I have concluded that it arises from an effort to turn the head away from something *not* desired, and that it has gradually crystallized into an instinctive expression of negation or refusal; while the nod of approval or affirmation may have grown out of the instinctive lowering of the head as an act of submission or acquiescence, or from reaching the head forward to receive or procure something desired, or conjointly from these two causes.

A striking resemblance to human speech is found in the word which I have expressed by the formula *egck*, which is used by the capuchin as a warning of the approach of some person or thing which it fears or dislikes. I described this word some months ago, but its frequent use among this species emphasizes its importance. As the capuchin uses it, it seems to have a tincture of defiance, something like "beware!" and its equivalent in human speech is very nearly expressed by the sounds "ah-ah!" or "ughn-ughn!" uttered with a strong staccato effect, as is often used by man in warning or forbid-

ding, and especially in addressing young children. Since the discovery of the word for food in the rhesus tongue, I have made a good record of several sounds which I am now studying with the hope of translating them, but I have devoted most of my time to my favorite capuchins and am getting on quite well with them. I often go into the cage in Central Park, New York, and have a great romp with them, but McGinty, my devoted pet, gets so jealous of Micky that he sometimes pouts with me for an hour; and when I am playing with him, if I take Micky into the game, he goes away and will not play with us. Yet they are the best of friends at all other times. McGinty will always divide his food with me, and wants to put it in my mouth, while Micky is so selfish that he will not part with any of his even when he has more than he can eat. He will occasionally give me a piece of stale bread which no animal, however hungry, could eat.

Among the captives of the simian race who spend their lives in iron prisons merely to gratify the cruelty of man, I have many little friends who are devoted to me, as I am to them, and I must confess that I cannot discern in what intrinsic way the love they have for me differs from human love. I cannot see in what respect it is less divine than my own is. I cannot see in what respect the affections of a dog for a kind master essentially differ from those of a child for a parent, nor can I see in what respect the sense of fear for a cruel master differs from that in the child for a cruel parent. It is mere sentiment to ascribe those of the child to any higher source than the same passions in the dog. That dog could have loved or feared another master just as well; and filial love or fear would have reached out its tendrils just as promptly with all the ties of kindred blood removed. I cannot believe that there is any intrinsic difference. It has been said that one is able to assign a definite reason why, and that the other is a vague impulse. I cannot see in what respect the light of a lamp differs from that of a bonfire, except in volume. They are the products of the same forces of nature, acting through the same media, and, becoming causes, produce the same effects. That psychic spark which dimly glows in the animal bursts into a blaze of effulgence in man. The one differs from the other just as a single ray of sunlight differs from the glorious light of noon.

R. L. GARNER.

IS IOWA A DOUBTFUL STATE ?

THE State of Iowa has been looked upon as the Gibraltar of Republicanism in the North-west. Its adherence to the Republican party has been so unchanging that it rose to the dignity of an axiom. As a matter of fact, however, the State was not so strongly attached to the Republican party as it was popularly supposed to be, and it has gone Democratic. In 1880 the Republican vote was fifty-six per cent of the total vote cast; in 1884, fifty-two per cent; in 1888, fifty-two per cent; while in the election of 1891 it was only a fraction over forty-seven per cent. Many causes have contributed to the Republican losses in Iowa. Combined, they have aided the Democracy to win the State, when separately no one cause, with perhaps a single exception, was strong enough to effect such a result.

Iowa, like Ohio, is eminently a "hiving" State. Settled originally by emigrants from New England, the Middle States, Ohio, and Kentucky, the people have retained and developed the characteristic energy of the early settlers. The State attained in forty years a population of more than 2,000,000, and while making this great advancement, contributed more than any other State of the Union to the growth of Nebraska, the Dakotas, Montana, Oregon, Washington, California, Colorado, and the Territories. Upon all these States the impress of Iowa can be found in their laws, habits, and customs. This emigration accounts at once for a part of the Republican loss in Iowa and the great Republican majorities of the States above mentioned. It may be objected that it is assumed in the foregoing statement that only Republicans have left the State. This assumption is to a great degree true, for probably three-fourths or more of the emigration has been of Republican people. Heretofore about seventy per cent of the Democratic vote has been of foreign birth or of foreign parentage. These people, finding in Iowa the prosperity and homes they had not found in Europe, were content to stay in Iowa, while the restless and impatient Americans pushed farther westward. Citizens of Iowa of foreign birth or of recent foreign descent are content with a business yielding a comfortable living and are satisfied with farms of moderate