of the paper was concluded with a description of the kinds and methods of deception practised by a medium named Haxby.

Mrs. Sidgwick then went on to discuss the various causes of error. She did not believe that hallucination, i.e., perception without objective counterpart, which Von Hartmann suggests as the explanation of what is seen at *séances* of this kind, had occurred in her own experience; but illusion, meaning the misinterpretation of what is really perceived or the confusing of inference with observation, was very common. It was believed that this was often the case when friends and relations are recognized in the 'materialized' forms.

Moreover, in estimating evidence concerning *séances*, a wide margin must be left for conjuring of a more special kind, and also for mal-observation arising from other causes, such as the ignorance of the observer as to the precise phenomena and conditions to be expected. Mrs. Sidgwick said that two arguments against the reality of the physical phenomena of spiritualism gained in force every year: 1°, the absence of phenomena about which there could be no question as to conjuring raised; and, 2°, the fact that almost every medium who had been prominently before the public had been detected in fraud. Nevertheless, the writer felt that there was some evidence not to be neglected, and which made it a duty to seek for more; but she considered it a waste of time to seek it with professional mediums under the conditions imposed at present. It is probable that many of the conditions supposed to be necessary, and which complicate the investigations and increase their difficulty, are invented merely to facilitate trickery.

Mrs. Sidgwick's paper was candid and able, and dealt with evidence, not theories. It is one more example of the good work being done by the Society for psychical research in determining just what basis there is for the multitude of current beliefs concerning certain classes of psychical and semi-psychical phenomena. In this case the conclusions are negative — or, as was remarked in the discussion of the paper, positive — as to imposture.

THE EVOLUTION OF LANGUAGE.

THE present advanced condition of our knowledge of language reflects, as well perhaps as any other study, the advantages of the modern method of research. One marked feature of that method is the taking of a broad general point of view, from which almost any pertinent fact bears an interest and a meaning: it does not narrowly and pedantically say such and such is my domain; what is outside does not concern me. The condition of logic about one hundred years ago shows what happens when the latter position is taken. A second feature of modern methods of study is the importance assigned to the evolution of things: we want to know not only how things are, but quite as well how they came to be so; only then do we say we understand them.

Both these methods have been applied to language. Language is considered from a broad biological point of view as the means of communication between the same or different animal species. Human speech is but the highest stage of a special development of one form of such a means of communication. We shall see below how it is related to more lowly forms of making one's self understood. Not only its evolution, but its devolution, its loss and impairment in disease, have been wrought out. This has led to the formulation of an important law, which tells us that the latest acquired and best organized is the first to drop out. Moreover, it has sifted out the separate moments in the acquisition of speech, by a comparison of cases in which one special function is lost, while all others remain intact. Its anatomical seat in the brain is localized with as much exactness as that of other less complex faculties. The purely philological study of language is certainly flourishing, and is making its way back into the remotest antiquity, when it seems almost to touch hands with the prehistoric man of the anthropologists.

A recent writer in *Kosmos* (Dr. Carl Francke) has presented a very readable account of the relation of human speech to that of other animals. Any thing is regarded as a language which serves as a means of communication: the system of signals (probably by use of the antennae) by which ants tell each other of a precious find is perhaps the most rudimentary type of language. When we ascend to mammals and birds, which have lungs and use them as men do, we find that the sounds thus uttered are variously affected by emotional states, and soon serve to express the presence of such emotions. The dog barks with joy, howls with pain, and pleads by whining. In this tendency of psychic states to express themselves by vocal utterances, we have the origin of speech; for they become real speech-sounds as soon as other animals appreciate their meaning. The next great step is taken when an animal utters a cry for the purpose of calling its mate, not as a half-reflex expression of its own condition. Young birds probably have not reached this stage, but dogs certainly have. A dog will bark before a closed door till some one opens it. Some animals post sentinels, which give a definite cry of

warning in case of danger. The further argument for the possession of a language-sense by mammals and birds, at least, is that they readily learn to respond to a name given them. To what extent that sense can be cultivated is shown in Sir John Lubbock's dog, which brings out a card with 'o-u-t' on it when he wants to take a walk. The close sympathy between man and the higher mammals depends upon the fact that they can mutually understand one another, can distinguish the tones of pleasure and approval from those of pain and censure. How much more difficult is it to establish a similar bond between man and a reptile, for instance! for here the scope of mutual understanding is very limited. So far, what may be called an interjectional language, that is, one composed of sounds directly expressive of accompanying emotions, has alone been spoken of. The human infant, and probably primitive man, made much use of such a language. But our present language is an intellectual, a thought language, which in some way must have been developed from the former. Before touching this rather speculative question, it will be well to consider a form of language still current, but not expressed by sounds; namely, the gesture-language. This is both the simpler and the more natural. It is possible only in animals with easily movable limbs, especially in mammals, as witness the prancing of a dog, the exposing of the canines, the purring of a cat, or pawing of a horse. The ape has a special facility in this direction, and uses its facial muscles as a means of expression. We use the gesture-language in nodding, beckoning, threatening, and so on. This language, like the spoken, is acquired by the child, but much sooner than the latter: it reaches its highest development in the less cultured tribes, while the spoken language is seen in its highest phases among the most civilized; it is more general and uniform than any spoken language, and is capable of considerable development, as is shown in the training of the deaf and dumb. All these circumstances suggest that the gesture-language is a rudimentary one, which now is on the decline, but which has had a considerable development in the past. Combining this fact with the high development of this faculty in the ape (which has almost no sound-language), we seem to be tending to the conclusion that the creature from which man developed in one direction, and the apes in another, possessed both a sound and a gesture language; that in man the gesture-language was developed at first, but was then superseded by the spoken speech, beginning probably with an interjectional vocabulary, while in the apes the gesture-language alone was developed.

A still higher stage in the evolution of human language was made when the interjectional and the gesture languages fused, and formed a sound-gesture-language. One reason for this change was that the gestures appealed to the eye, whose limit of distinct vision is very circumscribed; while speech appeals to the ear, which can hear in all directions and at great distances. This may have been prompted, too, by another reason. When desiring to communicate in the gesture-language, one would first interject a cry to call attention to that desire, and then the message would be told in pantomime. Many tribes cannot fully express their meaning without accompanying gestures, and it is told of one tribe that its members cannot communicate in the dark. But certain sounds are in direct connection with gestures. When one wants to refer to the teeth, one would point to them with the tongue; the chief function of the teeth is eating, and the interjectional cry accompanying this gesture would be modified into the word for 'eating.' Evidently, then, dentals ought to be found in the words for 'eating' in various languages. Here are a few: Gothic, *itan;* Greek, *esthiein;* Latin, *edere;* Tartar, *atarga;* Mongolian, *edeku;* Chinese, *tsiáh.* Many words for 'teeth' contain these dentals: as, *dens* ('tooth'); Persian, *dendun;* and so on. The sound *l* in connection with tongue-gestures, the sound *st* in connection with words for keeping silence (i.e., sounds with the mouth as much closed as possible), and other similar cases, could be summed up. Another class of natural words, as has long been recognized, is due to imitation. We see how strong this imitative tendency is in apes, young children, and even certain species of birds. The names of animals are given by their characteristic sounds, cuckoos, etc. The buzzing of the bees, the whizzing of the wind, the murmuring brook, are other examples.

One further step must be taken to set language on its present developmental stage: the man who pictures unseen gods in woods and streams, who sees signs of their pleasure in the flight of birds or the direction of the wind, must further extend his creative imagination to form sounds that are to be connected with new things and new deeds. Here, then, would be great range for individual differences; and the beginning of the confusion that reigned at the Tower of Babel must probably be put back to the time when the interjectional and gesture languages were still in full vigor. Once started on such a course, it is not difficult to imagine that languages would multiply and become hopelessly different and strange to one another. This is the problem of the philologists.

A critic should be lenient when considering speculations of this nature. The picture is doubt-

lessly filled in with greater detail than the facts rigidly warrant, and colors and forms are restored when age has worn off almost all traces of their original appearance. Nevertheless, the suggestiveness of the general view is valuable, and, when a better interpretation of the facts comes to hand, the old one can be modified or discarded.

JOSEPH JASTROW.

DISTRIBUTION OF COLORS IN THE ANIMAL KINGDOM.

MR. L. CAMERANO has recently communicated the results of his investigations on the distribution of colors in the animal kingdom to the Academy of sciences at Turin. Colors, he says, in the frequency of their occurrence, range in the following order: brown, black, yellow, gray and white, red, green, blue, and violet, the last of which is the most rare. They are, however, variable for different groups of animal life. Among the vertebrates, black, brown, and gray are the most common; among the invertebrates, red and yellow; green occurs most frequently among the lower types — never, however, in mollusks; violet appears in all the groups; while white is distributed very irregularly, but most commonly among aquatic animals.

The colors of animals generally bear some relation to the medium or situation which they inhabit. Aquatic animals usually have the colors more uniform and less lively than do the terrestrial ones. Not seldom they exhibit a transparency, and, when of brilliant colors, they generally live among seaweed and other aquatic plants, very seldom on rocks or sandy bottom. Birds of quick and rapid flight are not generally bright-colored. Animals living in sandy or rocky places are less varied and less highly colored than those living in regions covered with vegetation. The author denies the assertion that there is a constant relation between animals and their food-habits. Carnivorous animals living among rich foliage and flowers are often brilliant and varied, while many fruit-eating species are modestly or obscurely colored. The more rich a group is in species, the more varied, in general, are its colors. Intensity of coloration is not in direct relation with the amount of light to which the animal is habitually exposed, but bears a more direct relation with the general development, being diminished by deficient nutrition or disease.

A dry climate renders colors more sombre, while a moist one makes them more lively or clearer. Altitude also exerts an influence upon colors: according to the author, in the higher regions the more brilliant forms are observed, but this view is hardly borne out by facts in the animal kingdom, though vegetation may perhaps conform to it. Species of the lower groups inhabiting islands are more often sombre in color than allied species from the continents. Different regions also modify in different ways the predominating colors. In the arctic regions, white, gray, black, and yellow predominate; in Ethiopia, yellow and brown; in India, the different shades of yellow; in the tropics, green and yellow; in Australia, sombre colors, and especially black. Throughout the animal kingdom, animals of large size are generally less varied, or more monotonous, in coloration, than smaller individuals of the same groups. In most animals the more brilliantly colored or spotted portions of the body are the most exposed ones: this is especially the case in insects.

A NEW ENGLISH DICTIONARY.

THE great English dictionary of the Philological society originated in suggestions made in 1857 by Dean (now Archbishop) Trench. Though a great mass of material was collected and many eminent men lent their aid to the undertaking, yet in consequence of the death of the first general editor, Mr. Herbert Coleridge, and other disturbing conditions, the work languished until the year 1878. At that time the directorship was assigned to Dr. Murray; and the delegates of the Clarendon press consented, under certain conditions, to bear the expense of printing and publishing the dictionary. Work was at once resumed with ardor. More than eight hundred volunteer readers undertook to collect additional quotations from specified books. In the United States the reading was in charge of Prof. F. A. March of Lafayette college, Easton, Penn., who has been indefatigable in his efforts to aid this great enterprise. In the course of three years a million additional quotations were furnished, making the total number about three million and a half, selected by about thirteen hundred readers from the works of more than five thousand authors of all periods. The general editor has been aided by a considerable number of sub-editors, and various specialists have furnished material in their respective departments. The apparatus, therefore, for the construction of this dictionary, is such as the world has never before seen. It is a combination of all the resources of the English-speaking world, conducted by the men who represent the broadest and most intelligent scientific knowledge.

The aim of the dictionary, the editor states, "is to furnish an adequate account of the meaning,

A new English dictionary on historical principles. Parts i. and ii. Ed. by JAMES A. H. MURRAY, LL.D. Oxford, *Clarendon pr.*, 1884, 1885. f°.