lated from outside the metal case. To avoid any ill effects that might be caused by differences in the internal and external pressure when the apparatus is sunk in deep water, a kind of balloon filled with air is connected with it. As the pressure increases, in descending, the balloon is compressed, extra air is thus forced into the box, and the pressure on its walls equalized. A stout foot to support the apparatus and weights to sink it complete it for practical purposes.

In water near the shore, not greatly exceeding one metre in depth, the apparatus can be conveniently fixed, without the operator needing to enter the water, and, by direct sunlight, good negatives can be obtained in ten minutes. When the water is deeper the operator must descend in diving costume to fix the case securely on its stand before commencing the actual work of photography. In calm, bright weather photographs can then be obtained by direct sunlight in from thirty to fifty minutes. Colored glasses, preferably blue, must be interposed between the objective and the water, in order to obtain sharp images.

By the use of artificial light to illuminate the surroundings, however, matters are still more simplified. To this end, M. Boutan has contrived a special magnesium lamp. A cask of two hundred litres capacity is filled with oxygen gas, and on its upper end is fixed a spirit lamp, which is covered by a bell glass. A vessel containing magnesium, in powder, is connected with this lamp in such a manner that the metal can be projected across the flame by the action of a rubber ball which serves as bellows. The oxygen gas, of course, is intended to assist combustion, and the lamp, having been lighted and covered by its protecting globe, the cask simply requires weighting to sink it.

Good instantaneous negatives have thus been obtained by M. Boutan during a violent storm, when no daylight could penetrate the depths. They are lacking, as regards background, but this he attributes to imperfections in the apparatus, particularly the objective. He also found it necessary to place before the lens a diaphragm of very small aperture to secure a sufficient degree of sharpness. If a formula were calculated for an objective, the front of which might be exposed to sea water, he thinks these drawbacks might be remedied.

As it is, he has proved that photographs can be taken in a brief time under water, in calm weather, by direct sunlight, at depths up to six or seven metres; whilst, by the use of his special lamp, they can be taken, instantaneously, at any depth that can be conveniently reached by a diver, and the state of the weather is of no importance.

THE SCIENTIFIC BASIS OF COMPOSITION.

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THE end of literary composition is effective communication. To this end there are necessary, first, something to communicate and, second, some means of communication. The only thing to be communicated is thought. The medium of communication is language. One cannot, then, expect to understand the philosophy of literary composition without investigating both the nature and the process of handling both thought and language.

Psychologists recognize three distinct kinds of thought, viz., the concept, the judgment and the argument. The concept, the simplest form of thought, may be defined as the act of mind by which we merely become aware of something. Objectively considered, the concept is indivisible and unrelated—a kind of intellectual atom. The simple judgment, a more complex form of thought than the concept, may be defined as the act of mind by which we apprehend an agreement or disagreement between two concepts. Objectively considered, the judgment is a complex unit, resolvable into its constituent parts—a kind of intellectual molecule.

The argument, the most complex form of thought, is commonly regarded as differing essentially from both the concept and the judgment. It is, however, in the last analysis, nothing else than a complex judgment. It may be defined as the act of mind by which we apprehend an agreement or a disagreement between two concepts, by apprehending an agreement or a disagreement between each of them and a third concept.

The relation of logic to composition is peculiar and quite likely to be misapprehended. The formation of judgments upon a subject must, of course, precede the communication of thought upon that subject. But the formation of judgments upon a subject is nothing else than the study of that subject; it is not composition. That process begins with the selection of judgments already formed; and it ends, so far as the handling of thought is concerned, with the arrangement of them according to a certain recognized principle.

At this point, then, the mind begins a new process. Ceasing, for the moment, to form judgments about the subject of the communication, it begins to form judgments about those judgments in order to the process of discourse. This may be defined as the selection and the arrangement of judgments with a view to the greatest mental effect in apprehending them.

Thus, while the formation of a set of judgments about the subject of the communication, and of another set of judgments about the first set, are both processes implied by the process of composition, neither of them is included in that process. Again, the mind, in the formation of judgments about its own judgments, in order to discourse, is subject to the laws of logic no less than it is in the formation of judgments about the subject of the communication. The relation of logic to composition is, therefore, seen to be both vital and complex.

But, while the mind in the formation of judgments about its own judgments, in order to discourse, is subject to the laws of logic, yet the principles according to which the selection and the arrangement of the judgments are made, are not principles of logic, but of dialectic. This may be defined as the science of effective thought, as logic is the science of correct thought.

So important are the selection and the arrangement of judgments in the effective handling of thought, that it has sometimes been said that what the judgment is to the concept, and what the argument is to the judgment, such is method to the argument; and that, consequently, a fourth division is necessary to complete the doctrine of logic. Both the premise and the conclusion of this statement are, however, untenable.

It is evident that method does not sustain the same relation to the argument that the argument does to the judgment and that the judgment does to the concept, first, because the argument does not sustain the same relation to the judgment that the judgment does to the concept; and, second, because method is of precisely as much importance in simple discourse, where there are no arguments at all, as it is in reasoning, where there is nothing except arguments.

The importance of method, instead of arising from some relation which it is supposed to sustain to the argument, depends entirely upon the principle of the economy of the recipient's attention. By selection, the waste of his energy in the formation of irrelevant or unimportant judgments is avoided. By arrangement, the greater susceptibility of his mind at certain points in the time-series of cognitions which he makes, and to certain sequences of judgments, is taken advantage of.

The process of expression, like that of thought, is conditioned by the physical and psychical nature of man. It is not necessary here to describe the different steps of direct imitation by gesture and cry, of designation from analogy, and finally of imitative and arbitrary graphic representation, by which it is agreed that language was brought to its present high state of efficiency as an instrument for the spoken and written expression of thought.

Those principles of expression that are common to all languages, such as the principles of general grammar and those of rhetoric, have their basis in the nature of the intellectual processes. The principles of general grammar are necessarily the complement of the principles of logic; as the principles of rhetoric are necessarily the complement of the principles of dialectic. The special grammars of particular languages are more arbitrary in their origins, and occupy a position intermediate between general grammar and such purely conventional devices of expression as spelling, punctuation and variation of letter-forms.

The nature of the outline as a process-instrument antecedent to the full thought and its complete expression is not sufficiently understood, even by those who avail themselves of its aid in composition. The utility of the outline is due to the fact that by it we are able to express and contemplate major thought-relations without giving attention to minor ones.

The use of a certain number of visible symbols must be helpful in the process of connected thought; for by thus enlisting the service of the sense of sight, the mind is enabled the more easily to occupy itself with the judgments it has already formed, and accurately to determine their mutual relations. On the other hand, for the same reason, that is, because the mind through the sense of sight is fixed upon them, a great number of words organized into propositions, become a hindrance to that subtle activity of the mind by which, from a chaotic mass of unassimilated elements, organism of living thought is developed.

In order, then, to the most effective thinking about thought, as a process necessarily involved in that of composition, there is requisite a system of symbols which, enabling the mind through the eye to take firm hold of the growing thought, are yet not so numerous or complicated as to hinder their own frequent readjustment, as the subject takes form in the mind. These requirements the ordinary form of the outline, with its brackets and catch-words, effectively supplies.

The cry that composition as it is taught in the schools is a failure is heard on every side. Why are our teachers not more successful in this really fascinating subject? Is it not because they are ignorant of, or indifferent to, the scientific basis of composition, as it has been set forth in this article? Certainly a great reform is called for in the way of far less attention, relatively, given to the trick of juggling with words, and more to the nature and handling of thought. Frightful as the names "logic" and "dialectic" undoubtedly are to the common run of teachers, the subjects they represent not only are harmless in themselves, but lie at the very foundation of effective communication.

THE INTERNATIONAL CONGRESS OF ANTHROPOLOGY.

The International Congress of Anthropology convened at Chicago, Monday, August 28th, and held daily morning and evening sessions during the entire week, closing Saturday, September 2d. All the meetings were well attended, and there was more than a full supply of excellent papers on various branches of anthropologic science, which frequently elicited animated discussion.

The session on Monday was opened by the address of the President of the Congress, Dr. Daniel G. Brinton, whose subject was "The Nation as an Element in Anthropology." It was intended to show the physical, mental, and social changes which take place when man passes from a consanguine or tribal condition of government to that which is national. This transition exerts a profound influence on the physical man through new laws of marriage and relationship, and on religion, ethics, jurisprudence and art through the extension of the intellectual horizon. The goal of such changes, the speaker predicted, will not be reached in nationalism, but in internationalism, and in the supremacy of the individual, as the only proper aim of government. The remainder of the day was taken up with the exhibition of trepanned skulls from ancient Peru, by Senor M. A. Muniz, and explanations of the anthropological laboratories of the Department of Ethnology at the Columbian Exposition, by Drs. Franz Boas, Joseph Jastrow, H. H. Donaldson and G. M. West. The latter offered a paper of great merit on the anthropometry of North American school children, and Dr. Boas one on the physical anthropology of North America, the result of very extended measurements.

Tuesday was devoted to Archæology, principally American. Mr. H. C. Mercer, however, exhibited an artificially flaked stone from the San Isidro gravels, near Madrid, Spain, exhumed by himself, and explained its probable palæolithic character. Professor G. H. Perkins read a resumé of archæological investigations in the Champlain Valley, and Professor Otis T. Mason described in a most interesting manner the mechanical resources invented and developed by the aboriginal toilers of the American continent. The anthropological work at the University of Michigan was sketched by Mr. Harlan J. Smith; Senor Emilio Montes entered a plea for the great antiquity of the civilization of Peru; and Dr. Carl Lumholtz, just back from his explorations among the cave-dwellers in the Sierra Madre of Chihuahua, described their condition and exhibited specimens of their industries. The paper which attracted most attention, however, was that of Mrs. Zelia Nuttall on the Mexican calendar system, in which she presented a highly ingenious theory for the solution of this obscure and famous problem, supporting it with lengthy computations and the opinion of competent astronomers. The afternoon was spent in discussing the collection of games in the anthropological building by Dr. Stewart Culin, Captain J. G. Bourke and Mr. Frank Cushing.

The session on Wednesday was devoted to ethnology. It was opened by a paper by the President, Dr. Daniel G. Brinton, on the alleged evidences of ancient contact between America and other continents, in which he categorically denied that any language, art, religion, myth, institution, symbol, or physical peculiarity of the American aborigines could be traced to a foreign source. Miss Alice C. Fletcher and Prof. J. C. Fillmore presented a joint study of native songs and music of great interest. Mr. Walter Hough exhibited and described bark cloth from various primitive tribes; Mr. G. A. Dorsey related a peculiar observance among the Quichua Indians of Peru; Mrs. French-Sheldon spoke of some curious customs noticed by her among the natives of East Africa; and the Rev. S. D. Peet presented a memoir on secret societies among the wild tribes. The afternoon was spent in discussing the anthropological collections in the U. S. Government Building, Professor O. T. Mason referring to an industrial exhibit based on linguistic stocks; Mr. W. H. Holmes offering a critical study of the development of flaked-stone implements; Mr. Frank Cushing giving the