in the coldest part of the United States. In summer, the lowest is in the lee of the Sierra Nevadas. It is rather surprising to learn that the July vapor pressures about Yuma-Arizona, in almost the hottest and driest part of the Arizona desert are as high as those about the cool Great Lakes. Nothing could emphasize more strongly the fact that we feel in terms of relative humidity rather than in terms of absolute humidity.

In all the humidity tables and maps of Mr. Day's contribution we see a complex weather element which depends on the two variables, temperature and moisture. Humidity maps are in this respect on a par with snowfall maps; but they are less complex than those of evaporation, in which wind enters as another factor.

CHARLES F. BROOKS

SPECIAL ARTICLES

LIMITS OF THE GENERA VANDELLIA AND URINOPHILUS

MY monograph on the Pygidiidæ was published September, 1918. I was not able to state the limits of the genus *Vandellia* nor to indicate the type of the genus *Urinophilus*. These minute fishes are found in the tropical lowlands of South America. They attach themselves to other animals and drink the blood. Some of them are said to enter the urethra of bathers, and being provided with erectile, retrorse spines on the opercles can not be withdrawn. If not excised they finally enter the bladder and cause death.

It was found during the preparation of the monograph that some of the species contain teeth on the mandibles, others not. It was not known whether the type specimen of the genus *Vandellia* contained mandibulary teeth or not. The specimens are in the Jardin des Plantes, Paris, and were not accessible during the war. Dr. J. Pellegrin has recently examined these specimens and reports that the types of *Vandellia cirrhosa* Cuv. & Val. and of *V. Wieneri* do not have mandibulary teeth and the name *Vandellia* may, therefore, be restricted to those species without mandibulary teeth, *cirrhosa, plazai, wieneri* and *hasemani*. The name *Urinophilus* becomes, thereby, restricted to the only known species with teeth on the tips of the mandibular rami, *Urinophilus sanguineus* (E.). The species *Urinophilus sanguineus* is known from one specimen, 62 mm. collected by Mr. Haseman at San Antonio de Rio Madeiro, Brazil. Its alimentary canal was gorged with blood.

The genera *Vandellia* and *Urinophilus* are members of the Pygidiidæ, a family of the Nematognathi, the cat-fish-like fishes. In most of these the maxillary is reduced to a rudiment forming the base of the chief barbel of the catfish. In *Urinophilus* and *Vandellia* the maxillary bone carries peculiar claw-like teeth. In the monograph mentioned above the tooth-bearing maxillary was labelled "premaxillary" in the explanation of Figs. 35 *A* and *B*, and in Fig. 37.

C. H. EIGENMANN

THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

SECTION H—ANTHROPOLOGY AND PSYCHOLOGY. II

Racial differences in mental fatigue: T. R. GARTH. An experiment was given to school children of three races—white, Indian and negro, involving a simple task which all could perform. The problem was to ascertain which race showed least falling away in a task of continuous performance. The young group worked for twenty-eight minutes and the older group for forty-two minutes. The Indians, as a group, excel the whites in endurance but not in total performance.

Supernormal memory: P. F. SWINDLE. Ordinarily, the term *hysteria* is a name applied to certain spectacular forms of behavior which arise quite suddenly and which consist of strong and very permanently associated responses. Such a form of behavior may be called a somnambulism, a fugue, a hysterical fit, or a special personality; and it is manifested only by those persons in whom associations are easily and at the same time quite permanently formed. If, in this sense, a person possesses an exceptionally good memory, a single unusual occurrence will probably suffice to establish in him a series of strong responses which will be manifested later as a somnambulism. It is profitable to speak of "big" somnambulisms and "little" somnambulisms, or spectacular somnambulisms and ordinary somnambulisms. Hysteria is

entirely a relative term. The terms *amnesia* and *dissociation of the personality,* which are so frequently used in speaking of hystericals, are misleading. Each of them should mean that if a person is occupied in one way, he is ordinarily not doing other things or thinking in other ways at that time. For example, only a few minutes ago I was occupied in thinking about a certain demonstration that a katydid can exert a force of at least thirty pounds with its ovipositor. While occupied in this way, I had complete amnesia for a dog I once owned; and at the time that I was thinking about my dog, I had complete amnesia for the experiment with the insect. My dog and the insect established in me two "little" somnambulisms; and I am never active in both ways at the same time. Likewise, a typical hysterical remembers his somnambulism only under the condition that he manifests it again; and when he the cases of typical hysteria which have come under my observation, many of the somnambulisms manifests it he has amnesia for other things. In or personalities were remarkably well associated. This circumstance makes it easy to produce artificially any of the existing states; and it is also responsible for the remarkable periodicity in the manifestations, by certain patients, of their established somnambulisms.

Definitions of mind offered by college students: C. R. Griffith. The purpose of this investigation was (*a*) to obtain a definite expression of the nature of the beliefs and prejudices about "mind" which are held by common-sense, and (*b*), to point out some of the antecedents of these notions. Definitions of "mind" obtained in a naïve manner from students at the University of Illinois are suggestive of the beliefs of popular opinion at large, and indicate, as well, the degree in which the laymen lags behind the trend of scientific thought. A tabulation of the definitions under appropriate categories discloses the fact that popular opinion engages in little or no critical reflection upon the matter. Conceptions of mind as a power, force, energy, guide or faculty are frequent, as are also conceptions confusing mind with the brain, the nervous system, or some internal organ. Less frequent notions make use of such terms as "soul," "spirit," "personality" or "storehouse." Most of the definitions are, in fact, plainly reminiscent of the days of magic and of worn-out philosophies and discarded theories. Moreover, they represent in an undisguised way the wishes and desires of the men who value them. Over the whole is a thin surfacing of modern science. The opinions, thus formed, are garbled in the telling, and betray, for the most part, a notable want in critical ability as well as a lack of substantial knowledge.

Organization of course of study in the elementary school: Helen T. Woolley.

Contributions of experimental psychology to the psychology of the elementary school branches: C. T. Gray.

Safety-first education in school: M. J. Mayo. The loss of life and property in the United States through avoidable accident has become well nigh a national reproach. There is a growing public sentiment against the continuance of this evil. Largely through the influence of the National Safety Council, industrial accidents have been materially reduced. This has been effected through two means: (1) the appliance of safety devices to machinery wherever possible; and (2) a campaign of safety education among workmen. What are known as public accidents, however, show no decline. In the home and on the streets and highways an increasing number of serious and fatal accidents occur. The toll among the school population is large. The teaching of accident prevention is now admittedly a school problem. No other kind of education can more completely justify itself. Public safety can be promoted through two means: (1) the elimination of all avoidable sources of danger; and (2) adequate safety education. Safety education consists of (1) a thorough knowledge of all common danger situations, (2) correct habits of behavior in their presence, and (3) high ideals and right attitudes in regard to safety. We must teach definitely under what circumstances explosives and poisons are dangerous, just how it is that accidental burns and falls occur, just what our habits of behavior on the streets should be. We must act consistently and habitually in accord with this knowledge. This behavior can be secured only through high ideals of the value of human life and limb and a positive attitude towards safety. Our ideals must be dynamic in character. Only, for instance, when we have created an active ideal among the boys—a sort of public sentiment—that condemns riding on the rear end of street cars as a piece of recklessness and stupidity, can this source of fatal accident be eliminated.

The distribution of grades in large lecture rooms: C. R. Griffith. The distribution according to seating arrangement of the grades of students registered in large lecture classes discloses a variation that can not be attributed to differences in

mental ability or in physical well-being. For example, the grades of students who sit at the periphery of a group are appreciably lower than those of students who sit in the center. Again, grades at the rear of a room show greater variation than do those at the front. In general, the grades obtained by a given student are dependent partially upon such factors as his mental ability and physical condition, but partially also upon his position with reference to the rest of the group to which he belongs. The disadvantages arising from an unfavorable position in the group can not be wholly attributed to the size of the lecture-rooms, or to idiosyncrasies of the speaker. It is overcome, in part, during the course of the semester, and it may also be offset by the addition of frequent small sectional meetings; it is increased by such factors as intervening aisles and by unoccupied seats. The disadvantage has been found incidentally to rest upon variations in certain perceptual and attentional factors and upon differences in the type of self-instruction under which the individual works; but essentially to rest upon the varying degrees of social integration which are always present among the members of an assembled group.

Speech and brain patterns: L. W. COLE. Association experiments with nonsense syllables indicate that verbal recalls are due to the presence of brain patterns in which each syllable is under the influence of one branch of the pattern. The interweaving of these patterns accounts for the continued suggestion by similarity of one idea by another, or, in other words, it gives a neural basis for association by similarity. It also gives a reason for verbal lapses of memory in which there is recall of part of one word with part of another when the word sought for is partially forgotten. The theory is merely an extension of Sherrington's conception of reflex patterns and it would replace with a definite meaning such vague terms as "mode" of impression, retention and recall, which are used by many writers for the lack of a more definite term. Finally the experiments with nonsense syllables show that rhythm is the most persistent and permanent element of a verbal impression.

A learning curve starting at approximately zero: E. K. STRONG, JR. A boy of 5 years has been given two minutes drill on addition combinations a day for 150 days. At the start he knew nothing of additions except that one and one made two and that one and two made three and that he could count orally to twenty-five. The learning curve obtained in this case does not follow the usual course but runs nearly parallel to the base line for many days and then rises with a positive acceleration. At the end of 158 days it had not suggested a change from positive to negative acceleration.

Methods of error elimination in a mental maze: T. PETERSON. The mental maze method attempts to study maze learning devoid of all the disturbing spatial factors characterizing the usual mazes. The experimenter has before him a picture of a circular maze, with the various parts lettered in a random order. Sitting behind a screen, he calls out to the subject pairs of letters representing bifurcations in the maze and the subject chooses without seeing the maze. Whether the correct letter is called first or last is a matter that is determined by chance. The subject is instructed to get to the goal with as few errors as possible, and is told the number of errors each time on reaching the goal, but he must find out for himself where the errors are. Subject is also timed. Results show backward elimination of errors of entrance to blinds, and relatively early elimination of return "runs," thus substantiating results obtained by the author on rats in different forms of mazes. The tendency to return to the starting place in the maze at first greatly exceeds that expected on the law of probability, but this tendency rapidly yields to that of keeping the forward direction. "Coefficients of learning" for the runs past the several blinds are worked out statistically, each coefficient representing the ratio of probable runs past to probable runs into the blind. These coefficients are found to increase toward the goal end of the maze, thus accounting for the backward elimination of errors; and the advantage for learning at the goal-end of the maze over the entrance-end is shown to be greater than in mazes with many than in those with few blinds. Moreover, this advantage is greater in the first trial than in subsequent trials by any subject; it decreases with successive trials, thus favoring more rapid learning in early trials. Statistical calculations as to the number of errors in each part of the maze on the expectations of chance laws, lead to the conclusion that, independently of the backward elimination tendency, learning progresses more rapidly, in proportion to exercise, in the first and in the last part of the maze than between the extremes.

The development and functioning of a concept in problem-solving: J. C. PETERSON. An objective study is made of the reactions of adults to a num-

ber of series of closely related novel problems. In the solution of successive problems of a series the essential common elements are gradually abstracted and associated with an appropriate symbol of some sort. There thus develops a general concept which functions increasingly in succeeding problems in directing observation and controlling re-formulation of hypotheses, until finally new problems are solved at sight or a general formula is given for all problems of the series. In the solution of successive *series* of problems further functioning and development of the concept occur, enabling the subject finally to generalize correctly in advance for new series of problems of the same type. The order of abstraction of essential situation-elements was found to follow closely the order of frequency of the subject's reactions to them. This is also the order of their temporal nearness to the goal or end of the trial. The recombination of essential elements in connection with appropriate symbols, and their association with effective responses, follow the same order though somewhat less closely. There was usually a high degree of transfer of the effects of learning from problem to problem and from series to series of problems. The median percentage of transfer from the first to the second series was almost invariably surpassed by subjects who required more than the median number of trials for the mastery of the first series. This high degree of transfer in the work of slow learners appears to have arisen from the greater strength of mechanical associations rather than from a deeper insight into the causal relations involved. However, the basic concept mentioned above appears to have been the principal medium of transfer. Yet it should not be forgotten that this concept functioned through specific associations which had become mechanized to a high degree largely through repetition.

Edward K. Strong, Jr.,
Secretary

GENERAL MEETING OF THE AMERICAN CHEMICAL SOCIETY

The 59th meeting of the American Chemical Society was held at St. Louis, Mo., April 12 to Friday, April 16, 1920. The council meeting was held on the 12th, a general meeting on April 13th, both in the morning and in the afternoon, divisional meetings all day Wednesday and Thursday morning, and excursions, Thursday afternoon and Friday. Full details of the meeting and program will be found in the May issue of the *Journal of Industrial and Engineering Chemistry*. The registration was slightly over one thousand, eight hundred and twenty-five enjoying the smoker.

General public addresses were given by Paul W. Brown, editor and publisher of "America at Work," on "The Physical Basis for the Economical Development of the Mississippi Valley," by Chas. H. Herty on "Victory and its Responsibilities." The chief public address was given in the assembly room at the Central High School on "Chemical Warfare" by Col. Amos A. Fries, director of the Chemical Warfare Service.

The following Divisions and Sections met: Agricultural and Food, Biological, Industrial Chemists and Chemical Engineers, Organic, Pharmaceutical, Physical and Inorganic, rubber, and water, Sewage and Sanitation Divisions and the Dye, Leather, and Sugar Sections. Further details of their meetings will be found in the May issue of the *Journal of Industrial and Engineering Chemistry*.

The banquet, held on Thursday evening, April 15, filled the large banquet hall of the Hotel Statler.

A general business meeting was held on Tuesday morning, at which resolutions published in the Council Proceedings, this issue, on the death of Professor Alfred Werner were read by Dr. Chas. H. Herty. Also, Ernest Solvay was unanimously elected an honorary member of the American Chemical Society.

Chas. L. Parsons,
Secretary

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