ever of loss to him. I might fall back on the faith that apparent loss will after all prove real gain. But so long as knowledge confessedly is incomplete, this would have to be faith, and not philosophic insight. Even if I came up against an ultimate difference of ideal I should not despair of finding solid reasons for my own side. But in that case, at any rate, I should have to admit a solution which was of the nature of a compromise, which came about at the expense, to some degree, of a real preference, and was, therefore, a reconciliation only partially complete.

A. K. ROGERS.

UNIVERSITY OF MISSOURI.

SOCIETIES

NEW YORK BRANCH OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION

THE New York Branch of the American Psychological Association held its final meeting for the current academic year on May 22, in conjunction with the Section of Psychology and Anthropology of the New York Academy of Sciences. An afternoon session was held at the Psychological Laboratory of Columbia University. After dinner at the Faculty Club the evening session was held at the American Museum of Natural History. The following abstracts are of the papers presented at the two sessions:

Group Differences in the Interests of Children: GERTRUDE MARY KUPER.

That interest plays a very important dynamic rôle in the educational field is only too evident from such treatises as Dr. Dewey's article, "Interest as Related to Will" and Dr. Montessori's "Pedagogia Scientifica." But interest is a general term and can not have an absolutely universal value for every individual or every subject of thought or desire. Individual interests are as important in the social world as are individual capacities. They should, therefore, be a fruitful field for scientific investigation. The experimental work done with advertisements has brought to light group differences in the preferences of men and women for various appeals. The investigation to be reported was of a like nature, except that it dealt with children.

The formal experiment consisted in asking an individual child to arrange nine pictures in the order in which he liked them best. The nine pictures were chosen to represent nine specific appeals: landscape, children, animals, religion, pathos, sentiment, patriotism, heroism, and action. (They were Cosmos prints and therefore of uniform size and finish.) In all, there were three series of these pictures, each parallel so far as possible with the other two in their appeals. The children numbered over 200, 10 girls and 10 boys for each year's age from 6.5 to 16.5. They were almost entirely attendants of the public schools of New York City and came from quite varied sections of the city.

The results were tabulated according to age differences, broad social distinctions, and nationality. In the last-named case the number of subjects was so limited (10 girls and 10 boys to each of the following nationalities: Irish, French, German, and Italian, and only 9 girls and 8 boys to the Spanish) that the results are not held as significant.

The positive data showed a sex difference in the order of preference for these several appeals. The girls' order was: (1) Religion, (2) patriotism, (3) children, (4) pathos, (5) animals, (6) sentiment, (7) landscape, (8) the heroic, (9) action. The last two were decidedly lowest in the scale and the first three were quite clearly highest for all ages; but the picture representing these nine curves was one of bewildering intersections as the values changed from year to year. The boys' order was: (1) Religion, (2) patriotism, (3) action, (4) the heroic, (5) pathos, (6) animals, (7) sentiment, (8) landscape, (9) children. The boys' chart representing the curves for these appeals showed greater agreement from year to year. Religion and patriotism, the heroic and action, and landscape and children kept rather parallel courses all along the age scale, and no very decided tendencies appeared with progressive age differences. Girls seemed to lose interest somewhat in pictures of children and animals and to take greater interest in the heroic and action pictures. The latter change is explained by the fact that, as the girls increased in school knowledge, they read an historical background into these more or less warlike scenes.

A great sex difference was found in the variability measures, as calculated for the various ages, appeals, social classes, and nationalities. In every case but two, the girls exceeded the boys in their P.E.; and in these two exceptions the boys' P.E. was once greater than the girls' by only 5 per cent., and another time exactly equal to the girls' P.E. The amount of sex difference was, as a rule, anywhere between 12 per cent. and 57 per cent. This held true in every scale, whether according to age, appeals, social class, or nationality. The girls' average P.E. was 1.66; that for the boys was 1.36.

Both girls and boys were least variable about the subjects they liked best, *i. e.*, religion and patriotism; but apart from these appeals there was no correlation of variability with relative likes or dislikes.

It is a noteworthy fact that in range of variability the boys far exceeded the girls. The limits for the boys' P.E. were .82 (patriotism) and 1.60 (landscape), giving a range of difference of 78 per cent.; the limits for the girls' were 1.47 (religion) and 1.95 (animals), showing a range of only 48 per cent. In this particular experiment this indicates that boys are very much more agreed about some likes than are girls, and yet quite as varied about others. In other experiments such a range of variability may point to greater individuality of the male sex among themselves while as a group they are relatively homogeneous.

Another sex difference noted was the number of positive dislikes expressed by each sex. The girls gave 161, or 6 per cent., dislikes as against the boys' 65, or 2.4 per cent. Boys seemed to entertain relative indifference toward the appeals at the bottom of the list. The things the girls disliked most were, (1) scenes of action suggesting death and (2) pictures showing angry attitudes. The reasons given by the boys for their dislikes were, (1) gloomy, indistinct scenes, (2) sentimental pictures, (3) costumes worn by men which were feminine in style or left the figure partly nude, and (4) pictures suggesting illness.

A certain age difference revealed itself in the remarks made by the children about the pictures. The seven and eight year olds showed limited powers of observation. Some detail, and, in landscape scenes, always the human detail, no matter how small, was made the focus of attention to the complete overlooking of the larger subject. Unfamiliar details when pointed out to them received as many different interpretations as there were children. As the children grew older their remarks were fuller; they made fewer mistakes in their interpretation of the pictures and they drew upon all their known sources for filling in their perceptions. At the ages between 11 and 13 the critical spirit made its first appearance among the girls. Only at fourteen did it occur in the boys' comments. At these ages the emotions prompted the remarks of both girls and boys. Emotional attitudes, actions, and even words were ascribed to the pictorial persons. At 15, the remarks became more laconic, but what was said was significant and definite as to the persons, place, and action of the picture. This age marked the first signs of hesitation in speaking of the pictures of sentiment. Up to the age of nine the remarks had been very naïve; after that the pictures were dismissed with the phrase, "they're lovers" or "a love picture"; often the characters were named Romeo and Juliet, Paul and Virginia, etc.

In all their comments the girls were far more personal than the boys. The personal pronoun and references to their individual experiences were the usual preface to their statements. With the boys it was quite otherwise; they discussed the picture as an objective thing, independent of their conscious existence. Boys tended to locate scenes in definite historical time and specific geographical places.

The effect of uncertainty about a picture, crudely averaged, was a displacement of about five places toward the lower end of the scale.

Practise in the Case of Children of School Age: THOMAS J. KIRBY.

This experiment was conducted to get some information concerning (1) the value of the practise experiment as a method for school work and (2) the value of practise periods of different lengths.

339 fourth year children belonging to 10 different classes took part in the practise, which consisted of adding columns, each of 10 numbers, 0's and 1's not included, as rapidly as was consistent with accuracy, each child competing with his own past record. Seven different sheets of columns of equal difficulty were used. (Thorndike's Addition Sheets.)

In every case there was one hour of practise, but for different classes this hour was broken into 22½-, 15-, and 6-minute periods, an initial 15-minute period and a final 15-minute period being given to form the basis for determining the gain per cent.

The hour's practise for the 339 children taken as one group resulted in an average gain of 55 per cent.; median gain of 48 per cent. In a similar test with 19 university students, Professor Thorndike found an average gain of 29 per cent., median 33 per cent., from about 53 minutes of practise, and said: "The amount of improvement in this experiment may also add to our confidence that the method of the practise experiments wherein one works at one's limit and competes with one's past record may well be made a regular feature in many school drills. Even if the same length of time produced in children a percentile improvement, only half as great as here, the gain would still probably be far greater than the gain by any of the customary forms of drill."

For the classes which took the hour's practise in 22½-minute periods, there was an average gain of 61 per cent., median 49 per cent.; in 15-minute periods, average gain 55 per cent., median 43 per cent.; in 6-minute periods, average gain 54 per cent., median 44 per cent.

The Age of Walking and Talking in Relation to General Intelligence: CYRUS D. MEAD.

I. *Data.*—50 "normal" children (25 boys and 25 girls), averaging less than six years of age, of graduate students of Teachers College and Columbia College. Ages were thrown to the nearest month.

Walking means: "To take a step unassisted." Talking means: "To use a word intelligently, *i. e.*, to associate the idea with the object."

Results.—The median "normal" child begins to walk at 13.5 months, with a probable error of 1.06 months. The chances are 999 to 1 that the true median will not differ from the median obtained by more than .66 month. The extreme range is from 11 to 30 months. 90 per cent. of the cases fall between 11 and 17 months. The median "normal" child begins to talk at 15.7 months, with a probable error of 2.83 months. The chances are 999 to 1 that the true median will not differ from the median obtained by more than 1.96 months. The extreme range is from 9 to 25 months. 90 per cent. of the cases fall between 10 and 21 months, with 18 months as the mode.

II. *Data.*—145 "schoolable" children (boys and girls) of the Indiana School for Feeble-minded Youth, in reply to the question on the personal descriptive entrance blanks: "At what age did the child commence to walk?" and 92 in reply to the question: "At what age did the child commence to talk?"

Results.—The median feeble-minded child begins to walk at 21.8 months, with a probable error of 7.56 months. The chances are 999 to 1 that the true median will not differ from the median obtained by more than 3 months. The extreme range is from 12 to 72 months. 90 per cent. of the cases fall between 13 and 50 months.

The median feeble-minded child begins to talk at 34.2 months, with a probable error of 12.6 months. The chances are 999 to 1 that the true median will not differ from the median obtained by more than 6.5 months. The extreme range is from 12 to 156 months (only one case going above 108 months). 90 per cent. of the cases fall between 14 and 84 months.

Sex Differences in Incidental Memory: G. C. MYERS.

A test was desired wherein the thing to be remembered should be merely incidental and where the focus of the subject's attention should be directed away from the facts to be called for after the exposure of the stimuli, but where these facts would have to enter, wholly or in part, into the experience of the subject. To this end a list of six simple words were used as stimuli. The subject was told that he would be given a spelling test and he was led to believe that it would be a real test in speed and accuracy of spelling.

A practise test with digits was given for three successive times before the real test began, to delude the subject as to the purpose of the experiment. A dozen or more digits were pronounced at random so rapidly that the subject could scarcely keep up in writing them. In the midst of this series of digits the experimenter, without any warning, gave the signal for the subject to turn the page upon which he was writing, and continued to pronounce digits at the same speed. The subject was told that the words would be given in the same manner, but not quite so rapidly. The following words were then pronounced: angel, pickle, dirt, busy, onion, women. The last word was pronounced in such a manner that another word was expected by the subject, but the signal, "turn," was given instead, and the subject was told to write as many of these words as he could remember, to place them in the order in which they had been given, and to indicate by a line the place for each omitted word. The time each individual required to reproduce the words was recorded by a stop-watch.

After testing over 100 individuals the writer applied the test to groups of college, normal-school, and public-school subjects. Aside from immediate reproduction, records were secured after various intervals, ranging from ½ hour to 3 months. In all such cases a practise test of rapid folding of papers was added. After the words were pronounced the papers were promptly collected and the experimenter left the room. The subjects thought the work was ended, but at various times the experimenter reappeared and asked for the reproduction. The time for all group reproduction was limited to 1½ minutes.

The best results were secured immediately after presenting the stimuli. Practically the same efficiency was shown for the reproduction after 6 hours as for that after ½ hour. But there was a decided fall after 7 days and a still greater fall after 3 months.

No appreciable difference was shown in efficiency between the lower grades and the college students for immediate reproduction; but after various intervals there was a gradual decrease in efficiency with age.

Of the 1,515 subjects, 757 females and 758 males, only 29 of the former and 18 of the latter reproduced the six words in exact order.

In all grades the females were markedly superior to the males, both for the number of words remembered and for order. They had a higher central tendency and were more variable than the males in the 5th, 6th, 7th, and 8th grades, while for the other groups the males were more variable.

108 other subjects were tested with 10 letters and digits. Here the girls answered more, but the boys were better for order.

The Effect of Distribution of Practise Upon Learning: ELMER A. CULLER.

The purpose of this experiment was twofold: to determine the effect of differently distributed practise series upon learning given material; and to make observations upon the learning process in general.

The material to be learnt was the path from the beginning to the end of the Hampton Court maze. The paper (8 by 6 inches) on which the maze was printed, was affixed to a board. Over it was placed a large circular piece of cardboard, easily movable, having in the center a small opening ($5/8$ to $11/16$ inch) through which extended a pencil to mark the course of the subject's movement. At no time could the subject see more of the maze than the part visible through the opening. At the beginning of the experiment the subject was thus instructed: Pencil is now at the entrance to the maze; keep on moving until you reach the end. Never cross a line; always keep to an open path. Mazes are all the same and will be placed in the same position.

At each trial the time was recorded and number of errors was counted and recorded. To each subject were given 12 trials. Subjects were divided into 6 groups as follows: 12 trials at one time, 6 on 2 successive days, 4 on 3 days, 3 on 4 days, 2 on 6 days and 1 on 12 days. There were 5 men in each group except the last, in which were 3. With regard to time of day, subjects were divided into two groups: one group each day for the required number of days, after lunch (1–2 P.M) : the second group each day after dinner (7–8 P.M). In comparing men of the two groups no account was taken of this slight difference, as it was considered practically negligible. Good light was uniformly provided. The interval between successive trials of a subject at the same sitting was 30–40 seconds.

Subjects were all graduate students, age from 22 to 28.

Three classes of errors appeared: Wrong choice between alternative courses, retracing when on right course, and (accidentally) crossing a line. The first kind are major errors (value 1) and the other two kinds minor (value $\frac{1}{2}$). These are arbitrary values for computing results. The major errors were counted as follows: There are 6 (or 7, depending upon the course taken) places where choice must be made between alternative paths of which only one is right. Each time the subject moved from one of these places in a wrong path, *i. e.,* away from the goal, it was counted one error. Errors of retracing when on the right path were usually small and due to defective attention or eyesight—subject either thought he had accidentally passed an opening and moved back to see, or on coming to a turn failed to notice the opening and thought he had run into a blind alley.

The results are as follows:

I. TABLE OF ABSOLUTE TIME AND ERROR VALUES ATTAINED IN EACH GROUP

(The different groups are indicated thus: One—12, etc.; the word indicates the number of trials each day, the figure the number of successive days. The two columns show the average of number of seconds consumed and number of errors made in the last three trials in each group; thus showing the relative standing of groups at end of practise period. The figures in parentheses show relative position.)

	Time, Per Cent.	Errors, Per Cent.
One—12	50 (3)	4.8 (4)
Two—6	61 (5)	5.2 (5)
Three—4	59 (4)	3.2 (3)
Four—3	39 (1)	.9 (1)
Six—2	75 (6)	5.5 (6)
Twelve—1	48 (2)	3.0 (2)

II. Table of Percentage Gains

(In each case the percentage represents the ratio between the average of first three trials and last three trials in the same group. This table is intended to show improvement of each group irrespective of absolute values attained.)

	Time, Per Cent.	Errors, Per Cent.
One—12	210.0 (4)	147.9 (5)
Two—6	253.0 (3)	161.5 (4)
Three—4	195.0 (6)	302.0 (1)
Four—3	341.0 (2)	218.5 (3)
Six—2	206.6 (5)	125.3 (6)
Twelve—1	368.7 (1)	236.6 (2)

(It must be said that the results of Six—2 were vitiated by the professed indifference of one subject, because of which both time and errors for the last few trials in that group are abnormally high.)

The results seem to point to the following conclusions: In general, outside the Six—2 group, the One—12 and Two—6 groups made the lowest absolute records and also least improvement; this apparently indicates that the learning period was too prolonged, with insufficient practise at any one time. On the other hand, the Twelve—1 and Four—3 groups show in general the highest absolute records and greatest improvement. Here the practise was more thorough each time and not so prolonged. The curve of greatest regularity is the Four—3 curve. The three groups, then, in which practise periods were longer and confined to a few days show better results than the three in which practise periods are shorter and prolonged over 4–12 days. The application to learning any material would seem to be that better results are secured by a few more prolonged or persistent periods of study repeated perhaps for several days than shorter periods prolonged over a greater number of days.

Some observations were made on individual methods of learning which can not be included here.

Experiment in the Catching of Pennies: E. S. REYNOLDS, J. T. GYGER, L. L. WINSLOW.

The experiment had two aims: (1) To investigate the learning process. (2) To find what transfer, from the right hand to the left hand, if any, would be shown.

Three subjects took part in the experiment which follows. It was carried on in two series: (1) That in which the subjects caught the pennies, two at a toss, palm of the hand down. (2) That in which they caught three. The first series was of 7 days' duration; the second, 10 days'. The time for tossing was from 1. P.M. to 2 P.M. on Mondays and Wednesdays. Conditions were as nearly constant as possible, the same room being used throughout the experiment. In the case of the two-penny series, the subjects caught for 10 trials and then rested for 10. In the three-penny series two subjects caught at the same time, the third subject resting. In the first case, score was kept by the two unemployed subjects in turn; in the second case, by the one unemployed subject.

Certain conditions influencing accuracy were noted, among which are the following: Some parts of the room were more conducive to accurate catching than others, that nearest the window being the most favorable. The pennies could be caught with most accuracy if no objects were in front of the subject to distract his attention. The tossing, when carried on before a blank, light-colored wall, was most successful. An increase in confidence and in accuracy resulted when a window was opened to admit new air. An interruption, as that caused by another person entering the room, was followed by a corresponding fall in score. The subject, by counting to himself his successful tosses, was stimulated to a better score. The nervous feeling of haste as well as nervousness caused by outside matters of importance to the subjects (such as pressure of work) tended rather to increase than to diminish their scores.

Each subject discovered and followed his own methods of tossing. After finishing the two series, the subject who had followed the method of throwing his pennies high into the air was able to catch an additional penny (making four in all) with very little effort. The other subjects tried this continually and failed, their hands striking the floor before the fourth penny was reached. The quick shutting of the hand was an important factor. One subject was materially helped by thinking of the word "grab" previous to each trial. In some instances, the second penny would be caught and lost, the first and third being retained. Although occasionally a subject would catch all three successfully without knowing it, yet the tossing can not be said to have become automatic.

The progress in learning was unsteady. Yet in each case there was a gradual advance, noticeable particularly in the beginning. A warming-up period was universally experienced by each subject at the beginning of each day's practise.

In the second series, a transfer test was tried with the left hand before and after the practise series. This showed a considerable increase in ability to catch with the left hand.

AMOUNT OF TRANSFER CATCHES

Subject	Before Test	After Test	Per Cent. Gain
1	3	14	466⅔
2	11	32	290+
3	1	29	2900
Total gain	15	75	500

Painting and the Learning Process: C. M. SAX.

Although art and science are widely separated, they may cooperate in art education. Prevailing methods are indirect, depending upon a never certain transfer of training. During the three years the average student spends at art school, his course is as follows: Casts and still life in charcoal; still life in color; anatomy and perspective as formal subjects; the figure in charcoal; some composition, and, finally, painting the head and figure in oils.

Results show little transfer; for example, compositions show little knowledge of anatomy or perspective. Charcoal and oils have few identical elements in substance or procedure; in fact, specific habits formed in mastering charcoal often act preclusively when the student attempts to paint. Students who can draw, but not paint; construct, but not compose, or are draughtsmen, but not colorists, and their opposites are in the overwhelming majority.

Experiments now under way on the learning process as applied to painting seem to show that (*a*) preparation in charcoal and still life is unnecessary in painting figures; (*b*) efficiency depends largely upon correct analysis; (*c*) muscular coordination plays a minor part; (*d*) a direct method and generalized idea of procedure are essential and (*e*) the control of attitude is most important.

The Optimal Distribution of Time, and the Relation of Length of Material to Time Taken for Learning: DARWIN OLIVER LYON.

This paper was divided into two parts, it being in reality a discussion of two distinct questions: (1) "The Distribution of Time in Relation to Economy in Learning and Retention"; and (2) "The Relation of Length of Material to Time Taken for Learning." Concerning the first of these, it was shown that in estimating *economy,* not only must we consider the *time spent,* but the degree of *retention* as well. It was shown that individuals differ greatly, and that where one could learn a set of ten stanzas in less time by the continuous method (*i. e.,* doing the work in "one sitting"), another individual could lower his total time by dividing the time spent into several periods, *e. g.,* by spending 5 minutes per day. With but 3 exceptions retentiveness was decidedly better by the divided-time-method. This was notably the case with nonsense-syllables and poetry. The most general statement that can be made, taking all materials and methods of presentation into consideration, is that the most economical method is to distribute the readings over a rather lengthy period,—the intervals between the readings being in arithmetical proportion. For example, with one individual in memorizing a poem of 20 stanzas the highest retentiveness was obtained by distributing the readings as follows: 2 hours, 8 hours, 1 day, 2 days, 4 days, 8 days, 16 days, 32 days, etc. The practical bearing of the results obtained on education in general was then considered. The above individual found that the most economical method for keeping material once memorized from disappearing was to review the material whenever it started to "fade." Here also the intervals were found to be, roughly speaking, in arithmetical proportion. For similar reasons the student is advised to review his "lecture-notes" shortly after taking them, and if possible, to review them again the evening of the same day. Then the lapse of a week or two does not make nearly so much difference. When once he has forgotten so much that the various associations originally made have vanished, a considerable portion of the material is irretrievably lost.

2. *The Relation of the Length of Material to Time Taken for Learning.*—Tables were presented to show that the relation depended almost wholly upon the division of the time spent in learning, *i. e.,* the distribution of the time-intervals. In other words, the relation, or *ratio,* depends upon the method used in memorizing. Only three methods were considered: The "continuous" or "mass" method; the once-per-day method; and the once-per-week method. Up to a certain point, with some individuals, when digits were used as material, the time varied directly as the square of the number of digits, *when the continuous method was used.* By the once-per-day method, however, the time varied, roughly speaking, directly as the length of the material. It was shown that in order to get the best results the same subject should take all the various lengths of material used, and that it would be unfair to distribute the varying lengths among different subjects. As only one method can be tried at a time, an experiment of this nature must needs extend over a period of several years. In the case of *prose,* by the once-per-day method, 500 words were memorized in as few days as the 95-word passage. The time may therefore be said to vary directly as the

length of the passage. The same holds true for digits and nonsense syllables, but not to so great a degree; for the number of days needed for 200 nonsense-syllables was considerably greater than that needed for 20. By the "continuous" method, however, we observe that where the 100-word passage was memorized in 9 minutes, the 500-word passage took 52 minutes—nearly 6 times as much time being required, although the passage is only 5 times as long. This is much more strikingly shown when we examine the curve obtained for the digits. Here we see that although it took only 5 minutes to learn 24 digits, it took 2 hours and 34 minutes to learn 200—more than 31 times as long instead of 8. In short it is obvious that the once-per-day method is—to say nothing of giving a far superior retention—far more economical than the "continuous" method. This is especially so for material memorized by motor associations such as nonsense-syllables or digits.

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REVIEWS AND ABSTRACTS OF LITERATURE

The Essentials of Mental Measurement. William Brown. Cambridge: University Press. 1911. Pp. vi + 154.

The structure of Mr. Brown's book, as he himself points out, bears marks of its composite origin. The first three chapters of Part II., originally published in 1910 as a doctorate thesis, deal essentially with some experimental work with mental tests similar to the work of Winch and Burt, prefaced by a disquisition on the theory of correlation and a brief historical survey of the use made of the theory. To these chapters he has added a fourth sketching the possibilities of the use of the method of correlation by psychologists, and a Part I. treating of mental measurements in general. There are also four appendices, giving tables quoted from Fechner, Müller, and Urban, examples of the working out of single and multiple correlations, some regression curves in illustration of one of his earlier chapters, and a copious bibliography.

The result is an abstruse, slightly critical, mathematical treatise on the measurement of variables, rather than the expression of interest in things mental which might be investigated. With the exception of a concise statement of conclusions (pp. 126–27) the author leads one to forget any connection with psychologic functions, since the data supplying the basis for his mathematical elaboration might apparently have been drawn from any convenient source.

As it stands, Chapter I. of Part I. takes up Weber's law, Fechner's work with it, and three general interpretations of the law. Chapter II. sets out