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ABSTRACT

Two years of observation of the behavior of visitors in several museums led to the knowledge of the degree of simplicity that is desirable in museum surroundings and of the need for pamphlets that are better prepared than the usual guide books and catalogs. It also led to the advice that museum directors become experimental psychologists, and that they undertake behavior inventories. A report on the Pennsylvania Museum is appended. (MF)

THE BEHAVIOR OF THE MUSEUM VISITOR

By EDWARD STEVENS ROBINSON
Professor of Psychology in Yale University
Assisted by IRENE CASE SHERMAN
and LOIS E. CURRY

Together with a Preliminary Report from
The Pennsylvania Museum
by
HORACE H. F. JAYNE

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PREFACE

The following pages report a series of investigations of the behavior of the casual visitor in museums of art. The author was first introduced to the idea of studying the museum visitor by Professor Charles R. Richards, formerly director of The American Association of Museums. That was in the autumn and early winter of 1924. Due to the interest of the Carnegie Corporation in our project, active work was under way by June 1925 and continued until June 1927. During that period we enjoyed the help and encouragement of Professor Richards, of Mr. Laurence Vail Coleman, the present Director of The American Association of Museums, and of numerous members of the Association who gave us facilities for study and other welcome forms of aid.

Although the present report will fall far short of a complete psychological description of the museum visitor, we have felt that some statement of progress has fallen due. Our work has gone far enough in two years to demonstrate pretty clearly the types of museum problems most susceptible to psychological treatment. Furthermore, we have come to a point where work of consequence must wait upon a very active participation by individual museums. We have felt that such participation would be more likely if its need were demonstrated by a published report of our initial efforts.[1]

We hope that the fact that we have dealt only with picture collections will be regarded by others, as it has by us, as a mere incident. We believe that most of the points made in connection with collections of this type will be at least relevant throughout the museum world.

We hope that our failure to name the actual museums in which observations were made will suggest nothing more than the simple interpretation that is the truth. Our purpose was at no time that of evaluating individual museums. The museums in which we worked

[1] It is gratifying to say that the Pennsylvania Museum in Philadelphia has already begun experimental studies of its visitors. This work is going forward under the direction of Mr. Horace H. F. Jayne. See Section VII.

were to us only samples and it was in that spirit that we tried to deal with them.

In the preparation of this report we have had to decide whether to address it to museum official or to psychologist. Naturally we have taken the former alternative. In doing so we have disregarded issues with which the psychologist may be concerned, unless they have some practical value. For instance, two laborious investigations of labelling have not been reported for the simple reason that we have been unable to state the practical bearing of their results. The psychologist might find theoretical interest in going over them, but we have been concerned with neither the entertainment nor the edification of the psychologist. The psychologist may feel a lack of the minuter types of statistical analysis. In many cases such analyses were made, but their lack of practical value has caused us to disregard them in the present report. And while our colleague, the psychologist, may wonder at what we have left unsaid, he may wonder even more at what we have thought it necessary to say. But it has seemed to us that many matters of method which are an old story to the laboratory man can stand a good deal of emphasis for the practical man who is being encouraged to use them.

As a final word of this preface, the author wishes to express his obligation to his assistants in this work, Dr. Irene Case Sherman and Miss Lois Curry. Their interest, industry, and acumen have been responsible for a large proportion of what has been accomplished.

E. S. R.

November 23, 1927

THE BEHAVIOR OF THE MUSEUM VISITOR

I. INTRODUCTION

Need for Observation

The museum may be an intellectual and aesthetic delight to its financial supporters, to its curators, or to some other select group of the sophisticates. In the attainment of such ends the confidence of art has little need to be replaced or supplemented by the skepticism of science. Even if experts disagree, there is no great harm done. If the visiting connoisseur feels that the pictures are badly hung or the specimens poorly placed, he still will see which of the pictures are good and which of the specimens are important. And in all probability he will get a certain wholesome joy out of detecting the imperfections of the tout ensemble. There are those, however, who have bolder hopes for the public museum. There are those who are interested in that casual, self-conscious crowd which, on Saturday and Sunday afternoons, moves like some inanimate current from picture to picture and from glass case to glass case. It is at this point that decision through intuition and through argument become untrustworthy. It is here that light must be sought in an observation of the facts. What does the "average" man do in a museum? He wanders aimlessly, yes, but not blindly. His attention is drawn to this and distracted from that. He must have glimmering interests which might be fanned into overt enjoyment. Yet, this casual visitor is in the main a mystery and, if he is to be dealt with effectively, there needs be added to the talking about him and thinking about him deliberate observation of his behavior.

That deliberate observation of his public can be of service to the museum administrator should not be a novel idea. If there is any single predominant achievement of the psychology of the past quarter-century it lies in the revelation that so far as human nature is concerned *acquaintance with* is often a far cry from *knowledge about*. From the earliest times deliberate study was made of the psychopathic. But recently we have come to realize that, more than anything else, we need accurate facts about "normal" mental life. Since *acquaint-*

ance with normality is so intimate, the assumption was once made that normality is accurately understood. Of course nothing could be further from the facts. Most of us felt quite well acquainted with American intelligence before the scientific scrutiny of that capacity in the white draft. And we *were* acquainted with that intelligence—we were even able to get on with it moderately well—but the deliberate inventory taken by the testers revealed unsuspected facts. Similarly in the present case, there is no reason to believe that the museum director is not acquainted with the casual visitors who wander through his precincts. Yet, only a few hardy souls would claim that deliberate observation can add nothing to what has been learned informally and passively.

There are always individuals who are very sure of their opinions, especially if plausible arguments can be fashioned for their support. Such individuals and their arguments are the greatest obstacle to fact finding. They make observation seem so unnecessary. At the time our studies of the museum visitor were beginning, the Associated Press quietly announced what was under way. Immediately the letter writers and the editorial writers began to volunteer to solve our problems, not by doing our observing for us, but by replacing observation with argument. Open the windows in summer; supply more heat in winter; put down cork flooring; trade off your artistically stupid public for a public that is better informed; these and many others were the principles supported by vivid phrases. But, after all, these suggestions, however meritorious, simply distracted from our central problem by implying that there was no problem there. We wanted to find out as accurately as possible what is actually going on in the museum. And we saw no other way of getting such information than by going after it directly and deliberately. Experts could tell us that the average visitor tries to see too much when he goes through a large art museum. We were quite ready to admit the plausibility of that belief, but what we sought was knowledge of just how much the visitor to the large or the small museum does try to see. We were quite willing to believe that the average person gets bored toward the end of his visit, but we thought it worth while to discover exactly how much difference there is between his actual behavior at the beginning and at the end of his visit.

Thus our whole program during the two years of our study has been a program of observation. Its excuse rests upon the assumptions

that the museum administrator wants to know his public and that such knowledge can be secured in accurate form only when it is actively sought. Our one fundamental suggestion at the close of this report will be that every future change in museum policy or arrangement be carried out in the light of a vigorous and open minded enterprise of fact finding.

What Shall be Observed?

The description of the general procedure of our study and of the general procedure which we are recommending for the future is, of course, quite incomplete at this point. It is all very well to say that what is needed is more observation and less speculation. It is all very well to say that the museum visitor should be watched more and talked about less. But there must be added to observation purposes more definite than the obtaining of all possible bits of knowledge. One might, after weeks of painstaking effort, discover that long-legged visitors pass through museums on the average more rapidly than do short-legged ones; that only five percent of the Sunday visitors wear red neck ties; that young gentlemen in the company of young ladies act less interested in the objects of art or science than do young gentlemen who are alone. Obviously, scientific observation is a searching for facts which we assume will be useful if we can get them. Before the psychologist or the museum administrator investigates the visitors' behavior, there is required, therefore, a formulation of definite questions which shall turn merely passive observation into active inquiry.

In general, observation results most profitably when the questions which give it direction are simple ones. The one thing the scientist tends to overlook most frequently is the homely, everyday type of fact that lies right under his eye. Also this is the type of fact that many of us disdain to seek. When first the possibility suggested itself of a scientific study of the behavior of the museum visitor there was talk of refined physiological technique. There were thoughts of catching the visitor before and after his artistic or scientific excursion and of determining subtle differentials of blood pressure, pulse rate, respiration, psychogalvanic reflex. Almost surely some facts could have been had in such manner—and almost surely nobody would have had the slightest idea what to do with them. And so it was decided, and we think wisely, to ask simpler questions. Here is an exhibit of

1000 pictures. What do people do when they come to this exhibit? How long do they stay? Is there any easy and natural manner for prolonging their stay? What do they look at? What do they pass by? What is the exact power of location, of size, of mere vividness of color to control the visitor's behavior? Questions such as these are very naïve. Still, they are in the main answerable questions, and their answers are likely to have more meaning and more usefulness than those to questions put at such a level of erudition that the only possible answers must come in terms of galvanometric deflections.

We all dislike to waste our time in unnecessary labor. That is one reason why there is a strong inclination to favor complicated investigations over simple ones. In the latter case we feel that we can guess rather accurately the nature of the outcome. Why observe the facts when we already know their nature? But, of course, we lack precise knowledge in most of such cases, and, in many of them our guesses, though confident, are very erroneous. If we are to adopt a scientific attitude toward the behavior of the museum visitor we need to go after facts about him which may usually seem obvious when obtained, because only in such state of mind can we make common knowledge precise and only thus can we discover the more important and least distrusted of our erroneous opinions about him. There is a growing disposition both here and abroad against the separation of art objects of different classes, such as paintings, sculpture, and furniture, and toward the gathering together of materials of different types in such a manner as to represent more adequately the artistic spirit of a given place and period. Now, though this plan can certainly draw strong arguments to its side, no one so far as we know has sought to discover exactly what effect the plan will have on the behavior of the ordinary museum visitor. Perhaps, if one were intelligent enough, he might make an accurate guess as to the effects, but unfortunately he could not be sure whether his guess were correct. Yet there has, in this important instance, been contentment with guessing. The probable and approximate results of the plan seem so clear that the need of fact finding has not stood out. And this case illustrates beautifully the kind of situation in which fact finding is most called for, where it is likely to make vague surmises definite and where it is likely to furnish some surprises.[1]

[1] Observations along this very line are, it is a delight to say, being conducted now by Mr. Jayne in the Pennsylvania Museum at Philadelphia.

Objective and Subjective Observation

At the cost of a great disturbance of the peace within the camp, psychologists have discovered that there are two distinct perspectives offered by most human events. There is the event as observed by its actor and the event as observed by the spectators. Now in a way this should be called a rediscovery rather than a discovery, since it has been bobbing up again and again in the history of human thought. And the antiquity of the distinction may usefully be noticed because it gives one a better basis for judging the relative values of these two points of view. There have been periods during which the actor's account has had all the prestige; there have been periods when the spectator's testimony has been ascendant; and there have been periods during which honest efforts have been made to piece the two together.

Since first class minds have been on the three possible sides of the question, it would seem wisest in such a practical undertaking as the present study of the behavior of humanity in the museum to decide upon objective observation or subjective observation or some combination of the two on purely practical grounds. In the studies that we have made thus far we have found it impracticable to call upon our actors—the visitors—for an account of what they think and feel during their stay in the museum. There are other reasons for avoiding such a method besides the fear of being told to mind one's own business. The casual visitor to a museum has not usually had psychological training and there are few reports so untrustworthy as those of an unpracticed observer regarding what he thinks he thinks and what he feels he feels.

The restriction of our observations to purely "external" behavior may arouse special suspicion because of our interest in the effects of art objects. Psychological aesthetics has traditionally been concerned with the aesthetic *experience*, that is to say, with an almost completely subjective description of artistic activity. Yet we recommend and practice the procedure of following unsuspecting visitors through corridors lined with paintings without stopping a single visitor and requesting that he reveal to us the experience within him. But our defense is quite clear, even if it be unsatisfying. Why should we seek such personal revelations when we know from sorrowful experience that they are sure to be more false than true?

Some day an introspective method may be used predominantly in the study of the casual visitor's behavior. We should like to remain quite conscious of that possibility. In the meantime we must confess that in connection with the problems here before us we have not been able to conceive of any very trustworthy use for self-observation by the visitor.

Natural Observation and Observation Through Experiment

If one wishes to observe the phenomenon of solar eclipse, one waits until the event transpires in nature. If, on the other hand, one wishes to observe the fall of a body in a vacuum, one sets up that vacuum and deliberately lets fall an object within it. Science is forever presenting the distinction between observation under these two conditions. Neither is really superior. It is easier to keep one's head and know what one is observing in the case of a prearranged experiment. Yet facts gathered from natural occurrences often have a clearer application. In proceeding from the experiment to life, human reason is peculiarly liable to missteps.

In our studies of the museum visitor we have employed both natural observation and experiment. We began by watching the behavior of the visitor as he went about in museums which had been in no way altered for our purposes. In the beginning we did nothing whatever to modify his natural conduct in the exhibits. Later we came to observe behavior under laboratory conditions representative of certain elements in the complex museum situation. We also introduced into the actual museum factors capable of modifying the visitor's behavior there.

Our own work, which is to be reported here, was frankly exploratory. The later studies, which we hope will follow, can go forward with more confidence of method. And we believe that the method that is going to be most practicable and most reliable is an experimental method, but one in which the experiments are set up, not in the laboratory, but in the museum. There will be experiments with catalogues and guidance of various sorts; experiments with different groupings of objects; experiments, in short, wherever the effects of reasonable modifications of current practice can be subjected to observational study.

Limits of the Present Investigation

The run of museums of art, of science, of craftsmanship are, psychologically speaking, exceedingly complex. The objects each contains are so various, and the tastes and interests appealed to are so many, that the detection of cause and effect relations between the exhibits and the visitor's behavior is a baffling task. Since the aim of observation is one of getting not only facts, but relatively comprehensible facts, we felt it necessary to simplify the problem of museum behavior in some arbitrary fashion, at least until we could get our studies well under way.

It was decided, therefore, to limit our first two years of work to what psychologically is the most simple and comprehensible type of museum exhibits, namely paintings. We should not for a moment want it understood that we considered a painting to be simply a painting and nothing more. We believed merely that a collection of, let us say, one thousand paintings, represents to the casual visitor a more homogeneous set of objects than does any other equally extensive exhibit. One of the primary problems proposed to us had to do with "museum fatigue." In order to throw light in this direction it was clearly necessary to observe such progressive changes in behavior as take place during the visitor's stay in the museum. Now, if we consider his stay in a collection of paintings and notice that late in his stay he passes by twice as many pictures without looking at them, and that he stops only half as long at a picture when he does stop, then we may be sure that a process of saturation is getting well under way. But, if we consider the stay of a visitor in a museum of natural history and if we discover in this instance that there is a progressively greater tendency to hurry by cases, how are we to interpret our facts? Early in his stay he may have been among beautiful groups of elk or polar bears and later he may be in the neighborhood of objects of far less fascination. With certain museum problems in mind it would be quite as easy to work in one type of exhibit as in another. But in connection with the initial exploration which our first work represents this limiting of ourselves to paintings helped substantially toward keeping our feet in the vicinity of the ground.

Nature of Our Results

Application of psychological methods to problems as general as that of the behavior of the museum visitor are sure to disappoint a great many of those persons who hope to profit by this application. The reason for the disappointment is in their minds due to the manifest failure of the psychologist to perform his attempted trick. But in the psychologist's mind the disappointment is due purely to a misunderstanding of what he was attempting. The actuality of the issue is evidenced by one of many similar occurrences since the present work was begun. Said the director of a museum which was in course of alteration: "What advice is dictated by your results in regard to the labels I shall put up." The answer was this: "Our results indicate that it is exceedingly important that your labels be right as to typography and content—but they indicate further that nothing short of experimentation within your own museum and with your own public can tell you precisely what you want to know." This particular director caught the idea at once and was undismayed at our failure to discover a simple formula for all museum labeling. But results of this order, which furnish only general clues and methods of investigation, are often unsatisfactory when first confronted. We believe it fair, therefore, to state quite definitely, before we throw our results upon the table, that we have only methods of investigation, and further problems to investigate. We have no formulas of easy applicability to this or to that specific museum situation. We believe that the understanding museum man who goes through our work will gather unto himself a stop watch and a note book in order that he may begin to discover how his particular museum is functioning. This man is our hope. We advise the seeker after easy cures for museum ills to swallow his sorrow as best he can and quietly pass us by.

II. COMPARATIVE STUDY OF SEVERAL MUSEUMS

The Museums

The initial phase of our studies was devoted to the observation of behavior in several museums. We worked in three museums principally, though a few rather unsatisfactory observations were made in a fourth. Our aim was to gather some definite facts about museum behavior which might serve as a foundation for further work. We wished to get in mind something like an accurate picture of the casual visitor in order that our later, more specific studies of him might be aimed at actual, rather than at conjectured, characteristics of his activities. In other words, we wished to set up empirical norms of museum behavior. If efforts are ever to be exerted in the direction of making the visitor's behavior more intelligent and more interested, there must be standards with which to compare behavior under "improved conditions." Finally, we felt that the observation of behavior in different types of museums might throw light upon the relative effectiveness of those types.

Work was done in the collection of paintings in one very large museum in a city of great population and in the collections of two moderate sized museums in typical cities of the mid-west, cities having populations of a few hundred thousands. The fourth collection was of a peculiar sort and will be mentioned in detail later. The main classification of results and the only one to which we shall pay much attention is two-fold: (1) results from a very large collection and (2) results from collections of medium size.

Museum Lg (large) is in the heart of one of the largest of American cities. Its paintings number in the neighborhood of 1000 and they are hung in 40 rooms.

Museum Sm. 1 (small, number 1) is in a midwest city of two or three hundred thousand population. Its paintings, about 150 in number, are hung in 6 rooms. The museum is about two miles from the center of the city. For this reason it seems probable that it does not draw the visits from transients that it otherwise might. In the opinion of officials there, visitors are likely to have some genuine interest in art.

There is also thought to be more than the ordinary proportion of *re*visiting. Toward the latter part of our studies in this museum concerts were given there on Sunday afternoons. This may also have affected the general character of the museum population on those days.

Museum Sm. 2 (small, number 2) is in a mid-western city of several hundred thousand. Its paintings number about 140 and they are hung in 6 rooms. This museum is only a block or two from the business district and for that reason probably draws more visits from transients than does Sm. 1.

Museum X is located about half a block from Sm. 2. It is not, structurally, a typical museum. The permanent collection of pictures is very small, about 20. The remainder of the exhibit, which varies a good deal in size, is changed every two weeks. Pictures are hung in the halls and along the stairway as well as in the 6 exhibition rooms. During our first period of observation here, a total of 154 pictures were on display; at a later period there were 256. An additional complication was the fact that both lectures and concerts were given on Sunday afternoons. There was reason to believe that many visitors on those afternoons had little interest in pictures. After 27 records (the precise meaning of "record" will be explained later) were obtained in this museum, it was decided to discontinue study there. Because of the ambiguities incident upon the varying size of the exhibits and upon the peculiar arrangement of the museum it was felt that the data when secured would present insurmountable problems of interpretation.

It should be perfectly evident that results achieved from the museums in which we worked cannot be taken as furnishing accurate norms for the museum world at large. If we had had sufficient resources we should have extended our observations to include most of the art museums of any size in this country. Perhaps a time will come when this can be done. Analogous surveys of public schools are, of course, quite an accepted part of modern educational administration. It is now possible for the school board of a given city not only to have a study made of its own system, but to secure sufficient data about other systems to make possible something like reliable comparisons.

We believe, however, that the data and comparisons which we have been able to secure do throw a certain light upon the character of the

behavior of the casual visitor in general. And in the collecting of such facts, there have developed certain methods the future applicability of which seems, at least to us, quite clear.

Method

Observations were usually limited to behavior within the permanent collections of the museum. We felt that temporary exhibits were likely to contain a disproportionate number of sophisticated visitors. Observations were made almost entirely on days of free admission. Only on such days were visitors numerous enough to permit nonapparent record taking. We also thought that on such days the percentage of "casual" visitors would be relatively high.

It seems an essential need in such a study as this, to separate the artistically educated from the artistically uneducated. Since we were interested mainly in the latter group, we took the precautions already mentioned. It is impossible to say just how effective they were. Of one thing we can be fairly sure. The persons whose behavior we observed were not divisible into two clearly defined classes. The behavior of some was more leisurely, more interested, than that of others, but there were no concentrations of individuals into widely separated classes. This would indicate that there was no great error made in throwing together all of the persons observed in a given museum. Naturally we do not assume that these persons are all alike. What we do assume is simply this; that they may more safely be considered as variations within a single class than as divisible into two or more distinct classes, such as the sophisticated and the naïve.

In the interests of obtaining what statisticians call an homogeneous sampling, we observed the behavior of adults who went through the museum unaccompanied. Children were eliminated and so were persons who were obviously infirm. The definite reason for observing the behavior only of unaccompanied visitors should not be difficult to surmise. The social influences at work when several people go through a museum together must be exceedingly important in determining reactivity toward the objects of art encountered.

We obtained usable records for about 60 visitors in each of the three museums in which our main observations were made and records for 27 visitors in Museum X. From the standpoint of securing really accurate statistical pictures of behavior in these museums our

samplings were woefully small. Why we did not follow 500 visitors through each museum should not, however, be hard to guess. Observations could be made only by trained workers (we never had more than two at any one time), and especially in the smaller museums it was useless to operate except on Saturday and Sunday. Several months were consumed in collecting data from one museum alone. We might, it is true, have concentrated our efforts upon a single museum and thus have gotten moderate statistical reliability for at least that one instance. But we felt that it was quite as necessary to multiply the number of museums as it was the number of visitors.

It would have been desirable if we could have had the same balance of the sexes for the different museums. As a matter of fact our subjects were as indicated in Table I. It will be noticed that the sex balances of Lg. and Sm. 2 are fairly similar. If this large and this

TABLE I

Visitors Observed in Different Museums

	Male	Female	Total
Museum Lg.	46	15	61
Museum Sm. 1.	26	29	55
Museum Sm. 2	43	18	61
Museum X.	12	15	27

small museum had in our results shown high similarity and if they had been distinguished clearly from such a museum as Sm. 2, we should have been forced to make a thorough check on effects of sex on museum behavior. Since the similarity of results is mostly between those from Sm. 1 and Sm. 2, we have neglected the sex factor. We do not feel that this neglect is altogether justifiable, but the whole statistical setting of the investigation is so rough that we believe only minor errors can be due to such a cause.

The observer estimated the age of each individual followed. Records for the several museums showed a range of averages from about 34 years to about 40 years. Considering the fact that the estimates were not massed closely around any given age, that they spread out well over a range of something like 40 years, the similarity in ages between the visitors to the different museums may be considered satisfactory.

Each observer began her day's work by taking her place near the

entrance to the picture collection. She was equipped with stop watch and small note book, both of which were carefully guarded from sight. As soon as the museum was reasonably crowded she picked out an incoming visitor at random and proceeded to follow him throughout his stay. If the visitor detected that he was being followed, a thing of rare occurrence, the observer left him and discarded that record. As soon as the observation of one individual was completed or interrupted, the observer picked up another at the entrance and proceeded to follow him.[1]

At the beginning of our work the observer attempted to record almost every fact about the visitor's behavior which could conceivably have significance. As the technique of record taking developed it was found that there were four types of items which could be set down completely and accurately for each individual who was followed. They were:

1. Total time spent in picture collections.
2. The rooms entered.
3. Number of pictures in each room before which the visitor actually stopped.
4. Time spent before each picture (in the case of those pictures which the visitor stopped to observe).

In going over our results we have been able to combine some of these items. For instance, we have been able to consider the proportion of rooms entered and passed through without a stop.

There were facts that could be recorded only under certain favorable circumstances. In Museum Lg., where the technique of observation was largely developed, it was not possible to take down the name of every picture before which the visitor stopped. In Museums Sm. 1 and Sm. 2, on the other hand, it was nearly always possible to record the name of each picture observed. In Museum Lg. the observer usually was able to get the names of those pictures at which the visitor spent more than his usual amount of time; and when only one picture was looked at in a room, the observer could ordinarily determine exactly which picture it was.

In taking such records as we are describing, ambiguities inevitably arise. These must be met in terms of arbitrary rules of some sort.

[1] These observations were carried on by Dr. Irene Case Sherman or under her immediate supervision.

The main demand is for rules that can readily be understood and followed. Future observations of museum behavior can be considered comparable with the present ones only if they are secured in conformity with the rules here set down. By the very nature of the case, one could indulge in considerable argument about the final validity of these procedures, though it should be clear that nothing of consequence could thereby be gained.

Our rules of recording are herewith listed:

1. A visitor was considered to observe or look at a picture only when he stopped before it for an appreciable time such as could be measured by a stop watch. Obviously we could not hope to record the glances of the visitor as he walked through the museum.

2. Time of looking at a picture included the time given to reading its label. There was no way of making a distinction in this case. Since the observer had to keep out of the visitor's field of view as much as possible, it was quite beyond possibility to record eye movements.

3. When, before leaving a given room, the visitor returned to a picture previously examined and looked at it again, the second observation time was added to the first, and the total regarded as the observation time for that picture. (There were exceptions to this procedure, where detailed analyses were made of behavior within a single room.)

4. If a visitor returned to a room that he had previously been in and again stopped to observe pictures there, the pictures were assumed to be among those not previously examined and the times were not pooled as in the case described under 3 above.

5. If, on his way out of the museum, a visitor passed through a room previously entered, but passed through without stopping to look at any pictures, it was assumed that his visit had already come to an end and that this was not in any useful sense "another room entered."

6. When, in the course, of his visit, an individual stopped before an object which was not a painting—for example, before a piece of sculpture or case of jewelry—such objects were regarded as equivalent to pictures. This procedure would have been unjustifiable if the situations in which we worked had contained much of such material. Fortunately for our purpose they did not. In case no pictures were looked at in a room, then the material that was looked at was not considered equivalent to a picture.

7. In Museum Lg. there were some large placards each containing a number of figure drawings, illustrations, designs, etc. Each such placard was regarded as equivalent to one painting.

Before leaving questions of method and technique, there is one more issue that can fairly be raised. It may have struck the reader that all of our record taking was in terms of some criterion of the visitor's interestedness. Total time spent in the museum, number of rooms entered, proportion of pictures looked at, time spent for each picture observed, all these reflect in some degree the grip which the museum gets upon the visitor. If this be granted, one might ask why it was necessary to tabulate all of these items. If they all reflect the degree to which the museum takes hold of its visitor, why not consider one of the items—perhaps the best or most reliable one—and let it go at that. One answer to such a question is in terms of the fact that the problems which we had in mind called for solution in terms of a certain one or another of these items. For example, we wanted to know whether the visitor skips more pictures at the beginning or at the end of his trip through the museum. We could not solve such a problem simply by knowing how long he stayed in the museum. On the other hand we wanted to know the simple facts about how long the average visitor stays in this or that museum. Thus, several items were necessary unless all of our problems could be reduced to one.

There is in addition an even more fundamental reason for working with a number of types of information about the visitor's behavior. From an analysis of our results it is demonstrable that, although the various types of information which we collected are all related, none is identical with another. The technique of this analysis need not be discussed in detail; the essential facts will stand out more clearly if this is not done. Suffice it to say that we determined the degree of interrelationship between various kinds of information collected.[1] Visitors whose total time in a museum was relatively long tended definitely to spend on the average a relatively long time with any picture before which they stopped. There were, however, so many exceptions to this rule (coefficients range from 0.3 to 0.8) that one

[1] Analysis utilized the standard methods of statistical correlation. Both the product moment and the correlation ratio were employed, as our data showed several instances of curved regression. The reader who is not already familiar with these methods will not find it profitable to master them in this connection. The reader who is familiar with the methods will pardon us for omitting complete tables of coefficients. Such tables of precise-looking values would add little but a recondite atmosphere to our argument. Upon receipt of request we shall gladly furnish these tables.

could not replace knowledge about total time with knowledge about time per picture. Total time bears a similar relationship to the proportion of pictures skipped. There is also a positive but far from perfect relationship between the total number of pictures observed and the maximum time spent with any one picture. On the average the person who looked at most pictures was also the one whose maximum time for one picture was greatest (coefficients 0.27 to 0.8), but let it be emphasized that this also was true only *on the average.*

Behavior in Museums of Different Type

As we go through our results the principal comparison to keep in mind will be between Museum Lg., on the one hand, and Museums Sm. 1 and Sm. 2, on the other. This difference is not exactly a simple one, yet its main features are probably what, on the surface, they seem to be. The matter of location in a great city or in a city of moderate size is one of these features. But it is our belief that the relative number of pictures displayed furnishes the main explanation of such differences in behavior as may be found. There is no urgent reason, however, why the reader should accept this surmise; we have no actual proof. The differences between the three major museums and Museum X are always interesting, even though, because of the peculiarities of X, they are not always fully comprehensible.

The first, and perhaps the simplest, question that can be put to our data has to do with the length of time spent in the various collections by the visitors whose trips were recorded. Complete facts of the case are presented in Table II. The visitors were grouped in classes according to the total time elapsing between entrance to and exit from the collections. The table shows the number of visitors in each time class and also certain measures of central tendency for the several museums. The *Mean* is the familiar average obtained by adding together the times of all the visitors to a given museum and dividing that sum by the number of visitors. The *Median* was obtained by ranking the visitors according to time spent in the museum and then determining the time taken by the middle-ranking visitor. The *Mode* designates the time value represented by more visitors than any other time value, or in other words, the point of greatest concentration.[1] These same measures of central tendency will be used hereafter without explanation.

[1] Any introductory text book on statistical methods will befound to contain a discussion of the various measures of central tendency and their respective uses.

The outstanding fact shown by Table II is the difference between Museum Lg. on the one hand and the smaller collections on the other. The means and the medians both reveal greater time spent in the large museum. The maximum difference among the means and among the medians is in the case of the median times for Lg. and for X, where the

TABLE II

Frequency with which Various Total Amounts of Time Were Spent in Each Museum

Time spent, in minutes	Museum Lg.	Museum Sm. 1	Museum Sm. 2	Museum X
96.5–101.5′	1			
91.5– 96.5				
86.5– 91.5	1			
81.5– 86.5	1			
76.5– 81.5				
71.5– 76.5			1	1
66.5– 71.5	1			
61.5– 66.5	2			
56.5– 61.5				
51.5– 56.5	1			
46.5– 51.5	3	1		1
41.5– 46.5	1	1	2	
36.5– 41.5		1		
31.5– 36.5	6	1	2	
26.5– 31.5	8	4	4	1
21.5– 26.5	5	7	8	1
16.5– 21.5	5	12	6	2
11.5– 16.5	4	9	9	8
6.5– 11.5	7	15	16	5
1.5– 6.5	15	4	13	8
Total.....	61	55	61	27
Mean*.....	25.3′	17.4′	17.0′	14.9′
Median.....	21.0	16.2	12.3	11.8
Mode.....	4.0	9.0	9.0	14.0 & 4.0

* We calculated probable errors of these means, but abstain from presenting them because of the fact that such values measure reliability only where the nature of the samples of data involved can be given distinct and simple definition. That is certainly not the case here.

values are 21.0 and 11.8 respectively—a difference amounting to almost 100% of the smaller value. But it should be remembered that the number of pictures in Lg. is anywhere from 400% to 650% of the numbers in any of the three smaller museums. Thus, though means and medians show a longer time spent in the large museum, they

TABLE III

Frequency of Various Total Numbers of Pictures Looked at in Each Museum

Number of pictures*	Musem Lg.	Museum Sm. 1	Museum Sm. 2	Museum X
263.5–269.5	1			
197.5–203.5	1			
191.5–197.5				
185.5–191.5	1			
179.5–185.5				
173.5–179.5				
167.5–173.5				
161.5–167.5	1			
155.5–161.5				
149.5–155.5	1	1		
143.5–149.5				
137.5–143.5				
131.5–137.5	1			
125.5–131.5	1			
119.5–125.5				
113.5–119.5	3			
107.5–113.5	1	2		
101.5–107.5	1			
95.5–101.5	2		1	1
89.5– 95.5		2		
83.5– 89.5	2	1	2	
77.5– 83.5	3	2	1	
71.5– 77.5		1		
65.5– 71.5	1	2	3	1
59.5– 65.5	1	2	1	
53.5– 59.5		6	3	1
47.5– 53.5	4	6	3	
41.5– 47.5	1	5	4	3
35.5– 41.5	4	5	3	1
29.5– 35.5	5	2	5	3
23.5– 29.5	3	6	5	3
17.5– 23.5	4	7	4	3
11.5– 17.5	7	3	10	5
5.5– 11.5	5		10	3
-0.5– 5.5	7	2	6	3
Total.....	61	55	61	27
Mean.....	56.2	47.6	30.5	27.4
Median.....	34.9	44.5	24.1	22.5
Mode.....	14.5 and 3.0	20.5	14.5 and 8.5	14.5

* Fractions given merely as means of defining exclusiveness and inclusiveness of the classes.

indicate more hurry on the part of the visitors. Indeed, only twice as much time at most is indicated for from 4 to over 6 times as many pictures.

Further scrutiny of the table strengthens the impression of greater hurry in the large museum. That museum, although it shows more visitors remaining within its walls for over an hour, also shows the greatest number of visitors staying for the shortest length of time, that is, between 1.5 and 6.5 minutes.

The total time spent in a museum is not, of course, as important as what is done with that time. Table III gives a partial answer to this question. It presents data concerning the total number of pictures before which the visitors actually stopped. According to means there are, as one might expect, more pictures observed in the largest collection, but there are not proportionately more. In fact, when the relative sizes of the several collections are considered, this table even more than the previous one reveals an element of hurry in the largest museum. Its visitors looked at a much smaller percentage of what they might have looked at than did the visitors in the other museums. The medians are interesting especially for Lg. and Sm. 1. In this case there is an *absolute* superiority as well as a relative one for the smaller museum.

Taking the data before us, it is possible to calculate the chances of any picture in the large museum being looked at by any visitor, and likewise in the case of the other museums. According to averages, a given picture has about 1 chance in 20 of being observed by a given visitor to the largest collection, whereas such a picture in the most effective of the small collections has about 1 chance in 3 of being observed. In the least effective of the small museums, X, the odds for a given picture are better than 1 in 10, or, in other words more than twice as good as for a picture in Museum Lg. Yet the above probabilities can hardly be taken as unambiguous indicators of the effectiveness of the various collections. They tell us what happens in the case of the average picture and the average visitor. But almost always a large collection is better known and is situated where there are more potential visitors. It is likely, therefore, to draw more visitors. From this it follows that, although the chances of a given visitor stopping before a given picture are relatively small where the number of pictures is relatively large, a large collection will attract so many more visitors that the chances of a given picture being observed within a given time by *somebody* are relatively great.

TABLE IV

Frequency with which Various Numbers of Rooms were Entered

Number of rooms	Number of subjects			
	Museum Lg.	Museum Sm. 1	Museum Sm. 2	Museum X
47.5–48.5	1			
46.5–47.5	1			
39.5–40.5	1			
38.5–39.5				
37.5–38.5				
36.5–37.5				
35.5–36.5				
34.5–35.5	1			
33.5–34.5	1			
32.5–33.5				
31.5–32.5	2			
30.5–31.5	1			
29.5–30.5	1			
28.5–29.5	2			
27.5–28.5				
26.5–27.5	1			
25.5–26.5				
24.5–25.5				
23.5–24.5	1			
22.5–23.5	1			
21.5–22.5	4			
20.5–21.5	3			
19.5–20.5	1			
18.5–19.5	1			
17.5–18.5	1			
16.5–17.5				
15.5–16.5	1			
14.5–15.5	1			1
13.5–14.5	2			
12.5–13.5	4		1	1
11.5–12.5			3	1
10.5–11.5	2		5	1
9.5–10.5	3	3	4	2
8.5– 9.5	4	1	7	5
7.5– 8.5	2	3	14	4
6.5– 7.5	1	14	8	3
5.5– 6.5	1	20	11	1
4.5– 5.5	1	9	1	1

TABLE IV—*Continued*

Number of rooms	Number of subjects			
	Museum Lg.	Museum Sm. 1	Museum Sm. 2	Museum X
3.5– 4.5	1	5	5	3
2.5– 3.5	5		2	1
1.5– 2.5				3
0.5– 1.5	2			
Total.....	54*	55	61	27
Mean.....	17.1	6.2	7.7	7.4
Median.....	14.0	6.2	7.8	7.9
Mode.....	3.0	6.0	8.0	9.0

* In the case of 7 visitors we failed to secure full data on this point.

Considering total length of visit (Table II) there is a marked similarity between Sm. 1 and Sm. 2, which might be expected because of their approximately equal size. But in terms of total number of pictures observed Sm. 1 appears to have a greater effectiveness. Immediately one thinks of the quieter location of Sm. 1 and of its possibly more sophisticated clientele (see p. 15f.). And yet, one would expect such differences to bring about longer visits as well as more pictures observed.

In the main, Table IV corroborates the previous ones. Although there is a tendency to enter more rooms in the large museum, this tendency is far from proportional to the number of rooms which might be entered. In the smaller museums both medians and means indicate a tendency on the part of visitors to enter more than the total number of rooms available. This really represents the fact that in these smaller museums the tendency to return to rooms already entered is stronger than the tendency to omit rooms. One might possibly argue that any museum which, like these, causes the typical visitor to return to sections previously entered during the same visit is a museum which has not gone over the upper limit for effective size. There are other criteria that undoubtedly should be taken into account, but this one is not entirely worthless.

When a visitor stood before a picture and observed it for an appreciable period, this observation was, as we have said, timed and recorded. The various times obtained for each visitor were brought together and the average observation time calculated. Each average

is based upon the number of pictures which each visitor actually stopped to observe rather than upon the total number of pictures in the museum. The results of these calculations appear in Table V.

TABLE V

Frequency of Average Times per Picture in Seconds

Average time	Museum Lg.	Museum Sm. 1	Museum Sm. 2	Museum X
54.25–56.25″			1	
52.25–54.25				
50.25–52.25				
48.25–50.25			1	
46.25–48.25				
44.25–46.25				
42.25–44.25		1	1	
40.25–42.25				
38.25–40.25				
36.25–38.25				
34.25–36.25		1		
32.25–34.25		1	1	
30.25–32.25				
28.25–30.25	1	1	1	
26.25–28.25			1	
24.25–26.25			1	1
22.25–24.25			2	
20.25–22.25		1	2	
18.25–20.25	1		3	
16.25–18.25	4	2	3	
14.25–16.25		5	9	1
12.25–14.25	7	6	8	2
10.25–12.25	8	12	3	
8.25–10.25	8	14	11	2
6.25– 8.25	13	9	5	8
4.25– 6.25	11	2	5	7
2.25– 4.25	7		3	5
0.25– 2.25				1
Total.....	60*	55	61	27
Mean.....	9.2″	12.6″	15.0″	7.3″
Median.....	8.1	10.7	13.1	6.4
Mode.....	7.3	9.3	9.3	7.3

* A subject who looked at no pictures is omitted.

There is consistent evidence that visitors to the smaller museums, Sm. 1 and Sm. 2, behaved in more leisurely fashion than did visitors to Lg. As in two of the three immediately preceding tables, Museum X

TABLE VI

Frequency of Maximum Times of Observation of Pictures

Maximum time, in seconds	Number of subjects			
	Museum Lg.	Museum Sm. 1	Museum Sm. 2	Museum X
370.5–380.5″	1			
360.5–370.5				
350.5–360.5				
340.5–350.5				
330.5–340.5			1	
320.5–330.5				
310.5–320.5				
300.5–310.5				
290.5–300.5				
280.5–290.5				
270.5–280.5				
260.5–270.5	1			
250.5–260.5			1	
240.5–250.5				
230.5–240.5	1			
220.5–230.5				
210.5–220.5				
200.5–210.5				
190.5–200.5				
180.5–190.5		1		
170.5–180.5				
160.5–170.5				
150.5–160.5			3	
140.5–150.5				
130.5–140.5	1		1	
120.5–130.5		1	1	
110.5–120.5		1	1	
100.5–110.5	1	1	1	
90.5–100.5	1	3	3	
80.5– 90.5	1	1	3	
70.5– 80.5	3	3	1	1
60.5– 70.5	8	4	3	1
50.5– 60.5	4	6	8	1
40.5– 50.5	4	8	5	1
30.5– 40.5	7	9	10	5
20.5– 30.5	10	14	5	5
10.5– 20.5	9	3	9	8
0.5– 10.5	8		5	5
Total.....	60*	55	61	27
Mean.....	52.3″	51.1″	60.3″	25.9″
Median.....	34.8	42.4	43.5	21.5
Mode.....	25.5	25.5	35.5	15.5

* One subject looked at no pictures and is omitted.

seems to have gotten less of a grip on its visitors than the other two small museums. Between Sm. 1 and Sm. 2 there are differences revealed by means and medians in favor of Sm. 2. These, together with the differences in the same direction (heretofore not mentioned) present in Table IV, are perhaps important mainly in that they are reversals of Table III and therefore tend to minimize the possibility of an important distinction between Sm. 1 and Sm. 2.

The data thus far considered reflect the character of the visit as a whole. There remains the possibility that even where the total visit shows hurry, where the number of rooms and pictures skipped are many, and where the average observation time is short, there might still at some point in such a visit be a maximum of interest and enjoyment. Table VI, therefore, is based upon the time spent by each visitor in observing that picture with which he stayed longest. In other words, each visitor is represented in the table by his longest observation time. Museum X stands off by itself with low mean, median, and mode. The other museums give impressively similar results, although, by all measures of central tendency, Museum Sm. 2 shows greatest effectiveness.

Summary of Comparisons

The trend of the differences revealed in our various tables is to distinguish between the largest museum and the two typical smaller ones. The usual visitor to one of the latter sees a greater proportion of what is exhibited, moves through the museum in less of a hurry, and stays longer with each picture before which he stops than does the usual visitor to the large museum. Our own belief is that the number of pictures displayed is the main explanatory factor here, though this is only an opinion. The ideal test would be to move one of the small museums to the site of the large museum so that visiting populations might be considered more strictly comparable. It is our hope that the influence of the size of the collection exhibited may be put to accurate test in the not too distant future. This could be done wherever there were the possibility, in a museum possessing a large number of pictures, of presenting to the public various numbers of these pictures. It should be possible to determine for a given museum, with given wall space, the optimal number of pictures for general display. Of course, this question does not involve study materials for professional or semi-professional purposes. We are concerned only with the casual visitor.

III. MUSEUM "FATIGUE"

The Meaning of "Fatigue"

Of the numerous psychological problems recognized by museum men perhaps none has been more prominent in their eyes than that signified by the expression "museum fatigue." In practical terms such "fatigue" is characterized by aching muscles, tired neck and eyes, and by the vague but insistent desire to escape from too many pictures or too much sculpture. There has been current in regard to "museum fatigue" a belief that somewhere at the heart of the matter is a simple psychological or physiological principle the uncovering of which would make the elimination of this "fatigue" a relatively easy business. This popular conception did not, by any means, originate in connection with the museum visitor. It has an ancient source in popular and scientific speculation and has customarily been applied wherever the term "fatigue" has seemed, on any grounds, relevant. But, from the standpoint of our present interest, we should note, first of all, that the attitude of modern science toward older and still popular notions of "fatigue" is extremely critical. As a matter of fact, only a bold or careless man of science today uses "fatigue" without enclosing it in quotes.

In ordinary speech "fatigue" may mean incapacity, or reduced capacity, for further activity of a given kind following unduely continuous work or play or excitement or deprivation from sleep. It may mean the awareness of discomfort, pain, or even boredom associated with the above causes. Or it may mean some hypothetical physiological condition at the bottom of reduced capacity and increased discomfort. The reasons for distrusting the term as ordinarily used should now be apparent. It means too much to mean anything precisely. It means a mixture of fact and hypothesis. There is no reason why a single term should not be applied to an alleged organic basis for all that is called "fatigue," but there is reason for not applying one term both to such undeniable facts as reduced capacity and awareness of tiredness on the one hand and to the hypothetical explanation of these facts on the other hand.

As we have said, present-day psychologists are extremely critical of a term having such ambiguities attached to it. Some, like Watson, would be happier if the term were banished; others, like Thorndike, would keep the term but restrict its meaning to one of the most definite phenomena with which it has been associated—that is, to reduced performance; still others, like Dodge, would brush aside debate about the term and set to analyzing the multifarious facts and hypotheses which the term has so unsatisfactorily attempted to embrace. These views are not to be completely reconciled, yet, taken together, they reflect a unitary opinion upon one important issue. In none of these cases is there a tendency to bring all "fatigue" phenomena under a single explanatory principle.

Perhaps we can summarize these annoying doubts in two statements: (1) What is ordinarily meant by "fatigue" is not one phenomenon, but many; (2) Behind these many phenomena there lies not one explanatory principle, but many.

Where Shall Investigation Start?

It is clear that no amount of argument over terms or principles can remove a practical problem. And certainly no one would maintain that museum visitors get less tired because their tiredness is difficult to define and explain. Yet, our investigation of the museum visitor can profitably take account of the argument. Only in that way are we likely to avoid programs which would be doomed to almost certain failure. It is not feasible to search for the *one* organic cause of all that is called "museum fatigue," because there seems little likelihood that there is such a cause or that we could uncover it if there were. And, further, it is not feasible to seek data regarding everything which goes under the head of "museum fatigue."

With such considerations as these in mind, we formulated the simplest possible questions relevant to this whole set of problems. We asked ourselves what observable changes take place in the behavior of the museum visitor in the course of his stay in the museum. Does he observe pictures more and more hastily as his visit continues? Does he skip more pictures without looking at them? Does he pass more rooms without entering them? Does he show a progressively decreasing tendency to stay a long time with some particular picture? We realized that whatever answers might be secured to these ques-

tions would leave occasion for debate about interpretation. That is almost always true, however, wherever scientific facts are gathered.

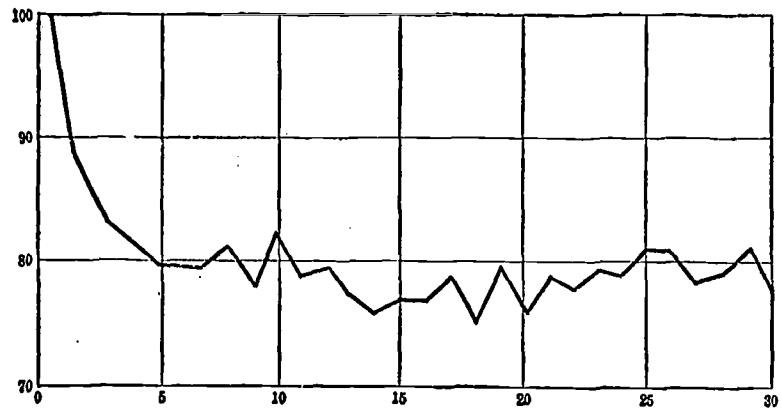

FIG. 1. WORK CURVE FOR ADDITION

The vertical axis represents the score on addition test. The horizontal axis represents the successive half minutes of work. From Chapman and Nolan, *American Journal of Psychology, 1916*.

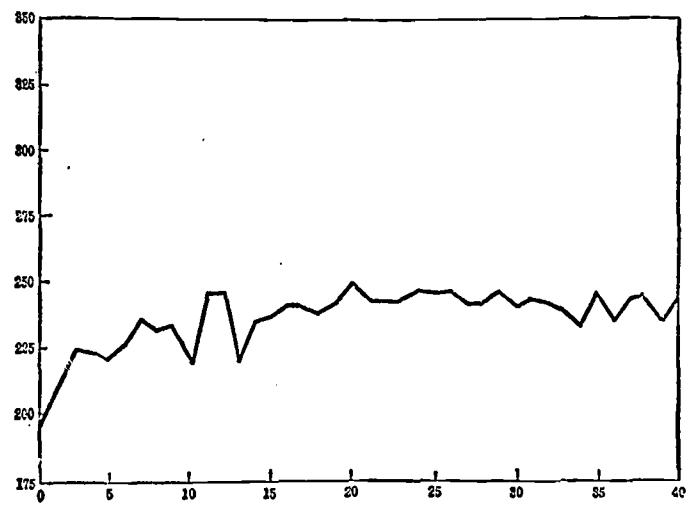

FIG. 2. WORK CURVE FOR BACKWARD RECITATION OF ALPHABET

The vertical axis represents the number of letters recited in 30 seconds. The horizontal axis represents the successive 30-second periods of work. Values are averages for 4 subjects. Adapted from Robinson and Heron, *Journal of Experimental Psychology, 1924*.

The Work Curve

A well established method of analysis in psychology and physiology is represented by the construction of so-called *curves of work* or *work curves*. The subject's productivity or accuracy or reported feelings are measured in some manner at successive intervals during a total period of work. In case the data are actually thrown into the form of a graph there results a line or curve representing the state of affairs at successive periods of the work. If the curve falls to the right, as in Figure 1, we have the usual loss in efficiency, the work decrement, associated with "fatigue." If the work curve is long enough such a fall to the right is very likely to be present. Increase of efficiency, shown by a rise to the right, occasionally occurs, especially early in a work period (see Figure 2). Such a rise is called a *warming-up* effect. The type of facts revealed in graphic form by the *work curve* can also be shown in tables where an efficiency value is paired with each observed point in the total period of work. Such tables are not as easily read as the graphic curve, if the data are numerous and complicated. They are perhaps a little better, however, where the data are not too numerous. As a matter of convenience we shall refer to all variations in behavior with the progress of the visit as *work curves*, though in certain cases we shall not present the results graphically and in no case do our results presume to present anything which is customarily called "work."

Observation Time per Picture for Successive Parts of Visit

It will be remembered that whenever a visitor stopped before a picture his observation time was measured and recorded. Such records furnish the basis for work curves of the total visit. There is one curve for every visitor, but these individual curves are too numerous and, what is more important, too irregular to warrant separate presentation. There was a necessity, therefore, for combining them in a manner which would statistically iron out minor irregularities and give us a bird's eye view of this phase of our results. The method of combining individual work curves was somewhat more complicated than is usually the case because of the fact that practically no two visitors looked at the same number of pictures. In other words, the individual curves varied a good deal in length. Our actual procedure was to divide each individual curve into tenths. Thus we were able

to secure for each curve a value representing average observation time per picture during the first tenth of that individual's visit, a value for the second tenth of the same individual's visit, and so on. These values were readily combinable with those for any or all other individuals whose results had been treated in the same way. We arbitrarily eliminated from this part of our study visitors who had stopped before fewer than ten pictures. The remaining visitors had stopped to observe from 10 to 267 pictures. For the benefit of readers who may be interested in the more technical side of our method, it may be said that, where the total number of pictures observed was not a multiple of ten, we employed simple linear interpolation.

Before presenting the work curves derived from actual museum behavior, we shall introduce a laboratory experiment which was carried out as a supplementary enterprise. The subjects were mostly undergraduate students of psychology having no special interest in painting or similar arts. Complete records were obtained from 27 subjects, 14 women and 13 men. Each of these subjects, under laboratory conditions, looked successively at 100 pictures. The observation time was left to the subject's discretion. The following instructions were given verbally by the experimenter:

"The first thing I am going to do is to show you a series of pictures, one at a time, and I want you to look at each picture as long as it interests you. Then, when you have looked at a picture as long as you care to, let me know, and I will show you another picture This is not a memory test, and you will not be required to tell me anything about the picture afterward." (This last item was very important, because of the frequency of memory tests in the psychological laboratory.)

The subject sat before a table upon which there was a large screen of gray picture-mounting board, 32 by 22 inches, bounded by a 2-inch wooden moulding resembling a picture frame. Upon this board the pictures were successively placed. Black and white *University Prints* were employed. Ten types of pictures were selected, such as portraits, landscapes, animals, figure studies. In the entire series of 100 pictures, each type was included 10 times. Every tenth of the series included one specimen of every type. It would not have been advisable to have presented the 100 pictures in the same order to every subject, because then the work curve secured might have been a function of the pictures which happened to come early and late in the

total series, rather than of serial position as such. For this reason different orders were arranged and the picture which occurred early in the series for one subject occurred late for another. The stop watch and recording sheet employed by the experimenter were hidden from the view of the subject so that he did not know that his observation times were being taken.

In Table VII we have presented average observation times per picture for successive tenths of the pictures observed, these figures being given separately for the different museums and for the laboratory experiment. Figure 3 is a graphic display of the same results.

In the main there is a decrease in observation time as the visitor's stay continues. The decrement is most marked in the case of the

TABLE VII

Average Times per Picture for Successive Tenths of Pictures Observed

	Museum Lg.	Museum Sm. 1	Museum Sm. 2	Museum X	Lab. Subjects
Number of Visitors	52	53	50	21	27
1st Tenth	10.8″	15.0″	14.8″	7.1″	26.0″
2nd Tenth	9.7	11.3	12.9	7.5	27.9
3d Tenth	10.1	10.8	17.0	8.5	28.1
4th Tenth	9.2	10.9	16.1	8.7	26.0
5th Tenth	9.0	9.9	18.3	7.8	25.7
6th Tenth	9.4	11.4	14.3	8.5	25.3
7th Tenth	8.0	11.8	12.9	7.8	25.7
8th Tenth	8.5	12.6	11.7	7.0	22.9
9th Tenth	9.7	10.4	11.0	8.9	22.2
10th Tenth	9.9	12.2	14.5	6.9	19.3

laboratory subjects. A possible explanation lies in the fact that all of these subjects looked at 100 pictures, whereas in the case of the largest of the actual museums the average number of pictures observed was only 56.2. This hypothesis is given some support by the flatness of the curve for Museum X (see Figure 3) in which the average number of pictures observed is smallest. There is, however, a very marked decrement in the latter half of the curve for Museum Sm. 2, a museum in which hardly more pictures were observed on the average than in X.

There is a distinction between the conditions under which the laboratory observations and the museum observations were made which may easily be more important than the total number of pictures

observed. The laboratory subjects were presented with one picture after another with no opportunity for rest between. The museum visitors, on the other hand, could, if they wished, establish a considerable interval between the observation of one picture and that of its

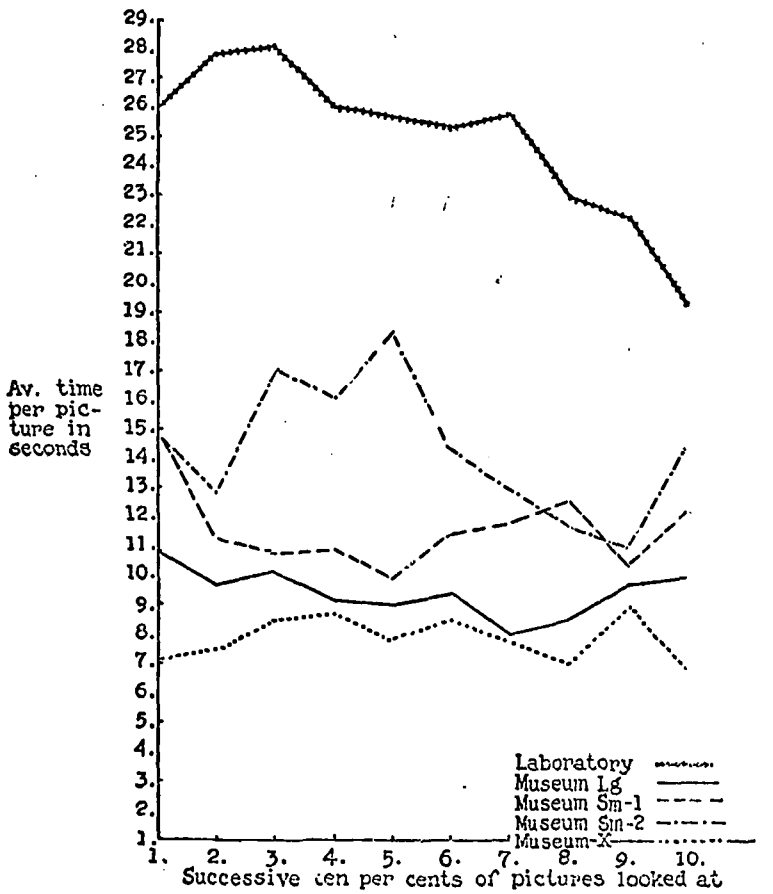

FIG. 3. COMPOSITE OF AVERAGE TIME PER PICTURE FOR SUCCESSIVE TEN PER CENTS OF PICTURES LOOKED AT

successor. It is possible that these "rest" intervals may have become progressively longer and so have compensated for a "fatigue" which otherwise might have appeared in decreasing observation time per picture. There is, however, another difference between the two sets of

conditions which one might expect to produce a *greater* decrement in observation time in the case of the museum observations. The museum visitors had to walk about from picture to picture. This meant exposure to the muscular aches which are alleged to be a frequent cause of curtailment of museum visits. The laboratory subjects sat comfortably throughout the experiment. The fact that, despite this item in favor of the laboratory group, their "fatigue" was greater might be taken to indicate that such matters as tired feet have less to do with progressive loss of interest during visitation than do number of pictures looked at and the continuity of observation.

Our curves suggest the additional possibility that the decrement may be related to the maximum height reached by the curve. Because they were a selected group or because of the peculiar conditions under which their observations were made, the average observation time of the laboratory subjects was higher than that for the museum groups. One might surmise, then, that because their initial interest was so great there was room for them to show a "fatigue" loss. The same hypothesis has some support in the case of the other group showing a marked decrement, that is the Sm. 2 group, which toward the middle of visitation, shows the highest observation time of any of the museum groups. It should also be noticed that the flattest curve of all is that for the X group whose maximum interest, as measured by maximum average observation time, was lowest of all.

One might have anticipated a *warming-up* effect in such results as these under discussion. That is to say, one might have looked for the point of maximum interest, the point of highest average observation time, not at the very beginning of the visit, but sometime later. This is, in fact, the case in the two curves occupying the two highest general levels, the curve for the laboratory group and that for the visitors to Sm. 2. But no such effect is clearly discernible in the other curves. The slight early rise in the level of the X curve is, more likely than not, simply a chance variation, rather than an indicator of a significant rise in interest.

We felt that the data represented by Table VII and Figure 3 required further analysis than is possible from mere inspection. The curves that have been discussed above are all highly composite affairs. That for Museum Lg. represents the behavior of visitors for whom the total number of pictures observed varied between 10 and 267. We thought that the character of the curve for this museum (and those for

TABLE VIII

Average Times per Picture for Successive Tenths and Halves of Pictures Observed Grouped According to Numbers of Pictures Observed

Museum Lg.

No. Pictures Observed	10–39	42–104	109–267
No. Visitors	25	16	11
1st Tenth	10.2″	9.5″	13.3″
2nd Tenth	9.2	9.9	10.7
3d Tenth	7.5	11.9	12.4
4th Tenth	8.5	9.0	11.2
5th Tenth	8.7	9.1	11.3
1st Half	*8.8*	*9.9*	*11.8*
6th Tenth	8.7	9.3	11.2
7th Tenth	5.6	10.7	9.5
8th Tenth	5.8	10.5	11.9
9th Tenth	6.4	13.7	11.5
10th Tenth	7.9	14.1	8.4
2nd Half	*6.9*	*11.7*	*10.5*

Museum Sm. 1

No. Pictures Observed	10–40	43–59	63–155
No. Visitors	23	17	13
1st Tenth	15.0″	15.7″	13.9″
2nd Tenth	10.0	11.8	12.7
3d Tenth	10.2	12.6	9.7
4th Tenth	10.6	11.4	10.8
5th Tenth	7.4	13.1	10.0
1st Half	*10.6*	*12.9*	*11.4*
6th Tenth	10.7	12.9	10.7
7th Tenth	13.3	11.9	8.9
8th Tenth	13.0	13.9	10.2
9th Tenth	10.0	11.2	10.0
10th Tenth	12.3	11.8	12.5
2nd Half	*11.9*	*12.3*	*10.5*

Museum Sm. 2

No. Pictures Observed	10–25	26–52	53–100
No. Visitors	22	17	11
1st Tenth	13.5″	15.3″	16.8″
2nd Tenth	11.8	11.0	17.7
3d Tenth	17.3	13.4	21.7
4th Tenth	14.5	16.5	18.3
5th Tenth	19.2	16.7	19.0
1st Half	*15.3*	*14.6*	*18.7*
6th Tenth	11.5	14.0	20.3
7th Tenth	11.2	14.9	13.1
8th Tenth	9.2	12.6	14.6
9th Tenth	11.1	10.0	12.2
10th Tenth	15.5	15.5	11.1
2nd Half	*11.7*	*13.4*	*14.3*

the others also) might represent one group of visitors predominantly or that it might represent a mere compromise between visitors whose total visits were long and those whose total visits were short. For this reason we divided the visitors to each of the three main museums (sufficient visitors to justify division were lacking in the case of X) into three groups according to the total number of pictures observed. As in the earlier calculations, we arrived at the average observation times for successive tenths of the total material observed. These values are presented in Table VIII. In order to facilitate interpretation we have also given the average observation times for successive halves of the observed pictures.

We have previously considered the possibility that the amount of decrease in observation time with the progress of the visit is largely determined by the total number of pictures observed. Although this possibility was given some support by the marked decrement shown by the laboratory subjects, all of whom observed more pictures than the average of the group for any museum, the occurrence of the next most marked decrement in the curve for the smallest of the museums showed at least that the total number of pictures observed *need not* be a dominating factor in the determination of the magnitude of the decrement. This whole question can again be considered in connection with Table VIII. Are the most pronounced decreases in observation time to be found where the greatest number of pictures are observed? In all three museums there is, from the first to the second half of the total visit, a decrement for the group looking at the largest number of pictures. But the groups looking at the smallest number of pictures and the groups looking at a middle number of pictures show decrements in only two out of three museums. Yet the irregularity of the data preclude our attaching any great importance to this superficial difference. We can be justified in concluding only that the tendency throughout our visitors is toward a decreasing observation time with the continuation of the visit. There are doubtless conditions under which the number of pictures observed would be a major factor in determining the magnitude of loss of interest, but we cannot be certain that we have isolated any such condition.

Pictures Observed During Successive Parts of Visit

There was one other objective and unambiguous aspect of behavior in terms of which the work-curve type of analysis could be applied.

We recorded the number of pictures observed in each successive room through which the visitor passed. Since we knew the total number of pictures in each room, it was an easy matter to calculate the tendency to pass by pictures at different stages of the visit. Principally because of the small number of rooms that they contained, this procedure was not very applicable to the smaller museums, but we present in Table IX the results for Museum Lg. Only those visitors were included who entered from 10 to 48 rooms. There were 38 of such visitors.

Table IX offers some support to our findings regarding observation time. The major trend is toward a decrease in number of stops

TABLE IX

Percentage of Pictures Observed Out of Those Passed in Successive Tenths and Halves of Visit. Composite for 38 Visitors to Lg.

	Per cent of Pictures Observed
1st Tenth	9.5
2nd Tenth	10.7
3d Tenth	13.2
4th Tenth	11.4
5th Tenth	11.3
1st Half	*11.2*
6th Tenth	10.6
7th Tenth	10.8
8th Tenth	11.4
9th Tenth	9.1
10th Tenth	7.4
2nd Half	*9.9*

as the visit progresses just as it was toward decreasing observation times. The initial rise in number of stops, from the 1st to the 3rd tenth of the visit, appears marked enough to represent a genuine warming-up effect. If so, there is a difficulty of explanation, however, because such an effect was notably absent from the composite observation-time curve for the large museum (Figure 3). And only one of the three groups of visitors to Lg. considered in Table VIII indicated the possibility of such an effect. Of course there might be a warming-up effect in one aspect of "interest" and not in another. But we have no explanation for the discrepancy in this particular case.

Summary

The outstanding result of the present section of our study is an objective and clear-cut demonstration of the existence of a "fatigue" effect in the behavior of the museum visitor. If this result seems to be the only one which could have been expected, the reader's attention may be called to the fact that objective tests about as often as not find no such effect even when, subjectively, there is the greatest certainty of it. Periods longer than two successive days and nights without sleep find many subjects as able as ever, according to objective measurements, to perform difficult intellectual tasks, such as mental multiplication. It would not have been so surprising, then, if museum behavior had failed to show any real evidence of failing interest. But such a loss was found so generally that it may be accepted as significant.

It is one thing, however, to have surely detected a "fatigue" effect and quite another to say whether that effect is slight or pronounced. Absolute standards are in such a case useless. (Who is to say whether two seconds per picture is a great loss or a small one?). We can, therefore, simply compare the loss under different conditions—where few or many pictures are observed, where pictures are observed continuously or with occasional interruption. When such comparisons were made, we found differences of varying magnitudes between the "fatigue" effects secured. In certain instances there was scarcely any loss discernable, though usually it was clear and at times very marked indeed. Now these differences in the "fatigue" effect should furnish the best starting point for a further understanding of the effect. Although the limits of our data prevent accurate conclusions being reached at this time, they define certain problems rather well. For instance, we got the greatest "fatigue" effect where there was the least walking about on hard floors, but the greatest continuity of observation and also the greatest number of pictures observed. Is it true, then, that tired feet constitute a very minor cause for loss of interest? The factors, which are tangled together in our observations, deserve isolation.

In the course of the observations and experiments that are to be described in the following pages, we shall report further data bearing upon the "fatigue" problem.

IV. EFFECTS OF SIZE, POSITION, AND CONTEXT UPON THE INDIVIDUAL PICTURE

Results from the Museums

Thus far we have considered the visitor's behavior largely as affected by the collection as a whole. But before understanding can lead to control it is necessary to take into account some of the minuter influences associated with variations in interest. Whatever the size of the total collection, whatever the serial position of a single picture, there are also matters such as size, local position, and immediate context which are capable of raising or lowering the level of interest. We shall first discuss some of these factors as observed in the museums.

We early made the attempt to record for each visitor, not only the number and lengths of the stops made, but also the specific pictures observed. As we have said elsewhere, we found it impossible, except in the smaller museums, to record with any real success which pictures were observed. But we were able to record which pictures were looked at for a very long time and from this we could determine for each individual that picture which he looked at longest. By considering the characteristics of pictures that were given the most prolonged observation we were able to secure some basis for evaluating those characteristics.

There were many cases in which we were unable to account for a picture being favored without entering into its more intrinsic features and values, and that was beside our purpose. Actually, in a little less than half the cases we found that favored pictures were large, or central, or isolated, or in some other purely formal way given an emphasis beyond that which they intrinsically carried. This would seem to indicate that these extrinsic, incidental features of a picture have almost as much power in catching and holding attention as do factors involved in the fundamental aesthetic value of the work. However, the first glance at our results probably exaggerates the importance of the extrinsic factors. Many of the large pictures are also unusually good and, unless the curator be perverse, this is even truer of the centrally hung pictures. In other words, the better pictures in a collection are likely to be given a certain advantage in the

hanging. Although there is no way of completely separating these extrinsic and intrinsic factors, it is our judgment that the former, while not, in themselves, quite as effective as they seem, are nevertheless of substantial importance. Certainly the director of a museum should pay particular attention to the hanging of any masterpiece which is small or of low luminosity. Although important formal factors are against this picture, there is *isolation* which can be brought to its support and also *central location*.

Among the formal, extrinsic factors that we singled out for observation certain factors and combinations of factors appeared more effective than others. Following is a list of these in the order of their effectiveness:

First: Large size and central position combined
Tied for second: Size alone and end position alone
Fourth: Size and end position combined
Fifth: Size combined with isolation
Sixth: Isolation alone
Seventh: Central position alone

This ranking, although it gives an accurate picture of what we observed, must be taken with a grain of salt. The museums studied were not arranged for the purposes of our work and therefore these various formal factors were not given equal chances of being effective. There were, for example, many more large pictures than isolated ones, therefore isolation did not have a fair show. Our ranking is interesting, however, in showing the actual effectiveness of these formal factors as they were found in typical museums. It is also interesting in that it makes clear the desirability of securing a comparative rating of such factors under simpler and better controlled conditions.

The Effect of Isolation

The formal factors and their combinations are so many that almost limitless opportunities for experimentation are offered. We decided to begin with the factor of isolation, which seemed to us both fundamental and practical. If a curator has a small picture that he wishes brought to the public's attention it will not help him to know the interest value of size. But any picture, large or small, bright or dull, can be hung in any desired degree of isolation.

Students were again used as subjects and the technique was essentially the same as that employed in the experiment described in Chapter III. Indeed, that earlier experiment gave us one-third of the

TABLE X

Frequency of Average Times per Picture for Different Exposure Conditions

Average time per picture in seconds	Number of subjects		
	One picture at a time	Two pictures at a time	Ten pictures at a time
56.25–58.25″	1		
54.25–56.25			
52.25–54.25			
50.25–52.25			
48.25–50.25			
46.25–48.25			
44.25–46.25	1		
42.25–44.25			
40.25–42.25			
38.25–40.25	1		
36.25–38.25	1		
34.25–36.25	2	2	1
32.25–34.25	1	1	0
30.25–32.25	1	1	0
28.25–30.25	4	0	2
26.25–28.25	0	3	0
24.25–26.25	1	2	1
22.25–24.25	1	1	2
20.25–22.25	3	4	5
18.25–20.25	1	2	1
16.25–18.25	2	1	1
14.25–16.25	2	0	3
12.25–14.25	2	3	3
10.25–12.25	2	0	2
8.25–10.25	0	2	1
6.25– 8.25	0	2	3
4.25– 6.25	0	1	1
2.25– 4.25	1	0	1
Total.....	27	25	27
Mean.....	25.18″	20.37″	16.88″
Median.....	23.25	21.00	15.92
Mode.....	29.25	21.25	21.25

results to be discussed in the present connection. In the earlier experiment, it will be remembered, each subject looked at one hundred pictures in succession, observation time being left to his own desire

and judgment. Two new group of subjects were introduced. The subjects in one group looked at the same one hundred pictures, but the pictures were shown two at a time instead of one at a time. The subject was not directed to look at both pictures at once—his directions were the same as those used for the earlier group—, but there were always two pictures within his field of view. The other new group of subjects had the one hundred pictures put before them ten at a time. The pictures in the case of both of these groups were displayed in decently pleasing combination and arrangement on large sheets of neutral gray mounting board. Where more than one picture was shown at once, observation time was taken for each two or each ten pictures. Time per picture was readily obtained by

TABLE XI

Average Time per Picture for Successive Tenths of 100 Pictures

Tenths	One at a Time	Two at a Time	Ten at a Time
1st	26.0″	23.3″	15.9″
2nd	27.9	24.9	18.2
3d	28.1	24.5	18.0
4th	26.0	22.9	20.3
5th	25.7	22.8	18.7
6th	25.3	20.8	19.2
7th	25.7	18.4	17.4
8th	22.9	16.6	14.9
9th	22.2	15.8	14.5
10th	19.3	14.1	13.0

division. There was no reason to get the time for specific pictures. Table X shows the effect of amount of material simultaneously exposed upon the rate at which the elements of that material were observed. From an inspection of the table as a whole, as well as of the central tendencies (means, medians, and modes), it is plain that that condition in which there was complete isolation of each picture was the most effective in holding interest. It is also plain that, within the limits of this experiment, the greater the number of pictures simultaneously exposed the less the tendency to prolong the observation of a single picture. But the increase in *distraction* involved when the number presented at once is raised from two to ten is not proportionally as great as when the number is raised from one to two. This fact would appear to argue that the really pronounced effects of

isolation are to be secured only when that isolation is something like complete. Or, to face in the other direction, a little distraction in the field of view is almost as effective as a great deal. Such a conclusion should not seem strange. No matter how much material is before one, he can, after all react only to a portion of it at one time.

With limited space at his disposal, the curator must necessarily be restricted in his use of the very powerful factor of isolation. But

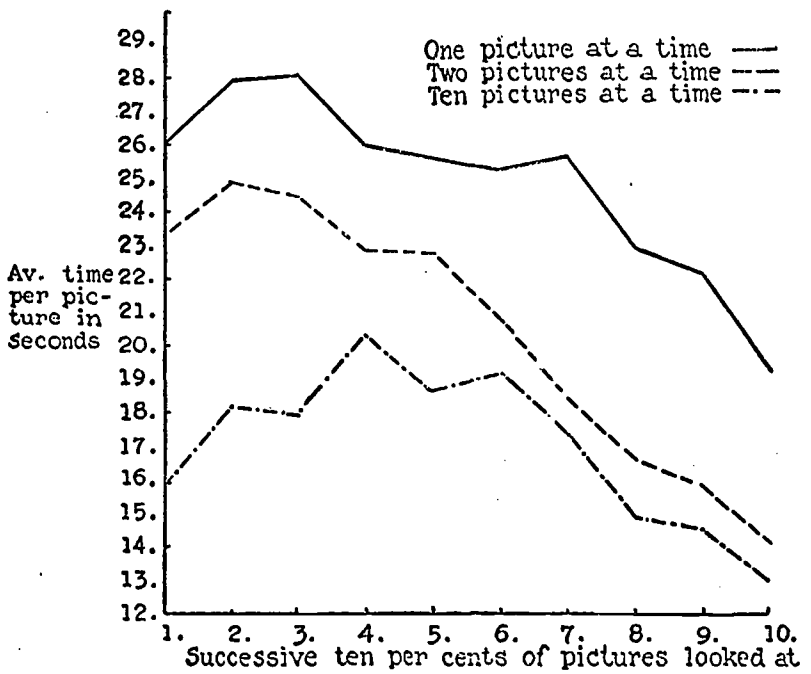

FIG. 4. COMPOSITES OF AVERAGE TIME PER PICTURE FOR SUCCESSIVE TEN PER CENTS OF PICTURES LOOKED AT

before he strives to get what advantage he can from it, he might well set up his own experiments, with his own materials and within the general atmosphere of his own museum, in order to determine the minimum degree of isolation which he may expect to have real effect.

Effect of Isolation Upon Fatigue

The experiment described above furnished new data bearing upon the question of "museum fatigue." We were able to calculate average

observation time per picture for successive tenths of the number of pictures observed. The results are shown in Table XI and in Figure 4.

Perhaps the first fact to stand out is the consistent disparity among the three conditions of observation. What we had previously seen to be true for the series of pictures as a whole, we now see to hold throughout the series. A warming-up effect appears to be a quite genuine characteristic of the three curves; it is marked in all of them. Whether the delayed culmination of this effect in the ten-at-a-time curve is actually due to that condition, as such, is hardly to be decided without further data.

The decrement is pronounced under all conditions. If, as we believe, the best measure of that effect is not the total fall, but rather the rate of fall—that is the downward slope of the curve—then the effect is about equal under these three conditions. There is importance in this finding. One might assume that any factor which has the power to increase average level of interest will also postpone or minimize fatigue. But here we have an instance in which such a correlation is absent. Conditions that are much more effective from the standpoint of average level of interest show just as marked a fatigue effect and one that is more prompt in beginning. In this connection it may be remembered that, in the first group of curves considered (Table VII and Figure 3), the most marked fatigue effects were in curves the general levels of which were relatively high. It would, of course, be unwarranted to conclude that, in general, whatever increases level of interest will increase rate of fatigue or at least leave the rate unretarded. We have secured instances, however, where such is the case, and these should stand as a warning against the other assumption, which is a not unnatural one, that a high level of interest and resistance to the fatigue effect are almost necessarily bound together.

Effect on Interest of Variety of Context

A variable within the museum situation which may well have its effect upon behavior is the uniformity or variety present in the context of a given picture. A landscape may be in a room where all the other paintings are landscapes—perhaps landscapes of the same general type—or it may be in a room also containing portraits, marines, Madonnas. While the grouping of paintings by artists, periods, and

donors is likely to preclude the possibility of ever following in a strict manner the dictates of psychological considerations, we felt that it would be worth while to illustrate a psychological approach to this general question. Most museums are likely to have at least some free range within which psychological principles of grouping pictures might well be followed.

We undertook museum as well as laboratory studies along this line, but for reasons beyond our control only the latter were brought to completion. And they should have been extended very much beyond the point at which we had to bring them to a close. Since the results are open to a good deal of statistical question, we shall describe these experiments somewhat more briefly than otherwise would be the case.

The method was similar to that discussed in connection with our preceding laboratory studies. Student subjects, individually, were confronted with pictures (University Prints) which they were told to observe according to their interest. Again it was made clear that there would be no test of their remembrance of the pictures. In all, 25 pictures were presented. These were given to the subject 5 at a time, each 5 being mounted pleasingly on a gray board. Altogether, 5 types of content were represented: landscapes, portraits, marines, Madonnas, and animals. The subjects (80 University of Chicago students) were divided into 5 groups of 16 each and each group went through a different one of the following conditions:

Condition I. All pictures on each card of the same type. Subjects first looked at all the landscapes, or all the Madonnas, etc., then at all of the pictures having another type of content, until the entire 25 were observed.
Condition II. Two types on each card.
Condition III. Three types on each card.
Condition IV. Four types on each card.
Condition V. Five types on each card.

However the conditions varied, the same 25 pictures constituted the total series.

The average time per picture for all subjects and all conditions is 17.08 seconds, which is very close to the 16.88 seconds obtained when 100 pictures were observed, 10 at a time. It is a little longer than the times secured for Museums Sm. 1 and Sm. 2—12.6 and 15.1 seconds.

But our main interest is in the relative standing of the present 5

conditions of observation. The means or averages together with certain measures of reliability called *probable errors*[1] are included in Table XII.

The differences among observation times under the five conditions are not large. Nevertheless there is one tendency that looks convincing, namely, the consistent rise from Condition I up to and including Condition IV. The chances for a three-step progression of this sort being a statistical accident are extremely small. Thus, interest seems to increase steadily, though slightly, as the immediate context in which each picture is displayed is given greater variety. Psychologically this beneficial influence of eliminating possible monotony is quite comprehensible. The interesting point is that the benefits of variety are limited. Indeed, in the situation containing what appears to be the greatest variety (Condition V) there is the next to lowest observation times. Two explanations occurred to us, both of

TABLE XII

Average Time per Picture for Observation under Various Degrees of Homogeneity of Context

Condition	Average Time	P.E.$_{av.}$
I. One type on each card	14.6″	0.88
II. Two types on each card	17.2	1.68
III. Three types on each card	18.3	3.21
IV. Four types on each card	19.8	1.98
V. Five types on each card	15.5	1.82

which seem reasonable enough. In the first place, more than a certain amount of variety may prove trying in that it calls for too many large shifts in attitude on the part of the observer. Most workers recognize that the day's activities may be trying for either of two apparently opposed reasons: there may be too much monotony, or there may be too many calls for sudden and marked shifts of attention or attitude. The change from the fourth to the fifth of our conditions may represent a crossing of the critical line beyond which further increases in variety are deleterious. Our second explanation of these results has to do not so much with fundamental psychological principles as with the incidental nature of our own experiment. Since we used in all only five types of pictures, each card in Condition V con-

[1] Consult any standard manual of statistical method for meaning of the P. E. $_{av.}$. This is hardly necessary, however, in order to follow the present discussion.

tained one picture of every type. In this sense all of the cards displayed to the subject under this condition were somewhat alike. The cards containing fewer types would now appear with one combination of types and now with another. For example, in Condition III, one card might carry a marine, a portrait, and an animal group, and another might carry a landscape, a marine, and a Madonna. Thus, from the larger point of view of the ensembles, the condition utilizing the largest number of types was for that very reason forced into the greatest monotony. This possibility appeared plausible enough for us to wish to put it to an experimental test.

In our second experiment upon effects of variety of context an effort was made to eliminate the repetition of types in the succeeding cards of Condition V. To accomplish this we increased the total number of types to 10. The added types dealt with the following topics: children, peasant life, historical events, literary events, and allegory. A total of 25 pictures was again presented to each subject, again the pictures were presented five at a time, and again these five varied from being all of the same type to being all different. Not every subject observed the same 25 pictures, but in the course of the experiment all 10 types were equally often represented under each of the 5 conditions. However, the point to be emphasized about this experiment is that under Condition V, where the single card contained 5 types of pictures, this was not the same 5 types for each succeeding card. The subjects this time were 80 students in Yale University all of whom were enrolled in some course in psychology. These subjects were divided into 5 groups of 16 each, that is, one group for each condition.

The average time per picture for all subjects and all conditions was 15.5 seconds, about 1.5 seconds less than in the similar preceding experiment. This difference seems to us remarkably small considering the fact that the two groups of subjects were drawn from distinctly different populations.

Again, however, our interest is almost entirely in the comparison of observation times under the different experimental conditions. The data required for these comparisons are to be found in Table XIII.

In general the results of this experiment are less regular than those of its predecessor. In a situation of this kind where differences between adjacent values are relatively small, one hesitates to draw conclusions unless, as in the earlier experiment, there is a regularity in

the direction of the differences which more or less makes up for their small magnitude. In the present case we have no such regular progression as appeared in Table XII. One point that is, perhaps worthy of note is the superiority of Condition IV. This fact supports the earlier finding in indicating an upper limit to the benefits of heterogeneity of context. The failure of Condition V to show superiority over IV also suggests that the failure of increasing variety to benefit beyond the degree represented by Condition V was due in the first place to something more fundamental than the similarity of the cards used in Condition V. Obviously more subjects should

TABLE XIII

Average Time per Picture for Observation under Various Degrees of Homogeneity of Context

Condition	Average Time	P.E.$_{av.}$
I. One type on each card	16.0″	1.34
II. Two types on each card	14.0	1.65
III. Three types on each card	13.4	1.56
IV. Four types on each card	17.3	1.63
V. Five types on each card	17.0	1.60

have been secured in this experiment, but practical considerations of time and other duties prevented.

Although the statistical reliability of the two experiments on effects of variety of context are not nearly as great as one would wish, there is fairly strong evidence of the presence of one fundamental principle: *Interest may suffer either because the context in which a picture is observed is too homogeneous or too heterogeneous.* As in the case of our other results, there is a task left for the curator. He must determine for his own public, his own pictures, and his own walls where lies that optimal, intermediate zone in which the variety is sufficient to prevent boredom and monotony, and insufficient to create the strain of too frequent distraction.

V. GUIDANCE BY PAMPHLET

Is Guidance Legitimate?

One can distinguish two extreme theories regarding the development of taste for objects of art. According to the first, the educative process requires that the individual be exposed, not only to the actual art objects, but also to such historical and technical lore as may have a legitimate relation to art. According to the second theory, the development of artistic taste must have its real basis merely in repeated exposure to beautiful things, and information, supplied in words, is very likely to cause a perverted or artificial aesthetic development. As is usual in the case of such oppositions of opinion, there is an element of truth on both sides. A knowledge of historical or technical facts relevant to a painting, for example, often adds to its aesthetic value. Indeed, there are plenty of art objects that get the larger part of their value because of historical or technical facts about them. It would, on the other hand, be quite erroneous to deny that very deep and sound artistic appreciation may develop with scarcely any supplementation of the factual sort. And it would be almost equally erroneous to deny that the possession of a certain number of facts *about* art is frequently mistaken for genuine taste. Thus, there seems to be danger either in withholding factual information or in supplying it. Clearly he who is to become artist or serious critic cannot go without facts and clearly he who is never to spend a large amount of time at art can easily be supplied with facts that, while true, are distracting and confusing. This narrows down our own problem. We are concerned at present only with that person who *drifts* through the picture collection. He certainly should not be given a background of fact sufficient for a professional; he should not be given facts enough to confuse or oppress. But should he be left entirely alone in this regard? Should we trust that an interest will arise out of the haphazard process of looking about? Some of our readers will, at this point, answer: "Yes! Let him alone. If a real interest does not arise out of mere exploration of the museum, that visitor is hopeless." Perhaps they will add the principle that it is better to avoid *spoiling*

a few individuals possessing potentialities for sound taste than to amuse the many who are, after all, fundamentally hopeless. Now, as experimentalists we should hesitate to deny this possibility, because we are as lacking in proof that it is false as its advocates are that it is true. As an hypothesis about the museum visitor, however, it does not greatly interest us, because it discourages investigation of *what can be done by supplying the casual visitor with some sort of guidance.* And, above all, we wish to preserve for investigation all of the possibilities that we can. We have therefore assumed that the run of visitors are not hopeless and that their usually unguided wanderings can be made more rational and more enjoyable.

The Present Problem

Of the possible methods of supplying the visitor with guidance and information, two stand out as extremely important. There is guidance by means of a museum catalogue, or other printed matter, and guidance by personal conduction. There is a great opportunity for experimental study of guidance of both these types. In the studies, here reported, however, we confined ourselves to printed guidance. We were able to collect data upon this aspect of the situation more readily than upon the effects of the personally conducted visit. Furthermore, we felt that our initial experiments ought to deal with a form of guidance simple enough and inexpensive enough to be practicable for any museum.

The fundamental problem before us contains three questions: (1) Are present museum catalogues generally employed by the visiting public? (2) If not, is that because the public has a natural antipathy toward printed information, or is it because of the character of the available catalogues and the indifferent manner in which these aids are offered? (3) Is it possible to devise a form of pamphlet or booklet which the public will welcome and use to advantage?

Are Catalogues and Guide Books Widely Used?

It would be an interesting adventure to visit all of the important art collections and note the extent to which catalogues and other printed matter are employed by the public. We were unable to carry out such a wholesale investigation, but we did make observations on this point in the museums readily available. Museum Lg. has a large,

fairly complete catalogue and a small guide book. Both can be purchased at a desk near the entrance, the little guide book costing only five cents. We devoted an entire day to noting the use of these guides by the visitors to the picture collections of the museum. Of the 590 persons observed none carried the larger catalogue and 3, or about 0.5%, carried the small, five-cent guide book. The other museum having a regular catalogue was Sm. 2. Of 61 visitors there observed 2, or about 3.3%, carried the catalogue. Now the possibility may be proposed that the fewer catalogues used the better, but that possibility is totally irrelevant at this point. Whether the catalogue does more harm than good is not now debatable. Museums have booklets of various sorts which we may legitimately assume are supposed to be useful. It is our task simply to measure whether their effectiveness is great or small. If our observations are fair samplings of the museum situation, we may conclude that on the casual public these forms of guidance are having a very small effect. Similar observations should be made, we believe, by the staff of every museum utilizing any type of catalogue or guidance booklet. The director can then determine whether a revision of his present service to the public along this line is indicated.

As far as our program of study was concerned, we felt that the possibilities of helping the public by means of printed guidance are not taken advantage of to any great extent and that it would be well worth while to demonstrate in some small way what can be accomplished by such means. We therefore instigated two experiments. The first of these, though unsuccessful in its main purpose, revealed more clearly than a success would have done the general requirements for the efficient use of printed guidance. The second experiment was, to our minds, a straightforward demonstration of the extent to which museum behavior can be influenced by a carefully prepared pamphlet.

Experiment in Museum Lg.

We prepared, with the aid of members of the staff, a list of 33 pictures in Museum Lg. These were not the best paintings in the entire collection, but merely average ones. We limited ourselves to 33 because we felt that the attempt of museum visitors to see too much is one of the strongest factors in museum fatigue. The median number observed in this museum was about 35 and this was taken as an approximate measure of the typical saturation point. It is desir-

able that exact information upon this saturation point be established sooner or later, but this approximation was sufficient for our purpose at this time. The main thing was to encourage the visitor to limit himself to a reasonable number of pictures. Our motive for selecting "average" rather than unusual pictures was simple. We did not wish our results to be too much a function of the excellence of a special group of pictures.

An attractive two-page pamphlet containing the list of 33 pictures was printed in plain type. The title of the pamphlet was:

SOME PICTURES YOU OUGHT TO SEE

Under this title was printed:

Look for the one idea in each

Following this, there came the list of paintings. For each there was given its number in the present series, title, artist, location, and some simple, but interesting and significant statement. The general plan will be sufficiently illustrated by our reproducing here the facts given in connection with a few of the listed pictures:

4. Landscape with Figures, by Corot
Room 25. North wall, second from left end.
You can recognize a Corot landscape by the trees; they are masses of filmy leaves represented with little detail.

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5. Sacred Grove, by Puvis de Chavanne
Room 25. West wall, center.
The use of statue-like figures gives a decorative rather than a realistic effect.

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7. The Lion Hunt, by Delacroix
Room 25. South wall, left end.
The artist here is interested in what the figures are doing; in the Sacred Grove, which you have just looked at, he is concerned with the manner in which the figures are placed.

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26. Sentenced for Life, by Forain
Room 45. East wall, right end.
Each figure expresses just the emotion he or she would feel at the moment. Note the satire expressed by the lawyer's laugh at being thanked for getting a life sentence for his patron, rather than the dealth penalty.

32. Sunlight, by John Alexander
Room 48. South wall, center
Here the interest is in the way the light falls on the woman's dress, not in the woman herself. Notice that the artist has shown the woman looking down at the light; this is to draw your attention from her to the gleaming sunshine.

The series was arranged in such a way as to start near a natural entrance point and to follow a natural route through the museum.

The pamphlets were handed out by a guard to such visitors as would accept them. The guard pointed to the first of the listed pictures so that visitors could at least make a correct start. This service from the guard did not excite the suspicion which it would have excited had it been performed by one of our observers who were in plain clothes.

It was our plan to pick out at random lone adults who accepted the pamphlet and to follow such persons through the museum making the same observations of their behavior that we had previously made of the unguided visitors. We took special note of apparent difficulties experienced in locating the pictures described in the pamphlet. As it turned out, the first part of our task—that of recording pictures observed, time of observation, and so on—amounted to very little. But the noting of difficulties in the use of the guidance was most important.

Practically all of the visitors who accepted the pamphlet appeared interested and made a genuine effort to follow it. Our formal records cover 100 cases. Only 10 of these were able to make anything approaching a satisfactory use of the guidance that had been placed in their hands. The greatest difficulty occurred in connection with the location of the pictures. Very few of the visitors in this large building seemed able to keep in mind the directions of the compass. Those who started with good orientation usually lost it very promptly. The room numbering system contributed to the confusion. The numbers were placed over the doorways inside of the rooms indicated. Thus, in order properly to use one of these numbers, a visitor had to turn around and look over the doorway he had just entered or else he had to look across at the door by which he would leave. In one case the suggestion is strong that the number designates the room he has just left and in the other case it is equally strong that the number designates the room just beyond the present one. Much confusion

arose simply because the visitor would not exert any real intellectual effort. Often he would read the title of a picture and its room number and then begin a search for the picture without reading the more specific information as to its location within the room. It occurred to us that our results might have been better if we had placed room number and intra-room location before title and artist. This change was made and seemed to be successful in a second experiment.

Although, as we have elsewhere said, this first experiment was in one way a failure, it was not without importance. In a museum in which half of one percent of the visitors avail themselves of the five-cent guide book provided for them, almost all of the visitors will accept an attractive pamphlet if it is handed to them. Not only this, but they will make an effort to use this pamphlet. Their inability to use the pamphlet effectively in our experiment was due partly to the size and generally confusing aspect of this particular museum and partly to the fact that we certainly did not have the optimal arrangement of our information. The need, then, seemed to be that of keeping the visitor oriented throughout his visit. Without that he cannot be expected to use any kind of printed guidance effectively. We might add that the visitor's confusion in space relations and his unwillingness to set himself right is hardly to be attributed to stupidity. The museum situation should never call for severe mental effort in the solution of its irrelevant space problems.

Experiment in Museum Sm. 2

Our second experiment with the pamphlet method of guidance was carried out in Museum Sm. 2. Due principally to its large size Museum Lg. offered almost too many problems for this stage of our work. We therefore desired to see what could be done with this method of guidance in surroundings in which the visitor is less subject to spatial confusions.

Again we limited the number of pictures to be listed in the pamphlet. Twenty were included. This is several more than the median number observed by unguided visitors. (See Table III.) The pamphlet, this time, was entitled:

SOME PICTURES WORTH STUDY

The list of pictures and the information concerning each was again printed, plainly and attractively, in a two-page folder.

In the make-up of the folder we took account of what seemed to have been the chief shortcomings of the previous one. First position was given to the number of the room in which a given picture could be found and not to a meaningless serial number. Next came the wall position within the designated room. A number was given, but it was the actual museum number—the one which could be identified by looking at the label. Other less important features of the make-up of the pamphlet will appear below where we shall present the samples from the text.

The paintings were divided into groups according to the rooms in which they were hung and these groups so arranged as to make a natural progression through the museum. Near the top of the first page of the folder there was a map of the museum with the room numbers and the points of the compass clearly indicated. Such a map would not, of course, be as useful in the case of a museum of a great many rooms. The task of reading it would require more effort than one would have a right to expect from the ordinary visitor.

As our experience grew we began to think of the pamphlet method in terms of two main problems. First, the natural tendency of the visitor to "get lost" must be met. Otherwise, he will desert the pamphlet without wanting to do so. Second, the comments made about the pictures must enhance the visitor's interest. The former problem was largely psychological and for that reason we were brave enough to handle it ourselves. The latter problem, on the other hand, had important artistic elements and we required assistance. In the first experiment we had this assistance from the staff of Museum Lg. and very generous assistance it was. In the second experiment the aid rendered by a museum director, Miss Charlotte R. Partridge, was so great and so understanding that her name should be introduced at this point.

We did not go far enough to determine what types of comments about paintings are, in this instance and that, best designed to enhance interest, in the casual visitor. Obviously the comments should not become spectacular simply to arouse interest. Two things they can do to advantage. Where the idea of a picture lies in a phase of its technique rather than in its story content, the visitor can well be put upon the right track. After he has been given information of this sort for a time he will almost surely reach a point where he will ask himself, as he confronts a painting: "Is this a theme of color, of light,

of design, of human emotion?" A related function of the comment is to secure an active rather than a passive attitude on the part of the visitor. It may be suggested to him that, after looking at the picture from a proper distance, he go up close to the canvas and see how the artist achieved his effects. This advice was given in connection with one of the pictures included in Museum Sm 2 and the faithfulness with which the visitors followed it and the interest shown by their faces at the time were astonishing. Another encouragement toward the active attitude is to be found in comment which calls for a comparison between the picture now before the visitor and one which he has lately seen. The reader may remember that such a method was employed in the first pamphlet. But we can well afford to reiterate that the possibilities and principles underlying the art of brief commentary for the unsophisticated are mainly unknown. We have looked with interest on the problem and have done our best without certain knowledge. We only hope that sooner or later this whole field may be subjected to a thorough survey.

As in the case of our first pamphlet, it will suffice if we present only part of the second one.

(Title) SOME PICTURES WORTH STUDY

(Map of the museum)

IN GALLERY I	
North wall Left of doorway No. 119	The Little River, by Jan Monchablon The rural quality of this French scene is felt through the blue haze as well as in the lazily rolling hills and fields.
East Wall Right of doorway No. 264	An Angel, by Abott Thayer Look at this picture from five or six paces and notice the subtle blends of blues and whites. Now go close to the canvas and see how the artist secured these effects.
IN GALLERY III (Just East of Gallery II)	
West wall Second from left end No. 163	Sunset in Georgia, by George Inness Observe the simple massing of darks and the golden glow which permeates the entire canvas; this is typical of this artist's color.

East wall Fourth from left end No. 125	The Cabaret (The Tavern) by Jules Dupré A gem in color quality which gives us the mood of this particular time of day.

East wall Fifth from right end No. 99	Hark, the lark! by Winslow Homer Where is the lark? Notice the sturdy forms of these healthy and handsome farmer's daughters.

IN GALLERY V (just North of Gallery IV)

South wall Left of doorway No. 155	The Astronomer, by S. Buchbinder An excellent example of the miniature type of painting characterized by delicate, minute handling of details. The effect of this picture is not spoiled when one comes close to it.

This second pamphlet, partly due to its own character and partly due to the favorable situation in which it was tried out, proved to be decidedly effective. As we have said, there are probably conservatives so zealous for the preservation of complete spontaneity in all aesthetic domains that they will deny any possible excuse for our procedure. But they will not be able to deny its effectiveness.

During the period of observation the pamphlet was handed to 86 lone adults as they entered Museum Sm. 2. Fifty-five, or about 64%, used the list and were successful in finding the pictures listed. This stands in contrast to the 10% who had any success with the other pamphlet in the large museum. Of the 31 visitors to Museum Sm. 2 who did not follow the suggestions of the pamphlet, 24 carried it but made no reference to it, 4 looked at it only as they were about to leave the museum, 2 looked at it only at the start of the trip and one said he was unable to read without his glasses.

As to the effects of the pamphlet upon the behavior of those who referred to it throughout the trip, the individuals of this group were followed in the same manner as were those of the unguided group earlier described. Thus these two groups can be brought into comparison. Unfortunately we cannot ascribe the whole of every difference between them to the presence or absence of the pamphlet guidance. The group using the pamphlet was not as random a group as the unguided one inasmuch as only such individuals as actually utilized the pamphlet could be included in that group. Therefore, the greater

interest that we shall find manifested by the pamphlet-guided group may be due to some extent to the fact that individuals who chose to use the pamphlet rather than to disregard it constituted the more promising part of the total group to whom the pamphlet was handed. We can make only a rough estimate of the amount of difference between the groups that was actually caused by the pamphlet. In our own judgment this part is a large part of the entire difference. Our main reason for coming to this conclusion lies in the qualitative differences apparent in the most superficial observation. The individuals using the pamphlet showed by manner and by facial expression that they were really having a good time. There was a marked absence of that self-conscious uncertainty so characteristic of the vast majority of casual visitors. However, the reader is free to discount argument "from impression" to whatever extent his natural skepticism demands.

We may now proceed to the quantitative effects apparent in this guided group, whether those effects be taken to be expressions of a manner of sampling the visiting population or expressions of the use of the pamphlet. The effects are so consistent and of such decisive magnitudes that it will be statistically safe to confine ourselves to statements of averages and to omit consideration of more minute tabular details, such as total distributions and P. E.'s.

The average time spent in Museum Sm. 2 by unguided visitors is 17 minutes. Average length of visit here of those using the pamphlet is slightly over 28 minutes.

The average number of pictures before which stops were made is 30 for the unguided group. For the pamphlet group it is 46. This is, in a way, a curious and unexpected finding. We believed that perhaps the majority of casual visitors leave the museum with a feeling that they are pictorially saturated. It was for this reason that we listed such a small number of pictures. But the list did not tend to set a limit to the scope of the visit. It apparently had a stimulating effect and made the visitor look at pictures which were not included.

With guidance the average number of rooms entered is increased from the 8 of the unguided group to 9. Since the museum contains only 6 rooms, this indicates an unusual amount of retracing on the part of the guided visitor. Of course, retracing was not provided for by the pamphlet, but it seems to have been a part of the generally stimulating effects of this kind of guidance.

In the case of the unguided group no pictures were examined in 24% of the rooms entered. In the case of the pamphlet users this percentage is reduced to 19.

The percentage of the total pictures passed at which a stop was made is 16 for the unguided subject. It is approximately 25% for the latter group.

The average time spent upon each of the observed pictures is only slightly higher for the group using the folder. In one case the figure is about 15 seconds, in the other 17 seconds. For each individual, there was one picture at which he spent a maximum observation time. The averages of these times show a markedly higher level of interest for the guided group. The average maximum time for the non-pamphlet group is approximately 60 seconds; for the pamphlet group it is

TABLE XIV

Behavior in Museum Sm. 2, With and Without Pamphlet Guidance

	Without Guidance	With Guidance
Average Time for Total Visit	17′	28′
Average Number of Pictures Observed	30	46
Average Number of Rooms Entered	8	9
Average Percentage of Rooms in Which No Pictures Were Observed	24	19
Percentage of Pictures Observed of Total Passed	17	25
Average Time per Picture Observed	15″	17″
Average of Maximum Times	60″	82″

(Fractions are dropped in this table)

about 82 seconds. Since, under guidance, the maximum-time picture was almost invariably one of those listed in the folder, we may be sure that the folder's comments had something to do with the matter.

In order to bring the foregoing figures together for easy comparison we have put them into the above summary table.

Effect of Pamphlet on Fatigue

It will be remembered that work curves were constructed for the unguided groups visiting the various museums. One set of these curves shows the rising or falling of interest, as shown by average time per picture, with the progress of the visit (see p. 37). Similar calculations were made for the group which went through Museum Sm. 2 with the folder. Table XV makes possible a comparison be-

tween the unguided and guided groups in this museum. Figure 5 is a graphic presentation of the same data.

The major trend of events is perfectly clear. Although in both cases there are large irregularities in the progressive course of interest, the tendency for the unguided group is downward and for the guided group upward. In this comparison we may be fairly sure that the use of the pamphlet is the differential factor. If the groups were very unlike to begin with, we should hardly expect their initial behavior to be so similar. As it is, the groups show practically identical behavior during the first half of visitation. What difference is present during this period may safely be attributed to statistical accident. There is one consideration which could have made us expect a greater

TABLE XV

Average Times per Picture for Successive Tenths of Pictures Observed—Museum Sm. 2

	No Guidance	Guidance
1st Tenth	14.8″	15.5
2nd Tenth	12.9	15.5
3d Tenth	17.0	14.7
4th Tenth	16.1	15.7
5th Tenth	18.3	16.4
1st Half	*15.8*	*15.6*
6th Tenth	14.3	19.3
7th Tenth	12.9	20.2
8th Tenth	11.7	15.6
9th Tenth	11.0	20.8
10th Tenth	14.5	18.6
2nd Half	*12.9*	*18.9*

falling off in interest in the guided group. If the decrement were affected by the total number of pictures observed, that effect would tend to create a greater decrement in the guided group, since that group observed 46 pictures on the average compared with the 30 observed by the unguided group. The fact that the actual result was a reversal of any such tendency would throw more emphasis upon the presence or absence of the pamphlet as being the major determining influence.

It seems to us that the different slopes of the curves of Figure 5 furnish the strongest incentive for going forward with the development of the type of guidance which has here been given a preliminary trial. Without such guidance there is a gradual diminution in interest

as the visit goes on; with it there appears to be a gradual increase in interest.

Summary

Whether or not it is legitimate to supply the visitor to the art museum with any information, hints, or suggestions calculated to raise the level of his interest, the presence of guides, catalogues, and labels indicate that many museum directors accept the utility of such procedure. It has, therefore, appeared a proper task to experiment with

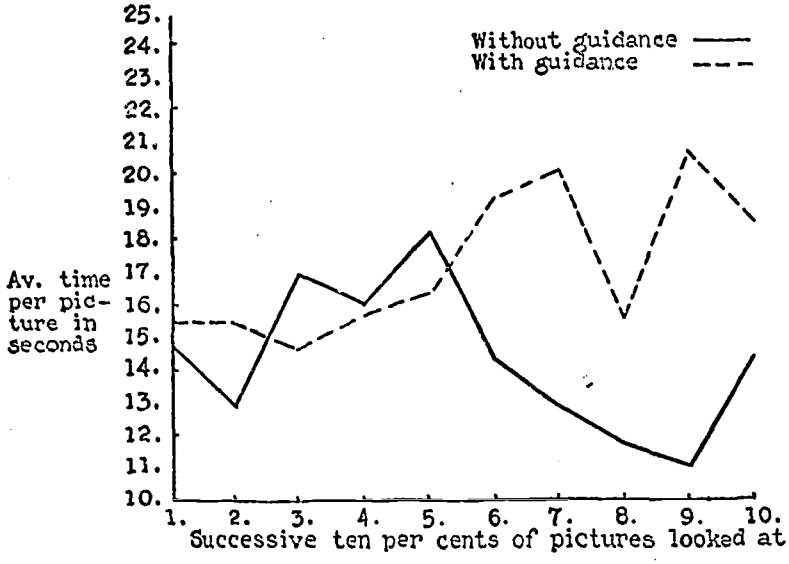

FIG. 5. COMPOSITE OF AVERAGE TIME OF OBSERVATION OF PICTURES FOR SUCCESSIVE TEN PER CENTS OF PICTURES LOOKED AT, WITH AND WITHOUT GUIDANCE

guidance of different sorts. When preliminary observation had shown us that the usual guide books and catalogues are little used, we devised pamphlets which were placed directly into the hands of the public. Although early results were hardly what we had hoped for, we acquired from them knowledge of the degree of simplicity that must be attained. Further experimentation in simpler surroundings and with a better prepared pamphlet demonstrated that the public will welcome such assistance; that the assistance will be put to use; and in all probability that it will raise the level of interest and also maintain that level for a relatively long time.

VI. THE ROAD AHEAD

The behavior of the museum visitor offers an inexhaustible stock of problems. There is no reason, therefore, to try to state how the finishing touches might be put upon the type of work that we have begun. The question is not one of how to finish the job, but simply one of how it may most profitably be continued and extended.

First of all, we should like to see museum directors generally become experimental psychologists. This would not require the sacrifice of the aims of artists and collectors. It would mean merely the acceptance of the fact that the behavior of the public is too complicated an affair to guess about while the possibilities of observation are open. It would mean that plans for appealing to the public, for educating and pleasing the public, be looked upon with skepticism until they have been submitted to observational test. Such a frame of mind implies quite other than a distrust of new ideas in museum management. It implies rather a need for *alternative* ideas, in order that empirical fact may offer grounds for selection. There is an advantage in entertaining the idea that museum walls and cases are too crowded. But how much more to be desired is a consideration of the specific questions: What is the optimal use of this wall space? What is the optimal use of that case? Such questions reflect more than skepticism. They reflect open-mindedness and an ambition for experimental investigation.

For the museum director who has decided to become experimental psychologist we believe that there can be no more profitable initial undertaking than what we might call a behavior inventory. Let him look at his own public. Let him record the casual visitor's behavior. Then let him study his records in order that he may get an accurate picture of what is going on in his domain. Does his public hurry? Does his public show signs of "fatigue?" Does his public look mostly at the large, bright objects centrally located? Such facts will enable him to compare his own museum with such as we have described in this report. But there is a more important use to which they can be put. Once an objective picture is obtained of behavior in a given museum, there will be supplied a basis for evaluating new practices. Only if

there is definite knowledge of how the museum functions under one set of conditions can there be grounds for saying that an attempted reform is or is not effective.

There is also a place for investigations aimed more toward general museum practice than toward the administration of some one institution. The essential requirement for sound work of this general character is a museum, or better a number of museums, in which experimental studies can be made. There must be walls which can be used in varying ways; labels that can be changed from time to time; cases the contents of which can be subjected to wide variation; catalogue devices of varying form. It would be ideal if one museum would volunteer to carry on intensive studies on use of wall space for pictures, another to investigate thoroughly the possibilities of pamphlet guidance, and so on. Questions concerning which we have been able to gather only the most fragmentary data might then receive something like authoritative answers, though it should again be said that the methods that we have sought to introduce will never produce rules-of-thumb. General investigations will furnish the cues for experiments in the individual museum and the better those more general investigations, the more definite the cues. But the substantial profits can be enjoyed only in those institutions where there is a willingness to experiment.

In concluding these very general remarks about the future of psychological studies in the museum, it is exceedingly encouraging to be able to report that the business of turning a museum man into an experimental psychologist is even now demonstrably feasible. Early last summer Mr. Fiske Kimball of the Pennsylvania Museum of Philadelphia suggested that experimental investigations be undertaken in that institution. This work was put into the hands of Mr. Horace H. F. Jayne, a curator in the Pennsylvania Museum. He has already accumulated important results, a preliminary report of which he makes herewith. This monograph ends, therefore, by turning from the experiments of a psychologist to those of a museum man. And this is the natural order of events. When the experimenter of the future requires some special advice regarding the establishment of controls, the treatment of results, and the like, let him call in the psychologist, but the progress of events in Philadelphia indicates exactly where the initiative should lie.

VII. A PRELIMINARY REPORT FROM THE PENNSYLVANIA MUSEUM

By Horace H. F. Jayne

In the recent work at the Pennsylvania Museum in Philadelphia an effort has been made to extend the investigation concerning the proper display of museum objects. The authorities of the Museum have been actuated by the concrete needs of a particular situation, for, as future administrators of Philadelphia's new Art Museum, the staff is faced with the question of how to show the city's collections of the fine and decorative arts not only to the best aesthetic advantage but also actively to serve as an educative force in a large metropolitan community. The new building presents unequalled advantages: because of its construction it is probably the most flexible building that has ever been erected for museum purposes; because of the great accommodations provided all at once, the display of the collections will not be hampered by lack of space or by disjointed additions. It therefore presents an opportunity to develop the most modern arrangements of exhibits, to eliminate factors that contribute towards "museum fatigue," and to order the galleries that they may best serve the needs of the general public. Hence it was felt that any psychological experiments that would contribute positive facts or that would test the tentative plans for the interior arrangements of the new building would be of concrete value.

The present museum building, Memorial Hall, a relic of the Centennial Exposition, has proven an ideal locale for such experiments, not so much because of its merits as because of its faults. Primarily, as a proper place for the modern display of art collections, it is distinctly antiquated: large galleries, high ceilings, oppressive architectural detail combine to diminish the visitor's attention to the actual things on exhibition. In the second place, the location of the building in west Fairmount Park inaccessible from the centre of the city, tends to keep away the more intelligent section of the public, while, conversely, the bulk of the museum's annual attendance of four hundred thousand is drawn from the typical untutored ma-

jority—precisely those whom it is particularly desirable to educate. Lastly, the overcrowded condition of the collections in Memorial Hall make the constant rotation of the exhibits virtually compulsory, so that experimental set-ups may be effected in a far less irksome manner than in the case of museums whose collections are arranged in a comparatively permanent fashion. In short, it was felt that where the various problems of display were solved in Memorial Hall and the proper modes by experiment there established, the same problems when faced in connection with the new building, with its adequately designed galleries, its favorable position in the city, and its extreme flexibility of plan, would be all the more easily met.

The tentative plans that have been advanced for arranging the Philadelphia collections in the new building have, naturally, determined the character of the psychological experiments carried on at Memorial Hall during the past five months. The principle tentatively considered for the arrangement of the main exhibition floor of the new Museum is the period-style plan regarded as representing the most advanced European practice:[1] Objects of one artistic epoch, whether they be paintings or furniture, rugs or textiles, ceramics, metalwork or jewelry will be shown together, either in plain galleries, or where desired in genuine interiors of the period—intimately associated so that the museum visitor will gain a comprehensible idea of the general artistic impulse that animated each period. This principle, anticipated in the Pendleton Collection, Rhode Island School of Design, and notably illustrated in the American Wing of the Metropolitan Museum, it was proposed in Philadelphia's new building to carry through all the various periods and countries.

It was, therefore, plain that fundamental tests should be devised to discover whether the general public is more susceptible to a group of mixed objects than to one of similar objects. This was approached from two angles: first, a series of table experiments in which a small group of objects varying in colour, form and material was contrasted with a small group of objects closely similar; second, by a series of gallery experiments in which the exhibition value of painting and furniture combined was contrasted with that of either paintings or of furniture alone. While space here does not permit a full setting forth of the experiments, the preliminary results go far towards proving the advantage of the period-style installation.

[1] C. R. Richards—"Industrial Art and the Museum," 1927, esp. pp. 18–20, 57–58.

The series of table experiments, as might be expected, gave the most direct answer to the question of whether groups of varied objects or groups of similar objects were most attractive. It is not necessary to detail here all the numerical results of the series, for it is hoped that the results of this investigation will be published at a later date. But a summary of the conclusions may well be given, since they seem to have a fundamental value rather than a merely local application to Philadelphia's requirements. Two tables were arranged for a certain number of Saturdays and Sundays with an equal number of varied objects—sculpture, pottery, metalwork, textiles and so forth—differing both in colour and in form. The number of seconds unaccompanied adult visitors stopped and observed the tables was then recorded. The average observation time of eighty-one visitors was 9.43 seconds per table. Next the tables were arranged with the same number of objects as before, but all closely similar in colour and size, for example a dozen Chinese pottery bowls, and again observation times were taken. The average for eighty-one subjects was 5.45 seconds per table. Although this falling-off is sufficient to show plainly enough the advantage of varied display, the figures fail to reveal the great number of visitors who passed by without observing the tables with the pottery bowls at all, whereas virtually every unaccompanied visitor stopped before the tables with the varied arrangements. Introducing a simple variation of colour without altering the monotony of form—six white bowls, and six black on each table, for example—did not appreciably increase the observation time. When, however, variety of form was introduced, though the colour monotony was preserved, that is, upon one table a dozen white pottery figurines, vessels, utensils; on the other a dozen bronze weapons, tripods, fixtures, and so forth—then the observation time per table was appreciably increased, 7.6 seconds being the average. Although it must be confessed that a difference of two seconds fails to stand as convincing proof of the superiority of form-variation over simple colour variation, yet the four seconds difference between the two extreme cases is surely significant, taking into particular account the greater number of visitors attracted to the tables when varied arrangements were displayed, and it does not seem improper to conclude from this series of experiments that, within limits, the greater the variation, the greater the observation time per group of objects, and the greater, too, the attracting power of such an arrangement.

The gallery experiments, although apparently simpler, since they presented a problem of contrast between only two classes of exhibits, contain, nevertheless, a disturbing factor which it is important to take into account. This factor, fully revealed throughout this set of experiments, is that paintings have a far greater exhibitional value than any other class of museum objects. Whether this is due to the traditional idea of museums as solely galleries for the display of pictures, or whether paintings have a greater absolute appeal than furniture, ceramics, textiles or metalwork, need not here concern us: in truth, it is doubtless a mingling of these explanations. The fact nevertheless remains. For example, in two different sets of experiments, where paintings and furniture were combined, the number of persons observing only pictures was almost exactly double those who observed both pictures and furniture, while the number of those who observed only furniture was so small as to be negligible, representing doubtless the collector or connoisseur of furniture whose observation though important does not show the reaction of the average visitor. It is further true that the majority of visitors passing through a gallery of paintings with no other objects shown in association will make some observation, whereas in the gallery arranged only with furniture, the majority pass through without making any observation whatsoever. For the testing of the period-style plan, therefore, it can easily be seen how important is this factor of the strong attraction of paintings. In a sense, it is in itself a strong argument for the plan, for, inasmuch as all period galleries and period rooms—with very few exceptions—will include paintings in their group content, the presence of the paintings insures at least the majority of visitors stopping in these galleries. On the other hand if they observe only the paintings, and neglect completely the objects of other classes, then the period-style plan fails in its chief purpose, namely to give a general impression of the artistic impulse through the whole range of fine and decorative arts. While it cannot be claimed that the experiments treating only with painting and with furniture cover by any means the entire field, yet the figures derived from them are surely encouraging and provocative. They may be best summarized and visualized in the following table.