applied psychology and animal psychology. As compared with his treatment of the factual discoveries of such a group as Külpe's, his treatment of the achievements of those American experimentalists who have been motivated by a dynamic view-point is, however, very incomplete. The reviewer has the feeling that the pioneer studies of Bryan and Harter and of Book on the acquisition of skill were of substantial importance even for the development of a generalized human mind. Stratton's classic experiment on inverted vision reflected very definitely the theoretic framework of American thought. Thorndike's studies of transfer and fatigue were other influential products of the experimental operation of that larger dynamic view-point which has pervaded America and determined the nature of a large part of the investigation done here. The reviewer has similar feelings in regard to Boring's treatment of animal psychology and the mental test movement. There is an attempt to characterize these subjects, but they are, after all, treated rather as offshoots from experimental psychology than as vital ingredients. Boring recognizes in a word that animal psychology has developed into a more general approach to mind than that afforded by the study of the human subject alone, but he has not paid tribute to the large part that investigations of animal behavior have had in shaping current notions of behavior. He recognizes that mental tests are an important offshoot from experimental psychology, but he gives little stress to the really epoch-making discoveries brought about by this device. The reviewer would hazard the prediction that the discovery of the almost invariably positive correlation of intellectual capacities will sooner or later be regarded as more important even for experimental science than the number of layers which somebody can discern in consciousness. It is not to be concluded from Boring's failure to treat in any detail the development of our knowledge of skill, intelligence and work that he regards these topics as trivial. The explanation seems to lie rather in the fact that he has purposely restricted the meaning of "experimental psychology" to what Wundt meant by that expression—"that is to say, the psychology of the generalized, human, normal, adult mind as revealed in the psychological laboratory." Like Titchener before him, Boring seems to feel that experimental psychology of this type must be kept clear of issues that arise out of application or out of investigations of animal behavior which the original Wundtian theory has always found it so difficult to place. But why should one want to confine oneself to the history of what is left of the Wundtian theory? That is a difficult question. It is especially difficult when one considers that the majority of the present work is an adequate history of "scientific psychology" in a much broader sense. It is only in his treatment of American psychology of the fairly recent past that Boring's interest shows its restriction.

Perhaps the reviewer attaches altogether too much importance to the fundamental, scientific contributions made by those who, in this country, have been dominated by a dynamic and functional point of view. It was not his wish, however, as he laid down this history that Boring had said a word less about occurrences within and close to the Wundtian tradition of experimental psychology. He only wished that the author had gone under the *schools* of functionalism and behaviorism and under the more superficial characters of the movements of application and animal study in order to bring out, as he surely would have brought out, discoveries of fact and the development of theory which have already shown their importance for psychology in its largest and most general sense.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

A MODIFICATION IN LANTERN SLIDE PROJECTION TECHNIQUE

IN the teaching of the usual courses in physiology, difficulty is experienced in the presentation of visual material. The usual method, and perhaps the simplest, is to draw the diagrams upon the blackboard during the lecture. This takes too much of the time from a short and busy lecture hour, time better occupied otherwise. Large charts mounted on cardboard are useful but have the disadvantage of being expensive, hard to keep clean, difficult to make and bulky for storage. It is often difficult to make them large enough to be easily seen by a large class.

Moving picture films are becoming cheaper and more accessible but are still expensive, and the exact diagrams and drawings of the individual lecturer are rather difficult to prepare in this way, taking a good deal of time and labor. Alterations are not easy, and still projection is hard on film.

Lantern slides still seem to be the best medium for charts and diagrams. However, the ordinary slide prepared by photography does not pass as much light as is often required when daylight illumination of the room is desired. Darkening a room for lantern slide projection is usually a strong hint to the class to take a nap. The process of preparing

lantern slides by photography is tedious and rather difficult.

A modification of this technique has been in use in our department for some time, and the method has been very convenient for some phases of visual presentation. The materials required are a number of glass plates the size and shape of the ordinary lantern slide, drawing inks of the waterproof type and drawing instruments. The plates may be prepared by cutting up thin window glass or boiling emulsion off of old photographic plates and cutting them up. Very fine pen points and camel's-hair brushes are necessary.

After thorough cleansing of the glass surface, the desired diagram is drawn directly in ink on the glass with fine point pens and brushes, using colored inks as desired. The material to be copied may be first drawn on paper and then the slide placed over it for the ink transference to glass. Details, such as fine shading, are rather difficult to reproduce and may often be better left out. But ordinary line drawings are very easily and quickly reproduced on the slide. Any color combinations may be used and, with care, color washes are often of value.

If the slide is to stand a good deal of wear it may be made fairly permanent by dipping the slide, after the ink has dried thoroughly, in a thin clear solution of rosin in xylol. The edges of the slide may be conveniently bound in black, gummed linen tape. The rosin-xylol coating is not necessary for ordinary use, the slide resisting all but direct heavy rubbing and scratching. Slides may be rapidly and easily altered at will. Fifteen or twenty minutes should be sufficient time to prepare a slide for lecture use.

The lines of even the finest pen are much heavier than the fine shading in photographic slides and therefore stand out heavily on the screen. Full daylight may be allowed to fall on the screen without marked diminution in visibility. The lines of the drawing being the only obstruction to the passage of light rays from the machine to the projection surface, very little light is cut off and a great deal of it is concentrated on the screen. Due to this fact and to the heaviness of the lines, a blackboard may be used as a screen in a daylight-illuminated room. Even the lines in black ink stand out clearly by reason of the intense illumination about them. This makes possible modifications of the usual technique of lantern slide projection.

Manifestly, if the lecturer is sufficiently facile with chalk drawing, the method of building up diagrams as the lecture goes on is best of all. The student sees the picture grow under his eyes at the same time that word pictures are built up by the speaker. However, this takes a good deal of time. Few lecturers are possessed of the magic touch of being able to draw accurately and artistically in a short period of time while simultaneously delivering a lecture. To make this easier, the basic fundamental outlines required may be prepared upon slides and projected upon the board. Then while lecturing the speaker may quickly and easily put in the necessary additions or alterations in chalk. By virtue of their lack of reflecting power, the chalk lines are distinct from the original outlines. Altering or adding is much easier and more rapid than the building up of the entire diagram. An eraser may be run over the board and the original lines left for reference and equilibration.

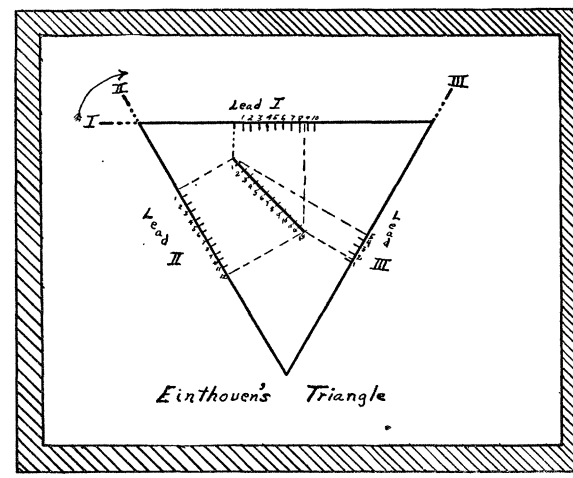

FIG. 1. Einthoven's electrocardiographic triangle. Slide may be projected on board, and after explanations, direction of heart axis may be changed by chalk alterations, simultaneously changing length of projected vectors on triangle to show effect of cardiac axis change on electrocardiographic records.

Uses of this method are numerous. Formulae for chemical equations may be thrown on the board with no figures and the necessary quantities may be written in chalk and altered to suit the problems. Outlines of the body or organs may be thrown on the screen and functions added in chalk (Fig. 1).

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HOW TO MAKE HORIZONTAL DEMONSTRATIONS VISIBLE TO AN ENTIRE CLASS

SOME class demonstrations can be seen only from above. This makes it necessary for small groups to observe them at any one time, which process takes up a great deal of the laboratory period and almost makes it impossible to show effectively such demonstrations in a lecture. At the same time those who