logical Institute of Moscow, the Psychological Section of the Ukrainian Psychoneurological Academy of Kharkov and the Department of Education of the Uzbek Pedagogical Academy. The expedition was also backed by People's Commissariat of Education of the Uzbek Socialist Soviet Republic and the Government of Uzbekistan.

The immediate aim of the expedition consisted in the further study of the system of thinking which is characteristic of primitive societies, the development of the psychological functions in their thinking and to point out those changes which this thinking undergoes in social and cultural transformation connected with socialistic growth. In the account of the first expedition it was shown that in the primitive community life one finds a specific system of thinking which is characterized by its own structure and by a different rôle which speech takes in it. A fact was noted that the main function of this thinking is not the formation of abstract connection and relationship between symbols, but reproduction of whole situations, whole complexes closely connected with specific life experiences; it was pointed out that separate psychological operations, such as memory, comparison, generalization and abstraction, are formed in this type of thinking quite differently, and that with the change of economic conditions this situational or complicated thinking very quickly becomes changed, giving place to other more complex forms of thought. It was the aim of the second expedition to study in more detail the characteristics of the structure of the "situational" thinking and its various functions as well as a study of those paths along which the transformation of the situational thinking takes place by the development of thought into concepts under the influence of such new molding forces as collectivization, cultural development, literature, etc. In this field the following problems were undertaken:

(1) Professor A. R. Luria, in cooperation with Bagautdinov, "The Structure of Situational Thinking and the Lines of its Modifications."

(2) Professor Kurt Koffka, together with G. Ashrafy, "Investigation of Perception in Various Historical Cultural Phases."

(3) Professor P. Leventueff, together with Assistant Mangushova, "Investigation of Causative Thinking and its Historical Development."

(4) Docent F. H. Shemyakin, together with Assistant Nugmonov, "The Understanding of Symbols in Situational Thinking."

(5) Assistant E. N. Mordkovich, "The Understanding of a Poster and its Meaning in Situational Thinking."

(6) Docent A. A. Ussmanov, together with E. H. Mordkovich, "Operations of Counting in Complex Thinking."

The material obtained in the two psychological expeditions to central Asia established certain peculiarities in the structure of thinking and the special psychological process at various stages of cultural historical development. It outlined those lines along which we have the development of psychological processes in a changing environment largely characterized by ever-increasing economic and industrial complexities. Further work in the analysis of this material, as well as a comparison of experiments in the villages as contrasted with the factory, would go on in a special division devoted, in the Moscow Psychological Institute, to the study of development of the psyche. The control investigation of structure of thinking in the disintegration of psychological processes would be concentrated in the division of normal and pathological psychology of the Psychological Sector of the Ukrainian Psychoneurological Academy in Kharkov. The further work in the study of the development of thought in the Uzbek child would be conducted by the pedagogical faculty of the Uzbek State Pedagogical Academy in Samarkand. The works of the first and second psychological expedition will be ready for press and prepared for publication by Professor Luria within the next year. A more complete account of this expedition is appearing in the forthcoming issues of the *Journal of Genetic Psychology* and the *British Journal of Psychology*.

A. LURIA[1]

SCIENTIFIC APPARATUS AND LABORATORY METHODS

THE MEASUREMENT OF SKIN COLOR

THERE is great need for a portable mechanism with which the color of opaque objects may be accurately determined. The writer has been interested for some time in estimation of the color of human skin. Many of the reports in the literature relating to human skin color are those of the students of race and those of the investigators of climatic effects. Irreplaceable data have been collected by these workers through use of mechanisms based upon the principle of the color top (or wheel) or upon comparative color scales of porcelain or paper. Many of these devices have the advantages of simplicity in use and easy portability. They are, however, open to certain criticisms, especially those of the errors possible in any subjective method and those relating to an uncontrolled and variable light source.

The medical literature of the last few years indi-

[1] Translated from Russian by J. Kasanin and F. L. Wells.

cates the need of both clinicians and research investigators for a less subjective yet simple means of estimating skin color. Technical improvements in optical instruments have stimulated the use of photometric and spectroscopic mechanisms by medical investigators interested in cutaneous pigmentation. It is now generally admitted that the combination of photometry and spectroscopy in spectrophotometry provides the fundamental method for measurement of color. Visual spectrophotometry has been found to be too time-consuming. Although photoelectric spectrophotometers will undoubtedly become the standard instruments eventually, such an apparatus is at the present time too expensive and not sufficiently portable for most investigators interested in human skin color.

One characteristic of skin colors is that they are not highly saturated. For this reason, the writer was advised by Professor Arthur C. Hardy, of the Massachusetts Institute of Technology, that a trichromatic colorimeter would serve the writer's needs satisfactorily, would be portable and could be constructed for a relatively moderate sum. Funds were secured from the National Research Council, Medical Division, in the form of a grant-in-aid and such a colorimeter was built at the Massachusetts Institute of Technology under Professor Hardy's direction.

The essential element in this skin colorimeter is a Martens polarization photometer, the eyepiece of which is sufficiently modified to permit the insertion of three color filters. These are respectively:

Red	Wratten A (No. 25)
Green	Wratten B (No. 58)
Blue	Wratten C (No. 49)

An integrating sphere, approximately fifteen centimeters in diameter, is set onto the objective end of the photometer. At the pole of the sphere opposite to the photometer, an aperture thirty-two millimeters in diameter is placed. Four automobile headlight bulbs of six volts each illuminate the concavity of the sphere as well as any object placed at the aperture. The lights may be run with standard electric current using a transformer, but the writer prefers to employ a small automobile storage battery. A snap switch insures against wasting of current and undue heating of the sphere when the instrument is not actually in use. The instrument is about thirty-three centimeters long and weighs less than two kilograms. It is easily portable in a wooden case.

In operating the colorimeter to obtain a skin color reading, the instrument is first calibrated for each filter by placing the window of the sphere over a freshly scraped piece of magnesium carbonate (obtainable at most drug stores), balancing the brightness of the two halves of the photometric field, and recording the scale reading. Next, the aperture of the colorimeter is set against the skin, and readings are again taken through each of the filters.[1] The reflecting power of the skin relative to that of the standard white magnesium carbonate is then determined for each filter by calculating the ratio of the tangent squared of the angle read on the skin to the tangent squared of the angle read on the magnesium carbonate.

Using a recording spectrophotometer, Professor Hardy determined for each of the three filters of the colorimeter the respective spectrophotometric curves showing the transmission of these filters as a function of wave-length. This was done in order that the data obtained with this particular colorimeter can be transformed subsequently into any terms that may seem desirable. The state of color science at the present time does not justify an attempt to do this and hence these curves are merely for record purposes, to be used if a standard method of color specifications becomes universally adopted.

The colorimeter as above described is now being used by the writer. It is easy to use, and check readings are consistent. Data obtained through use of this colorimeter will soon be ready for publication.

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PREPARING QUICK-DRYING CANADA BALSAM

CANADA balsam is undoubtedly the most universal medium used for the mounting of slides in microscopy. However, one of the most serious objections to it is the time required for hardening. In biological work the slides must be kept in a horizontal position for several days, while in petrographical work the solid stick balsam necessitates a heating of the thin rock slices in order to receive the cover slips. In both cases the degree of inconvenience could be lessened by using a type of liquid balsam which hardens relatively rapidly.

In the making of thin sections of rocks, after following the usual procedure[1] of grinding to thinness (0.02–0.03 mm), the real hazard comes in mounting the cover glass. The disadvantages of the hot mounting method are: the formation of bubbles under the rock slice, the formation of bubbles under the cover glass, breaking of friable sections by pressing on the

[1] Due to the fact that skin colors are not highly saturated, the color difference in the two halves of the field is ordinarily small and readings are but little affected by anomalies in the observer's visual mechanism.

[1] A. Johannsen, "Manual of Petrographic Methods," p. 595, 1918.