This difficulty may be avoided if it be supposed that the oven chamber in which the atoms of the beam made their last collision is subjected to a stray field which is parallel to the deflecting field, for it has been shown by experiments with resonance radiation that a small field (of the order of a few gauss) is sufficient to cause complete orientation in the presence of collisions. Although this solution of the difficulty has been ruled out by Stoner on the supposition that the oven chamber was magnetically shielded yet in view of the fact that only small fields are sufficient to produce orientation and since if stray fields were present they would, from the geometry of the apparatus, have been parallel to the deflecting field, it seems that this cause of orientation should be given more weight.

A striking confirmation of the view that the atoms become oriented by stray fields in the oven chamber is provided by the recently published article by E. Wrede[2] on the deflection of beams of electric dipole molecules in a non-homogeneous electric field. In these experiments the oven, where collisions were taking place, was unquestionably field free and the traces produced by the deflected beam shows that the molecules had no definite quantized direction. We have here, then, a case where the field is unable to produce orientation in the absence of collisions.

A further test of the ability of the field to produce orientations might be made by a repetition of the Gerlach and Stern experiment, subjecting the oven chamber to definite magnetic fields. For example, if the oven field were at right angles to the deflecting field the orientations produced during collisions, in the case of atoms with a magnetic moment of but one magneton, would be in such directions that no deflection would be produced unless the deflecting field were able to change the orientation.

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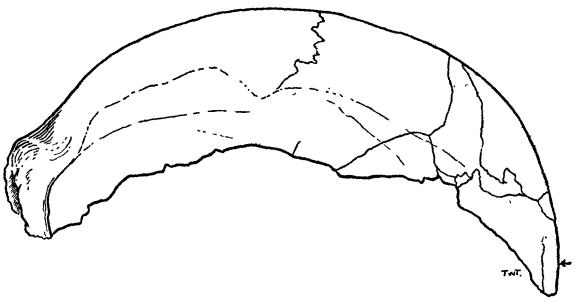
THE IDENTITY OF CLEAR CREEK SKULL

CONSIDERABLE discussion has occurred in regard to the identification of a calvarium found at Clear Creek near Everton, Arkansas, and purchased by Mrs. Bernie Babcock for the Museum of Natural History and Antiquities, Little Rock, Ark. As there has been unusual publicity concerning the age of this skull, it was necessary to obtain its accurate classification. The specimen was examined by Dr. T. Wingate Todd, professor of anatomy, Western Reserve University, and compared with the remarkable collection of models of the important fossil skulls, together with numerous crania of *Homo sapiens* in the Hamann Museum.

The calvarium (Fig. 1) is obviously that of a

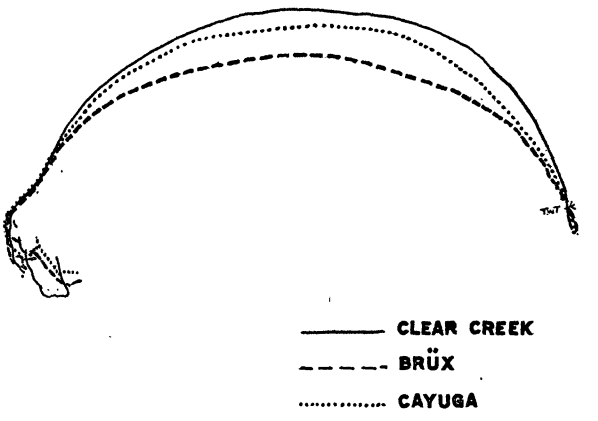


dolicocephalic individual because the cephalic index is approximately 65.4 mm. The large supraorbital ridges proclaim a male, and the union of all vault sutures[1] together with the texture, indicate a man about fifty years of age. The thicknesses of the vault are

Glabellar region	12.5 mm.
Vertical thickness at bregma	7.0 "
Region of lambda	6.5 "
Parietal eminence (approximately)	5.5 "

Compared with corresponding dimensions on the modern male, white cranium, these thicknesses are but slightly greater than those of the average contemporary man.[2]

The supraorbital ridges possess the lozenge characteristics of contemporary dolicocephalic man, whether of white or American Indian stock. There is slight ridging of the sagittal vertex region and slight flattening of the parietal slopes as in primitive



[2] E. Wrede, *Zeits. für Physik*, 44, 261, 1927.

[1] Todd, T. W., and Lyon, D. W., Jr., "Endocranial suture closure; its progress and age relationship, Part 1," *Am. J. Phys. Anthrop.*, 7, 325–384, 1924; and Ectocranial closure in adult males of white stock, Part 2, *Am. J. Phys. Anthrop.*, 8, 23–45, 1925.
Anat. Record, 27, 245–256, 1924.

[2] Todd, T. W., "Thickness of the male white cranium."

dolicocephalic peoples. The dimensions obtainable are

Glabello-inion length	191.5 mm. (?)
Probable euryon breadth	127.5 "
Minimum frontal diameter	94.0 "

In contour the calvarium resembles very closely the people of Cayuga skull (Fig. 2) presented in Morton's volume,[3] which has the following approximate dimensions:

Glabello-inion length	195.0 mm.
Euryon breadth	127.5 "
Minimum frontal diameter	105.0 "

In our calvarium the frontal bone extends rather further backwards on the vault than in the Cayuga skull.

In Hrdlička's excellent résumé[4] the Rock Bluff cranium discovered in 1866 most closely resembles our specimen. The dimensions of this cranium are

Glabello-inion length	195.0 mm.
Euryon breadth	137.0 "
Minimum frontal diameter	97.0 "

Hrdlička's description fits our skull equally well. Its most noteworthy feature, and that which gives it the appearance of a specimen of low type, is its greatly developed supraorbital ridges. These are not in the form of arcs, however, as in anthropoids and in the human skulls of Spy, Neanderthal, etc., and to a less extent in the two Calaveras specimens, but involve, as general among Indians, only about the median three fifths of the supranasal and supraorbital portions of the frontal bone. They project greatly forward, however.

In comparing the profile of our calvarium with that of Brünn[5] we note that whereas the supraorbital ridges of both are equally pronounced, the Brünn specimen has a lower vault and less prominent forehead.

The calvarium is devoid of organic material, but this may well occur within a century of burial. There is no mineralization or other evidences of great antiquity such as would be indicated by relationship to the Conard Fissure material[6] from northern Arkansas.

[3] Morton, S. G., *Crania Americana*, Phila., Plate 35, 1839.

[4] Hrdlička, A., "Skeletal remains suggesting or attributed to early man in North America." *Forms Bull.* 33, of Smithson. Inst. Bur. Am. Ethnol. 30, 1907.

[5] Schwalbe, G., "Das Schädelfragment von Brüx und verwandte Schädelformen." *Ztschr. f. Morphol. u. Anthrop.*, 9, 81–182, 1906.

[6] Brown, B., "The Conard Fissure; a Pleistocene bone deposit in northern Arkansas," *Manual* American Museum of Natural History, 9, 155–208, 1908.

Mrs. Babcock and the Museum of Natural History and Antiquities are to be congratulated upon the zeal which saved this specimen from oblivion, and, although there is no reasonable doubt of its belonging to an American Indian with a head shaped like that of the notorious Cayuga, its primitive character indicates that we may hope to find other evidence of low grade dolicocephalic people in the locality.

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BIBLIOGRAPHY OF COLORIMETRY

IN connection with the work of the colorimetry section of the Bureau of Standards and the report of the colorimetry committee of the Optical Society of America, I am desirous of compiling a bibliography of papers and books having direct bearing on colorimetry, spectrophotometry, and color specifications. It is expected that this bibliography will ultimately be published in the Journal of the Optical Society. It will also be of use in replying to frequent inquiries for information on this subject. In the interest of completeness and accuracy, all authors who have contributed to this subject are requested to send me check lists of their papers giving titles and complete journal references.

The following subjects are mentioned as illustrative of the classes of material desired:

1. Color of daylight and artificial sources. (Spectral distribution of energy, color temperature.)
2. Visual psychophysical data. (*E.g.*, visibility of energy, hue discrimination, saturation discrimination, brilliance discrimination, excitations, abnormal color sense.)
3. Theories of color vision.
4. Methods of computing the trilinear coordinates, dominant wave-length, and purity from data on spectral distribution.
5. Spectrophotometric instruments and methods.
6. Spectral transmission of materials.
7. Reflectance of materials.
8. Colorimeters.
9. Systems of color standards.
10. Applications of colorimetry and photometry to chemical analysis.
11. Turbidity and scattering of light.
12. Color nomenclature and terminology.

Reprints will also be of real service and will be gratefully received. I already have a considerable collection of such reprints. They are classified by subjects, and are of great assistance to those engaged in colorimetric research at the Bureau of Standards. This collection has been profitably used not only by regular members of the staff but by temporary re-