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PHYSICAL ANTHROPOLOGY OF THE OLD AMERICANS

PIGMENTATION; GREY HAIR; LOSS OF HAIR

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I. PIGMENTATION

INTRODUCTORY REMARKS

By anthropology of the Old Americans is meant the status, physically, physiologically and demographically, of the oldest parts of the white

population of the United States, as contrasted with the American population at large and with other units of the white race.

Since discovery this country has been an ever-increasing eddy that drew in and still draws the offshoots and surplus of a wide range of white man's populations in the older parts of the world, and a large majority of these newcomers have remained, made this their permanent home, and intermingling with others have been gradually building up the great new nation.

The changed environment, the many new stimuli, the freer and more virile as well as strenuous life, the on the whole better and more abundant nourishment, the more wholesome conditions in general, and besides all the steadily growing admixture of blood, have now been acting on the older parts of this nation for from one to over three centuries. What are the results? Here is a vast natural laboratory the subject of whose multitudinous experiments has been man himself—how has he responded, and what are the indications for the future? Satisfactory answers to this can only be reached through intensive scientific investigation.

We observe on all sides in the American, individually and collectively, a mental freshness and vigor not equalled it seems in any other country; but these matters are difficult of proper gauging. They elude measurement or strict appraisal. But there are the physique and the physiological functions of the American stock, all of which yield more or less readily to exact determinations, the results of which would be of the utmost value. The need of such determinations has long been felt, and it was only the chronic lack of means for scientific purposes that has thus far prevented the carrying out of the desirable research in this direction. Notwithstanding this difficulty a considerable amount of work has already been accomplished. This particularly on the American child, on the students of our colleges, on the drafted men and soldiers during the Civil as well as the late wars,¹ and on some of the immigrants.

Nevertheless these studies, though highly useful, are still more or less incomplete and insufficient, and the records on the recruits and soldiers both from the Civil and from the recent wars suffer from the additional

¹ See writer's "Physical Anthropology," 8^o, Wistar Institute, Phila., 1919; *The Amer. J. Phys. Anthropol.*, 1918-'21; the publications of the Children's Bureau of the Surgeon General U.S.A. and of the U. S. Bureau of Education.

Demography of United States is being taken care of by the U. S. Census and by the principal life insurance companies.

defect of not having been secured by well trained observers and with the appropriate instruments. In none of these researches furthermore, was there a sufficient selection of the subjects as to American ancestry. They deal with the child, student or recruit in America rather than American. Their results are not capable of giving satisfactory answers to the questions concerning the changes already effected or being effected in that part of the population which has longest been subject to the American environment; and they give us little or nothing on the general adult population.

In order to supply as far as possible the need in these directions the writer undertook, in 1912, a systematic anthropological study of the oldest part of the "Old Americans." By "Old Americans" he designated all those who in their families had no mixture with more recent elements on either side for at least three generations. The study lasted until the present year. It was carried on in the anthropological laboratory of the U. S. National Museum, but eventually also in the field, and the utmost care was exercised throughout to assure the reliability of the data secured.

The examinations comprised the most important of measurements on the body with a series of physiological tests and visual observations. They were restricted to healthy adults of both sexes, of between 24 and 60 years of age, and without any selection as to class or territorial derivation. The subjects were all volunteers and included members of some of the foremost American families.

The study proved throughout one of the most absorbing interest; but an unexpected difficulty developed in finding sufficient numbers of persons of the right qualifications. Native Americans of two generations on each side born in this country may already be counted by the millions, but those of three generations or more are far scarcer, except in certain limited inbred regions or communities. It was on this account that short trips had eventually to be taken into Massachusetts, Connecticut, Virginia, and finally the mountain region of Tennessee, where highly interesting additional series of subjects were examined.²

The final number of subjects on whom observations were made counts nearly two thousand. The large majority of these were from the eastern States, the States that furnished the old stock to the rest of the

² In Virginia a very efficient help with the work was given by Professor Robert Bennett Bean, of the University of Virginia. After mastering the methods employed by the writer and with the same instruments, he measured a good series of the U. S. Engineers located at that time near the University.

country. In the east all the States are represented in the series from Maine to the Gulf, and a good comparison will be possible between the Yankees and the Southerners.

The first preliminary report upon these studies was made before the XIX International Congress of Americanists in 1915, at Washington;³ the second before the recent International Eugenics Congress in New York; and a third, in April of this year, before the National Academy of Sciences, in Washington. The final data on measurements and the more technical observations are now in preparation. The data on pigmentation which are of wider public interest and the most readily understood, have also been prepared for the present Report of the Smithsonian Institution under whose auspices the whole investigation was conducted.

II. DEFINITIONS

By pigmentation we mean the amount and nature of coloring matter in the skin, eyes and hair; though the condition is also manifest in the mucous membranes, in the sclerotic, and even in other parts and tissues of the body.

The pigmentation of an individual is not the same throughout his life, and will not appear the same under all conditions. It is much influenced by age, prolonged exposure or confinement (skin, hair), and state of health. In addition the appearance of the skin, eyes and even hair will be modified by the blood (flush, paleness or blueness of skin, brightness or dullness of eye, dull dryness of hair), the state of feeling, the presence or absence of the natural sebaceous or oily coating (skin, hair), and the presence of minute air bubbles between the cells of the hair occasionally after great nervous strain, or normally in advancing years (greyness).

The coloring substance or substances, the exact nature and differences of which are still a matter of some uncertainty, occurs in the shape of minute granules which in the skin are lodged in the deeper layers of the epidermis, in the eye infiltrate various cells of the iris, and in the hair are disseminated through most of the cells of the hair shaft. The pigment, generically known as melanin, is much alike in various organs of the same individual, in different individuals of the same race, and in different races of man; but there are indications that it may represent a complex of related forms differing by slight chemical variations.

The main function of pigmentation is a protection of the skin and the eyes against those rays of the sun which would be harmful to the

³ Published in the Proceedings of the Congress, Wash. 1917, pp. 582-601.

organism; in addition to which pigment may possibly serve also as an accessory means for the elimination from the system of certain substances that result from the metabolism in the cells. A complete lack of pigmentation, as abnormally present in full human albinos, is accompanied by weakness of the eyes as well as great irritability of the skin.

The acquisition of pigmentation in man is of ancient ancestral origin. According to various indications, early man, up to at least the middle of the Palaeolithic period, was brown in color, with hazel- to dark-brown eyes and reddish-brown to black hair. He was a product of the tropics or semi-tropics and could not have developed there without adequate pigmentation.

Before the middle of the glacial period this early man reached western Europe, which according to many indications became the cradle of his further differentiation. It was primarily from Europe that he spread into other parts of the world, and it was from western Europe that he eventually followed the final recession of the ice northward, until he peopled what are now Denmark, northern Germany and the Scandinavian peninsula.

These regions concern us particularly in this connection. Under the peculiar post-glacial climatic and environmental conditions of north-westernmost Europe, combining in all probability considerable cold, damp and cloudiness or mists with a diminished amount of light, and the effects of these conditions on man's clothing, housing and habits in general, the protective pigmentation of those who lived there became to a large degree unnecessary, and as organism will not tolerate for long anything that has become useless, the pigmentation of the northerners was reduced. Gradually or by mutations man grew lighter in these lands, until he came to constitute a blond "race." He has lost so much pigment that his skin has become "white," his eyes blue, and his hair light, ranging from light brown, yellow, or golden, to almost colorless. In the more central parts of Europe the depigmentation was less effective, and the result is the intermediary "Alpine" or "Keltto-Slavic" type; while in southern Europe, Asia Minor and northern Africa it was still less, leaving us the swarthy to brown, dark eyed and black haired Mediterraneans. It may be noted however that, except in full albinism, even the whitest skin, the lightest blue eye and the lightest hair still retain some of the old pigmentation. The blue eye in particular is not blue because of any new form of coloration but because the remaining pigment is limited to the posteriormost cells of the iris, the result of which is that the eye appears more or less blue on refraction; but viewed from behind the iris is not blue.

III. EFFECTS OF MIXTURE

Through long residence in their respective regions and inbreeding, the three main types of pigmentation or rather depigmentation in Europe have become fairly fixed, so much so that even a prolonged residence elsewhere, such as that of some offshoots of the blond type in parts of the Mediterranean region and that of the dark Jew or offshoots of the Mediterraneans in northern Europe, has not been potent enough fully to efface either the blondness or darkness—though there has not been a complete preservation. There are however no sharp lines of demarcation, no break of continuity, between the blond and medium or the latter and the dark type; even where purest they pass on the boundaries imperceptibly into each other.

But due to original individual variation in the grade of the depigmentation, and to the great mixings of the European peoples before and especially within historic times, a large majority of the people of every larger country and even district either retain some of the old differences in these respects or have lost more or less their one time purity. A great majority of the present population of Europe are mixed-bloods—within the limits of the white race—and the mixtures have played havoc with pigmentation.

Yet the effect of the mixings in relation to pigmentation has been simple enough, consisting merely of an addition by the darker parent of so much melanin—or more strictly of so much more tendency to form melanin—to the progeny. In the blonds this tendency has been largely lost; in the mediums and darks partly to largely preserved; in the mixtures of darker strains with lighter it becomes more or less restored, and in consequence the progeny will show in varying degrees a darker pigmentation than the light parent. By admixture with a darker line the blond strain returns more or less towards its ancestral pigmented condition. Whether any of the first or second generation of the mixed progeny may, through a Mendelian form of heredity, be born once more pure light, medium or dark, as were their parents or grandparents, is not yet definitely known, but the plainly evident results of the mixture between different types of pigmentation is a large variety of intermediaries.

The effects of such mixtures are not manifested in the same way in all the involved parts. The skin-hair-eye pigmentation behaves in a large measure as a unit, but in interbreeding not infrequently this complex becomes more or less dissociated and its components enter into differing combinations with the pigmentation factors provided by the other

germ cell. The skin, hair and eyes show somewhat different tendencies in these directions.

In the skin the usual result of a mixture of two types of color is a uniform change, but the grade of this change may show considerable differences in different members of the resulting family. There are however also cases of irregular "blends." These may be witnessed occasionally in the admixtures of the white with the negro, and probably more frequently than we are generally aware of in the mixtures of darks and lights among the white people. The darker stain manifests itself in the form of more or less marked irregular areas or patches, or in larger or smaller "freckles." Permanent freckles have much more significance than they have hitherto received, and even passing freckles may occasionally have a phylogenetic rather than mere ontogenetic or casual significance. The characteristic freckled "Scotch skin" is much more probably a record of admixture of a darker with a light type in the past, than a sun-effect, or a meaningless individual or tribal peculiarity.

The hair in mixture behaves much like the skin. Generally the result is a "blend" or rather increased pigmentation more or less over that of the lighter parent. But not infrequently in mixed progeny with the lighter shades of hair, particularly in females where due to the length of the hair the conditions may be more easily appreciated, there may be detected strands of darker or lighter hair than the majority. An imperfect blend seems also to exist in some of the "sandy" or "rusty" reds. Individual tufts or locks of black or white hair are anomalies, though they may run in families.

The organs in which the most varied and interesting conditions result in consequence of mixture are, however, the eyes. The original human eye was probably hazel (or medium brown) to dark-brown. All the primates, all the colored races of man, and a considerable proportion as yet of the whites, have brown eyes. Such eyes in earlier times were doubtless associated with dark hair as well as a darker skin. But under the already discussed environmental conditions of northwestern Europe, acting through thousands of years, the protective brown pigment, no longer needed, was eliminated until it disappeared from the eyes, nearly disappeared from the skin, and was greatly diminished in the hair. The result so far as the visual organ was concerned was the blue eye, which became fixed by heredity. The blue eye as already noted, is not an eye wholly without pigment—that condition is present only in the eye of the full albino; neither is it an eye with any special pigment. But whatever pigment is present in the blue eye is located

only in the posterior columnar epithelium cells of the iris, whereas in grey, brown and the so-called black eyes pigment is found also in branching connective tissue cells interspersed between the bundles of connective tissue that form the substance or stroma of the iris, and even in the endothelial cells on the front of the iris.

If an unmixed blue-eyed person marries one with brown eyes, the result so far as the progeny is concerned may be one of several distinct conditions. In a small number of cases of such progeny, taken at large, it will be seen that the brown pigment owed to the darker mate has been distributed uniformly throughout the iris; and, according to its quantity, instead of a blue eye we shall have "greys," possibly some "greens," and light browns, the latter of which in a strong light may show a greenish tinge. But in the large majority of cases the distribution of the brown pigment in the iris will be more or less localized, and we shall have a *blueish* (never perfectly blue), greyish or greenish eye with a brown ring or area about the pupil, or brown "fly specks" or spots scattered over the iris, with a closer aggregation about the pupil. These cases constitute the large category of "mixed" eyes which are met with in the central and north European peoples of the present time, and which are very common among Americans.

IV. CLASSIFICATION

A detailed investigation on pigmentation in a highly complex population such as that of the United States, offers, due to the conditions enumerated above, some difficulties. There is a large number of shades in the color of the skin and hair which pass into each other without any lines of demarcation; and in the case of the eyes there are numerous mixtures that are not always easy of characterization. A correct appreciation and recording of the true conditions requires good eyesight in the observer, proper light, distance, and exposure (skin) in examination, a careful effort at distinguishing the true conditions, and the simplest possible thoroughly understood scheme of classification. Fortunately extreme details, except in some special researches, are not necessary, and the many shades met with may be grouped into a few categories that are not merely sufficient for ordinary scientific purposes, but are readily intelligible even to a non-scientific man or woman.

The most practical classification for white people of the American type as found by the writer, both through considerable experience in examination as well as in the analysis of the obtained records, and one which was therefore used throughout in these studies, is as follows:

PIGMENTATION

SKIN					
<i>Light</i>	<i>Medium</i>			<i>Dark</i>	
(blond, pale-rosy)	(all between light & dark)			(swarthy, dusky)	
HAIR					
<i>Lights proper</i>	<i>Light Brown</i>	<i>Medium</i>	<i>Dark</i>	<i>Black</i>	<i>Red</i>
(blond; yellow and golden; light brown, near blond)	(not blond)	(medium brown, medium dark)	(dark brown, dark, near black)		(sandy- light brick-, salmon-, dark- or chestnut- red)
EYES					
	<i>Pure Lights</i>		<i>Intermediates, Mixed</i>	<i>Pure Browns</i>	
blue (pure)	green (pure)	grey (pure)	(brown spots, splotches, ring, or tinge, in lights; in browns plain tinge of grey or greenish)	(light, medium, dark)	

In general the pigmentation of the parts examined shows considerable conformity. A light skin will be associated with blond or yellow hair and light to medium blue or greenish eyes; red hair goes generally with a light to pale rosy skin and a light to medium blue or greenish or mixed eye; and a dark brown eye is invariably associated with dark to black hair while the skin will range from slightly brunet to dark. As a rule also the unmixed medium and dark types breed true, the lights lights, the darks darks, though the range of exact shading in each is fairly extended. But those with medium pigmentation seem less stable and harmonious, and the usually large category of mixtures presents frequent smaller or greater disharmonies and irregularities.

V. COLOR OF SKIN

The observations on the skin in the present studies, extended to 200 "Old American" males and 250 females without selection. The gross results are as follows:⁴

⁴ It is self-understood that non-instrumental observations such as these, however carefully made, cannot claim mathematical precision, and would probably differ slightly from observer to observer; but these differences, with equally instructed students, could not be great enough materially to affect the general results.

COLOR OF SKIN

Skin	MALES (200)		FEMALES (250)	
	Number of Subjects	Percent	Number of Subjects	Percent
Light (perceptibly lighter than medium)	1	— .5	13	5.2
Medium	135	67.5	188	75.2
Swarthy (perceptibly darker than medium)	55	27.5	42	16.8
“Scotch” (freckly), otherwise medium	9	4.5	7	2.8

The above figures show that in a little over seven-tenths of the cases in men and in over three-fourths of the women, the color of the skin of the Old Americans may be classed as medium; that, particularly in the males, there is in health but a small proportion of lights; but that a very appreciable minority possess skin that, while far from really dark, is perceptibly “swarthier” or darker than the medium.

There is throughout the series a somewhat greater inclination towards pigmentation of the skin among the males than among the females. This to some extent is probably connected with more exposure among the males, but it does not seem to be due to this alone. The whole showing is rather noteworthy, for as will be seen presently it is not paralleled by the pigmentation of other features.

A study of the correlation of the skin color with that of the hair and eyes gives results that are very interesting. There were recorded one “light” skinned male and thirteen females, and the corresponding hair and eye colors were:

CORRELATION OF COLOR OF HAIR AND EYES WITH THE COLOR OF THE SKIN IN OLD AMERICANS

LIGHT SKIN

Number	Skin Perceptibly Lighter than Medium	HAIR			EYES		
		Blonds	Reds	Light Brown	Light Blue	Medium Blue	Greyish or Greenish Blue
1	Male			1	1		
13	Females	6	4	3	3	5	5
14	Subjects, percent	43.	28.5	28.5	28.5	35.7	35.7

All the subjects with light skin are, it is seen, blonds or near blonds, with a few reds. There appears therefore to be a positive correlation between a lighter than ordinary skin and light hair and eyes. Wherever there is a subpigmentation of the skin, there is also in our subjects a feeble pigmentation of the eyes and hair. But the rule does not work both ways—subjects with light hair and eyes do not always or even very often have also a lighter than medium epidermis.

On the other side of the “medium” we have the more or less swarthy, dusky or faintly tawny skins, and the correlation of hair and eyes with these discloses some curious conditions.

CORRELATION OF COLOR OF HAIR AND EYES WITH THE COLOR OF THE SKIN IN OLD AMERICANS

DARKER SKINS

Number	Skin Perceptibly Darker than Medium	HAIR					EYES			
		Lights		Medium	Dark to Black	Reds	Lights Blue, Grey, greenish Mixed	Browns		
		Blond	Light Brown					Light Brown	Medium Brown	Dark Brown
55	Males		(2) 3.6	(16) 29.1	(37) 67.3		(34) ¹ 61.8	(7) 12.7	(12) 21.3	(2) 3.6
42	Females		(1) 2.4	(8) 19.	(33) 78.6		(21) ¹ 50.	(3) 7.1	(13) 31.	(5) 11.9
97	Subjects:		3.1	24.7	72.2		56.7	10.3	25.8	7.2

¹ Mostly “mixed” (blue or greenish or greyish with more or less marked traces of brown).

The above shows that in the darker persons there exists a very marked correlation between the color of the skin and that of the hair. There are no “blonds” in the men or women with darker skins and unexpectedly also no “reds,” which points to a rather close relation of these shades; and there is a very large proportion of darks to black. Also, throughout, there is an evident tendency towards more darkness of hair and eyes in the females than in the males, which however, as will be shown below, does not apply alone to this class of cases.

As to the eyes, the correlation of their color with that of the skin is plainly less than with the hair. A good proportion of both men and women with a darker skin and dark hair have blue, greenish, grey and especially mixed eyes; but there is also a considerable proportion of

browns, much above that in the Old Americans at large. The women show again a greater tendency in this direction—they have less “lights” and light browns, but decidedly and progressively more medium and dark browns. Why this should be so is not yet quite clear, but we shall return to the phenomenon, which seems to be generalized among all whites, on another occasion.

The above correlations between brunet skin and the color of the hair and eyes, may be shown still more clearly by comparing the percental representation of the different classes of shades of the hair and eyes in those with swarthy skins to the whole number of subjects in our series:

COLOR OF HAIR AND EYES IN SUBJECTS WITH SKIN PERCEPTIBLY DARKER THAN MEDIUM COMPARED WITH THAT IN THE SERIES AT LARGE

HAIR					EYES			
Blonds	Reds	Light Brown (Not Blond)	Medium	Dark to Black	Blues, Green, Grey Mixed	Light Brown	Medium Brown	Dark Brown
Percental relation to proportion in the whole series:								
Males		22.	58.	279.	74.	310.	225.	124.
Females		24.	44.	262.	65.	203.	209.	243.

Among those with darker skins there are, in respect to hair, no blonds or reds, only a little over one-fifth as many light browns, and approximately one-half as many medium browns as in the Old Americans taken as a whole, but nearly three times as many darks-to-blacks. As to eyes the darker skinned show one-fourth to one-third less lights, but more than twice as many browns, two to three times as many light browns, over twice as many mediums and over once to twice and a half as many darks. A greater tendency to eye pigmentation is once more apparent here in the women.

The meaning of these conditions tends to be that a normally darker skin in the American and doubtless other whites is generally an expression of not a localized but a systemic tendency towards darker pigmentation, and as such is probably of phylo- rather than ontogenetic significance; that it is, in other words, a survival of a darker ancestry rather than an individual peculiarity. Just how much more or less of the darker skins there are in the Old Americans than among other whites, we shall only be able to tell from similar studies among these other groups.

The “Scotch skin” is a medium white skin with numerous light and rather large and irregular “freckles” on the exposed parts. On the face

these "freckles" extend to the forehead. It is highly characteristic of a proportion of persons of Scotch derivation and that among the Old as well as recent Americans. The subject deserves a detailed study of its own. As already mentioned, there is a strong indication that these "freckles" are merely the remnants of a darker skinned strain admixed in the dim past into the Scotch people.

VI. THE HAIR

The records on pigmentation of the hair are much more numerous and comprehensive than those on the skin. They apply to 1,009 men and 914 women.

The method, based on considerable experience and preliminary work, was to subdivide the large range of colors into as few as possible definite classes, and then to use common sense, with good indirect light, plenty of time, and due care, in determining the shade. In general this method is preferable to that of comparing the hair with given standards, for that takes longer and among such a mixed population as ours we would never have enough standards. It is true that it is not easy in such a visual method to get rid of all personal equation, but the amount of such an equation may be very much reduced and be rendered practically insignificant by due instruction or understanding of the subject, with practice. The final classification of the shades is not arbitrary. We begin with the safe units of "black," decidedly "light" and unmistakably red. This leaves a large category of intermediate grades, all of which fall however into three subdivisions, namely, light brown (not blond), medium (or "medium brown"), and dark (or "dark brown"). A large majority of cases will readily and unmistakably be placed in one or another of these classes by every properly instructed observer. This will leave, as possible sources of error, only the transitional shades, for there are between none of the colors any definite lines of demarcation. These cases, with a careful student, will amount to approximately 10 percent with the blonds, 20 percent with the light browns (not blond), mediums, darks and reds, and 5 percent with the blacks. When we add to this that by the law of chance, other things (such as the training of the observers, etc.) being equal, as many of the "uncertains" in each category will be recorded right as wrong, and that those recorded wrong in one class will be counterbalanced by the wrongs of the next, it may be seen that unless there is a lack of due instruction, negligence, or the development of some special bias on the part of an observer, his records on any large series of individuals will be substantially correct

and comparable with those of all other similarly instructed and careful workers. That this is so may be shown in our series in Virginia. In a camp of U. S. Engineers, near Charlottesville, after due initiation the work was left in the hands of Dr. Robert Bennett Bean of the University of Virginia. The results, except for a slight difference which developed in recording the eye colors, were practically identical with those of the author as far as the latter applied to the same territory.

The study of hair color among the Old Americans fully confirms previous observations on the change in the color of the hair with age. Except in those with the darkest shades the hair in general shows from infancy on to adult life and in many cases even through a part of the adult life, a progressive darkening. The lightest hair in an infant may thus eventually become light, medium or even fairly dark brown—though not black. Even the red hair darkens or loses its purity. The golden also is unstable. A small series of near-adults found by the writer among the teachers shows, as will be seen later on, a very perceptibly higher grade of lightness than that of the fully adult of the same class. In some persons the darkening of the hair seems to progress until the time when the first traces of greying (in individual hairs) commences. This progressive darkening of the hair has been observed in all white people with hair lighter than black. Its causes are not yet well understood. It means of course a progressively greater production of the hair pigment, but whether this is due to environmental stimuli, metabolic changes or phylogenetic influence, is not as yet determined. There are decided individual variations in this respect, and possibly also sexual, locality and other differences. The whole subject deserves a separate, deep-going investigation.

Our records on the distribution of hair color among the Old Americans, as finally tabulated, are as follows:

OLD AMERICANS: COLOR OF HAIR

	Lights Proper	Light Brown (not blond)	Medium (medium brown)	Darks (dark, dark brown, near black)	Black	Reds
	<i>Per cent:</i>					
Males (1009)	5.3	16.	50.	25.	1.1	2.6
Females (914)	6.9	14.2	42.9	29.8	1.3	4.9

These figures are striking in more than one respect. Over three-fourths of the adult Old Americans have hair ranging from medium

to dark and black, while but one in 14.5 among the females and one in near 16 among the males is in hair truly blond. The females as contrasted with the males show a few more blonds and more reds, but also more darks, while the males give a predominance of the lighter and medium shades of brown.⁵ The females show the greater diversity.

However, an even closer insight into the conditions is possible. The following data give us the more detailed colors:

OLD AMERICANS: COLOR OF HAIR, DETAILS

	Blond	<i>Lights Proper</i> Golden or Yellow	Light Brown (near blond)	Light Brown (not blond)	Medium	Dark	Black	Reds
	<i>Per cent:</i>							
Males . . .	1.2	0.6	3.5	16.	50.	25.	1.1	2.6
Females	0.9	1.6	4.4	14.2	42.9	29.8	1.3	4.9

The golden and yellow among the females are seen to be more than twice, the near-blonds once and a half as frequent as in the males. The males, as seen before, predominate in the submedium and medium brown. In the darker shades the females have a larger representation than the males, and this domination, as will be seen later on, is of significance. It may also be stated in this connection that the reds in the females are mostly the more or less golden reds and again the darker reds.

All the above establishes the facts that: (1) The Old Americans are, so far as hair color is concerned, only exceptionally blond, but commonly medium to brunet; and that the females show a greater proportion of golden, near-blonds and reds, but also of dark browns and blacks, than the males. The males are more intermediate. Possibly there is in the females a clearer show of varied ancestral conditions, while the males show greater blend.

Tested by subdivisions of 100 or more, the above data hold fairly good, so that they may probably be regarded as a pretty true expression of the conditions among the territorially mixed Old Americans in the eastern half of the United States. But in localities where some definite group of immigrants has settled, such for example as the Scotch, Penn-

⁵ It is self-understood that all possible care was exercised not to include any cases of hair changed artificially. Fortunately this is not frequent in this class of people, except perhaps among some of the older persons where the object is to mask greyness and simulate the natural shade.

sylvania Dutch, etc., the conditions will differ in harmony with the original pigmentation of the group. The ancestral influence appears everywhere to be very tenacious.

The above results indicate that blondness is not characteristic of the Old Americans. There is in addition but a modest proportion of reds and very few true blacks. Half of the people are medium, three-quarters are medium to dark haired. The affinity of the Old Americans with the Nordic blonds is seen from this to be rather secondary, unless substantial changes in the direction of greater pigmentation have been realized in the Americans since their sojourn on this continent—which however, as will be seen later, is contra-indicated by facts.

The records on the two sexes show, it was seen, interesting differences, though the total amount of pigmentation in the two sexes is about the same. The women evidently preserve better the different ancestral conditions from which the mixture represented now by the Old Americans arose, while the men show more fusion, more blend. Similar facts, including the preponderance of the darker shades in the females, have been observed elsewhere. The English observers in particular have shown that the women of Great Britain tend to be darker than the men. From Beddoe's data, Parsons⁶ found that among the English the females were, according to regions, darker-haired than the men by from 0.6 to 6.5 per cent. Fleure and James⁷ found similar conditions, that is, a greater predominance of darks among the females than among the males, in Wales; and Gray with Tocher⁸ in Scotland. The latter have also shown further by their studies on Scotch children⁹ that the greater darkening of the females is a post-natal, or rather post-infantile phenomenon.

For purposes of sexual as well as groupal or racial comparison, it would be very convenient if it were possible to reduce the different classes of hair color to approximate numerical values. It seems well worth while to make an attempt in this direction. Let us take pigmentless hair as 0, black hair as 100 and medium hair as 50. It will then be reasonable to assign to the "Light brown (not blond)" class the mean value of 25, and to the Light or Blond (with golden, yellow and light brown near blond) that of 12.5; while the "Darks" will be 75. For

⁶ *J. Anthropol. Inst.*, 1920, L, 166-'7. See also Beddoe, J.—*Anthropological History of Europe*, 1912 ed., 98.

⁷ *J. Anthropol. Inst.*, 1916, XLVI, 49.

⁸ *J. Anthropol. Inst.*, 1900, XXX, 109.

⁹ *Ibid.*, 115.

red hair, the most difficult to gauge, we may perhaps assume the mean value of 35. These values, which are not as arbitrary as they might seem, will be seen better in a little table:

ASSUMED VALUES OF HAIR COLORS

Lights proper (blonds or near)	12.5
Light brown (not blond)	25
Medium	50
Dark	75
Black	100
Red	35

If now the records on hair pigmentation be presented in these values, we obtain the following:

OLD AMERICANS: UNITS OF HAIR PIGMENTATION
(Per 1000 Subjects)

SHADE	MALES	FEMALES
Lights proper.....	662	862
Light Brown (not blond)....	4,025	3,550
Medium.....	25,000	21,450
Dark.....	18,750	22,350
Black.....	1,100	1,300
Reds.....	910	1,715
	50,447	51,227

Males : Females :: 100 : 101.5

The females are, on the whole, approximately 1.5 per cent darker than the males. This proportion will naturally differ with region, as the actual records differ, but the female always shows a greater total.

GEOGRAPHICAL DIFFERENCES.—Attention was given from the start of the studies to possible indication of regional differences in pigmentation, especially between the north and the south; but nothing striking or definite became manifest in this direction. What differences do exist became apparent only after the data were reduced to percentages. The results, so far as the hair is concerned, are shown in the following table:

REGIONAL DISTRIBUTION OF HAIR COLOR IN THE OLD AMERICANS
MALES

Region	Lights (Lights proper & Light Brown)	Medium	Darks (Dark to Black)	Reds
New England ¹⁰ (65)	26.1	55.4	16.9 ¹¹	1.5
Middle East & Mixed (449)	22.4	45.2	29.6	2.7
South (D. C. & Southward) (369) Appalachians (Tenn. & neighboring) (126)	22.3	48.	27.1	2.7
	12.7	69.8	15.1	2.4

FEMALES

New England (41)	39.	34.1	26.8 ¹¹	
East & Mixed (339)	21.	37.2	36.3	5.6
South (534)	19.8	47.2	28.1	4.9

BOTH SEXES

	Blonds and Moderately Light	Medium	Dark (to Black)	Medium & Dark	Red
New England (106)	<i>32.6</i>	<i>44.8</i>	<i>21.9</i>	<i>(66.7)</i>	<i>0.7</i>
Middle East & Mixed (788)	<i>21.7</i>	<i>41.3</i>	<i>32.9</i>	<i>(74.2)</i>	<i>4.1</i>
South (903)	<i>21.1</i>	<i>47.6</i>	<i>27.6</i>	<i>(75.2)</i>	<i>3.7</i>

The regional differences in hair color, it can be seen from the above figures, are not very material, yet there are differences, and in a measure, as to between north and south, they bear out the common notion. In both sexes among the "Yankees" there is a larger proportion of lights and a somewhat smaller percentage of darks than in the south. The hair among the Old Americans of the South may therefore be said to be less frequently blond and somewhat more frequently dark than that of the same class of the population in the New England region. But the Old Americans of the middle east and of mixed-state parentage agree very closely with those of further south, showing if anything even a good trace more of darks, though if we take the mediums and darks together the proportions are almost-identical. In all the regions, it is noticeable, the females present a larger proportion of darks than the

¹⁰ All American ancestors of the subject lived in the regions here given, not merely the individual recorded.

¹¹ No blacks.

males, indicating a deep-rooted tendency in this direction. In the New England States there appear also more female than male blonds and less intermediates. The females show less intermediates throughout the series.

A very interesting locality group is that of the more northern Appalachian mountaineers. They show the least lights as well as darks and by far the most intermediaries of any of the groups. This is in all probability the result of a more thorough intermixture due to interbreeding. The mountaineer, as long as he remains in the mountains, marries almost invariably in the mountains. The group affords a good indication of what would very likely eventually take place in the whole body of Old Americans were there no mixture from outside of their own circles.

Our conclusions may be summarized in the statement that the ordinary conception of the southern Americans being darker than the "Yankees" or New Englanders, is sustained to but a moderate extent; that there is no appreciable difference as relates to hair color between the Southern and Old Americans at large; but that more isolated groups in the south and possibly also in the north may be expected to show more or less exceptional conditions according to ancestry and grade of intermixture or inbreeding.

RED HAIR.—The subject of red hair, like that of age changes in hair color, is not yet fully understood and needs a thorough reinvestigation. The two prevailing theories are first "that it is a variant of fair hair because it so often accompanies a freckled skin and light eyes; the other that it shows a mixture between a light and a dark race" (Parsons, *o. c.*, 182). The English records "seem to help both theories . . . Scotland and the north of England are the fairest parts of the kingdom and it is there that red hair is most marked; but it is also well marked in Wales and in parts of Ireland, especially Kerry, where the nigrescence is very high."

From the English records it would appear that there is no regular sex difference in the proportion of redness. In 66 locality groups (Beddoe's observations), 30 show a larger percentage of reds in the females, 32 in males and in 4 the proportion was equal. The whole group of Beddoe's males give a red hair percentage of 4.4, the equally large group of females 4.9. From the same data Parsons finds that "red hair is more common in the upper than in the lower classes," to which he adds (*o. c.*, 182), that according to his own observations not only is red hair commoner in the upper classes, but that these classes have also an altogether

lower index of nigrescence, in other words are less pigmented, than the lower.

In the course of the study on the Old Americans the impression grew that the category of "red hair" is not wholly homogeneous, and that it probably includes more than one related condition. There are "reds" in which the whole system participates in the phenomenon. The eyes are pale, light blue or greenish, the skin is akin to the rosy skin of the albino, the breast areola is devoid of pigment, the mucous membranes are light red. Also these individuals are generally believed to differ more or less mentally as well as in their predispositions to certain ailments, from the average of the population. And there are other "reds," generally of the darker shades, in whom the rest of the system does not participate, or participates but little in the condition, is not peculiar in other words to any marked extent. It may be that the differences are merely those of degree; we shall not know until the subject is exhaustively investigated by itself. A study of the blood may one day help to clear matters.

Red hair, or at least some of it, also changes with age. Some such hair grows nearer to brown, loses in lustre and beauty and loses the gold of the red; while other simply darkens.

A relation of red hair to the brown is very evident. Most brown hair in certain light shows a more or less marked trace of red, and the moustache of brown-haired men is generally more or less "grizzly" or "rusty," that is nearer red. A relation to the blonds is not apparent, except perhaps through the golden red. It is a golden red which accompanies all shades of color down to dark brown. On the whole, red hair seems to imply a partial loss of pigment from the hair, a loss limited possibly to the outer layers of hair cells. It is a phase of depigmentation, not a variant of blondness; and the red pigment, if it exists as such, appears to be only a variant of the ordinary brown pigment. The relation of red hair to the color of the eyes will be dealt with later. The relation of red hair frequency to social status, as believed to exist in England, did not become apparent among the Old Americans where there is little class distinction. Our highest group socially (on the whole) gave for the men the frequency of 2.2, our lowest 2.0 percent of red hair; while what could be taken as an intermediate group showed 3.0 percent. Geographically, the least red hair (men but 1 case, women 0) occurs in our series of the New England States; the most (men 2.7, women 5.6 percent) in the middle eastern States and in those of mixed parentage from more than one State.

Eyes in the Red-haired. An interesting inquiry was that into the association of eye-colors with red hair. It is common knowledge that red hair is generally associated with light eyes, yet the matter seems never to have been subjected to a rigorous test. Our records disclose the following conditions:

EYE COLOR IN INDIVIDUALS WITH RED HAIR
BOTH SEXES

Light	Blue Medium	Deep	Greenish	Greyish	Mixed	Light	Brown Medium	Dark
%	%	%	%	%	%	%	%	%
6.2	16.9		7.7	6.2	56.9		6.2	
23.1								
Lights <i>37 Percent</i>					Mixed <i>57 Percent</i>		Browns <i>6 Percent</i>	

A little over one-third of the red-haired Old Americans have light eyes. A little less than a half of these (46 percent of the group or 17 percent of the whole) are "light eyes—light reds," and to somewhere near that extent only may we assume red-hairedness to be directly associated with blondness. In the rest of the cases with pure light eyes the hair was medium to brownish- or chestnut-red.

A large proportion of the eyes in the red-haired are mixed. In the whole series studied the proportion of mixed eyes was approximately 48 percent; in the red-haired it is 57 percent, a plain excess for the latter. This excess as well as the whole proportion of mixed eyes in the red-haired points to the conclusion that red-hairedness is strongly associated with mixture of blonds and brunets; that, in other words, it represents partial depigmentation or repigmentation.

In a small percent of our cases red hair was associated with eyes that were pure medium brown. The hair ranged in these individuals from light- and salmon-red to brown-red and chestnut-red. As the brown eye is believed to be dominant over the lights in mixtures, the mixture of types in these cases may have remained occluded; but a partial depigmentation of the hair from any other cause might possibly have been sufficient. We should scarcely be justified, in other words, without much further inquiry into the subject, in regarding red hair in the progeny of brunet parents as an absolute proof of admixture into the family of either a red- or blond-haired outsider.

The conclusions concerning red hair may be briefly summarized as follows:

1) Red hair appears to be merely a form of depigmentation (or partial repigmentation).

2) In traces and minor degrees it is a far more common condition than generally appreciated.

3) In a large majority of cases it is connected with the mixture of light with darker types of individuals.

4) In a minority of cases it may probably exist without mixture as a variation in the direction of depigmentation (or partial repigmentation).

5) There are red-haired individuals in whom the depigmentation involves the whole system, approaching more or less albinism and an abnormal condition.

6) There is no line of demarkation between red hair and golden on one side, and red hair and the different shades of brown on the other.

ANOMALIES OF HAIR PIGMENTATION

Anomalies of hair pigmentation relate to uniformity in color. But little in these respects was noticed among the Old Americans, if we disregard slight to moderate irregularities in shading (lighter or darker strands).

Two individuals, however, one male and one female, showed different colored tufts (or locks) of hair. The female had a white lock in dark hair above the forehead; the male a black tuft in otherwise uniform medium hair above the fore part of the right temporal region. In one female, 45 years old, most of the hair on the right side was medium brown, while the whole left side was (naturally) perceptibly darker.

VII. COLOR OF THE EYES

To properly gauge the eye color is a fairly simple matter in some groups of the white race, such as the pure Nordics or the Mediterraneans; but it becomes a difficult task in mixed strains such as that of the English and especially the Americans.

To approach the subject properly, we should be clear to start with on the elementary question as to what is eye color. The many shades of eyes to be met with, as with the hair, do not represent so many different pigments, but only so many grades and varieties of pigmentation and depigmentation. The eye pigment as that in the skin and doubtless also in hair, is there for protection, and though it may not be strictly simple or homogeneous, it behaves essentially as one pigment which is

distributed in small granules in the lining and certain interstitial cells of the iris. The color of the iris is a reflection of light according to the quantity, density and distribution of the pigment granules. If these granules are in considerable quantity and distributed throughout the endothelial, interstitial and even epithelial cells of the iris, the eye is brown to "black," the shade differing with the total quantity and density of the granules. With the maximum quantity the eye is black as in some negroes; on the other hand as the quantity of the pigment decreases we have gradually a lighter and lighter shade of brown until this passes into light brown, then greyish or greenish brown, then bluish or greenish grey and finally, when no pigment remains in either the anterior lining or the interstitial cells of the iris, with but little in the endothelium, the eye is blue.

As in the skin and hair, so here again there are no lines of demarcation between the various shades, and we must make a somewhat arbitrary classification. In this we may recognize to start with two great groups, the pure eyes and the mixed. The pure in their turn are capable of three subdivisions, the brown, the blue, and the lights other than blue (grey, greenish); and the browns and blues are further subdivisible each into the dark (or deep), medium and light. Intermediary tinges appearing different under varying conditions of light, health, mental state, occur and can only be classified with difficulty.

The "mixed" eye is strictly speaking a misnomer. It does not mean an eye with a mixture of any two distinct pigments, but an eye resulting from a mixture of a brown-eyed with a lighter parent in which the parental conditions are not well blended. Have the eyes of the parents been different, the eyes of some of the progeny may show a darker or lighter blend of the parental colors; the eyes of some may show one or the other parental shade dominating with the other in recession; but the eyes of most of the children will bear traces of the mixture in an unequal distribution of the pigment derived from the darker parent.¹² It is these last eyes alone that the observer can designate as "mixed."

The "mixtures" are of many kinds, but they are all characterized by some imperfection in the distribution of the brown. This may occur as a narrower or broader ring about the pupil; as a greater or lesser disper-

¹² The laws of heredity in this connection are still under investigation. See Davenport (C. B.)—Heredity of Eye-Color in Man. *Science*, 1907, XXVI, 589; Hurst (C. C.)—On the Inheritance of Eye-Color in Man. *Proc. R. Soc.*, 1908, 80:85; Boas (Helene M.)—Inheritance of Eye-Color in Man. *Am. J. Phys. Anthropol.*, 1919, II, 15-20.

sion of brown spots, with an aggregation about the pupil; in the form of brown patches or stains of color over the iris, with lighter regions; and rarely in the form of a single brown segment radiating from the pupil to the periphery of the iris.

From the above it will be seen that the only rational classification of eye color can be about as follows:

EYE COLORS	
(Largely) Depigmented, pure	Blues { light { medium { deep
	Grey Greenish Greyish-blue Greenish-blue
Pigmented	Brown { light { medium { dark { or near black
	Black
Mixed	Light brown { With rings, spots, Grey { patches, areas, stains Greenish or Blue { or segments of brown

All records on eye color, however carefully made, necessarily bear the following imperfections: A small number of the apparently pure light browns, and other-than-blue lights, will belong to the category of only apparently and unstably (in relation to progeny) pures; they are mixts in which the mixture is not clearly perceivable. A small proportion of the medium browns will be in the same category. A superficial observation in addition will inevitably result in classing many of the mixts as pures. The classes freest of error will be the pure blues and the darker browns, in which it will merely be a question of classification errors along the boundaries.

There have been many former attempts at a satisfactory classification of eye-color, and several "standards" have been made by which to record these colors. Being largely empirical, however, none of them, either classifications or standards, are fully satisfactory. In the present studies reliance was placed on the above analysis of the colors, on due regulations of the procedure, on large practice, and on constant care. All eyes were examined in clear light, at the distance of best vision, the "reading distance." The use of artificial standards, after

sufficient expertness was acquired, was found unnecessary and hindering rather than facilitating the examination.

With all the above regulations and precautions it is certain that the results on eye color here recorded are still imperfect; though they are probably as near correct as they can be made under present conditions.

The number of records on eye color among the Old Americans is the same as that on the hair, namely 1009 males and 914 females; and the total data show the following results:

OLD AMERICANS: COLOR OF EYES

	Pure Lights	Mixed	Pure Browns
	<i>Per Cent:</i>		
Males (1009)	31.	52.5	16.5
Females (914)	24.1	55.9	20.

More than half of the eyes among the Old Americans are mixed, in general a light of some sort with specks, ring or other plain traces of brown; approximately one third in males and one fourth in females are pure lights, and one sixth in males with one fifth in females are pure browns. The females have less pure lights and more browns, showing again the tendency towards somewhat greater pigmentation.

The above data contrast in an interesting way with those on hair:

OLD AMERICANS: CONTRAST OF HAIR AND EYE COLOR

HAIR

	Lights ¹	Medium	Darks
	<i>Per Cent:</i>		
Males	22.2	50.8	27.
Females	22.7	44.6	32.7

EYES

	Pure Lights	Mixed	Pure Browns
Males	31.	52.5	16.5
Females	24.1	55.9	20.

There is seen to exist a marked general correspondence of lights with lights, medium hair with mixed eyes and of darks with darks; but already

¹ To each category is added one third of the reds.

these gross figures show more light eyes than light hair and more dark hair than dark eyes, indicating that on the whole the hair tends towards a greater pigmentation than the eyes. It is known that this tendency, while universal, is particularly noticeable in certain districts or among certain racial groups in Europe. The Irish are a good example.

Additional features of interest so far as the eyes of the Old Americans are concerned, are shown by a more direct classification:

OLD AMERICANS: COLOR OF EYES, DETAILS

	Pure Lights					Mixed	Pure Browns		
	Blues			Other Lights			Light	Medium	Dark
	Light	Medium	Deep	Greenish-Blue & Greenish	Greyish-Blue & Grey				
	<i>Per cent.</i>								
Males	7.9	14.8	1.1	2.2	5.	52.5	4.5	9.3	2.7
Females	2.9	15.2	1.9	1.4	2.7	55.9	2.2	13.8	4

Light blue eyes are more than twice as common in the males as in the females; the medium blues are about equal in the two sexes, the deep blues are nearly twice as frequent in the females as in the males. There is therefore a tendency in the males towards the lighter, in the females towards the darker shades of blue. This is in all probability connected with the general tendency of the females towards a greater eye pigmentation, which is shown very plainly by the browns. The females show also less of both the pure greenish and the greyish eyes, which most likely is equally due to the phenomenon just mentioned.

We may well ask in this place just why this tendency towards greater pigmentation in the female hair and eyes should exist. So far as the writer knows, while the fact has been recorded again and again, no serious attempt has yet been made at showing the reason. Yet there must be reasons, and judging from the generality of the tendency, they are more likely to be of inherited than of environmental nature.

These are the facts that may have a bearing on this question: In the section on skin pigmentation it was seen that the skin of the male is more frequently darker than medium than happens among the females; should this fact be substantiated elsewhere, we would be justified to assume that the skin in the male takes care on the average of a somewhat larger quantity of the pigment produced in the body, while in the female, should she produce proportionately to her weight as much as

man, the surplus would be likely to go into the eyes and hair. In addition, the male discharges a substantial quantum of pigment through his beard, moustache and greater body hairiness, as well as through the hair of the head, for due to the frequent cuttings a man produces on the average more hair on his head than a female. All this disposes in the male of a considerable amount of the pigment formed in the body, so that if the sexes produced the same or nearly the same amount per pound of active tissue, there would be a surplus of pigment in the female which would inevitably, it seems, affect the pigmentation of both the eyes and the hair. There is no indication that there is any greater production of pigment in the female, but she differs slightly in the manner of its disposition and elimination.

The relative pigmentation of eyes in the two sexes may also, as in the case of hair, be presented in the form of values. If the subject is carefully weighed it will be found that about the following approximate values may be assigned to the different eye colors:

ASSUMED VALUES OF EYE COLORS

<i>Pure Lights:</i>	Blues	{	Light	10
			Medium	20
			Deep	25
	Greenish			15
	Grey			30
<i>Mixed:</i>				50
<i>Pure Browns:</i>		{	Light	65
			Medium	75
			Dark	85

Arranging our data on this basis, we obtain the following interesting results:

UNITS OF EYE PIGMENTATION
(Per 1000 Subjects)

Shade	Male		Female	
<i>Pure Lights:</i> Blues	{	Light	790	290
		Medium	2,960	3,040
	}	Dark	275	475
		4,025	3,805	{
	330	}	5,855	4,825
Greenish & Greenish-Blue				210
Grey & Greyish-Blue	1,500			810
<i>Mixed:</i>	26,250	26,250	27,900	27,900
<i>Pure Browns:</i>	{	Light	2,925	1,430
		Medium	6,975	10,350
	}	Dark	2,295	3,400
		12,195	15,180	{
TOTALS:		44,300		47,905

Eyes—Males : Females :: 100 : 108.1
 Hair—Males : Females :: 100 : 101.5

A few words only are necessary to the above figures. The pigmentation of the eye among the females in the Old Americans is to that of the males as 108 to 100; the female eye in other words is approximately 8 per cent darker. The rest of the differences parallel what has already been shown by the simple percentages. It is interesting to observe that the differences in the eye pigmentation exceed those in the hair. The same phenomenon, as will be seen later, has been observed in England and is probably true elsewhere.

REGIONAL DIFFERENCES.—As with the hair, so with the eyes, the main interest as to regional differences in pigmentation attaches to the question of differences between the north and south. The following table shows these relations:

REGIONAL DISTRIBUTION OF EYE COLOR IN THE OLD AMERICANS

Region	BOTH SEXES TOGETHER		
	Pure Lights	Mixed	Pure Browns
	<i>Per cent:</i>		
New England	32.8	48.	19.2
Middle East & Mixed ¹	24.4	55.8	19.8
South	30.8	52	17.2
Appalachians (Tenn. & South)	24.6	62.8	12.6

¹ Part of forbears from northern, part from central or southern states.

The differences in eye color between the south and the north and between either of these and the middle states, are seen to be slight only, even less than with the hair. There are a few more lights, but also a few more browns among the Yankees than among the Southerners, but the differences are too small to be given any special significance. There is however, as with the hair, a marked difference shown by the Appalachian mountaineers, among whom there are less pure lights, less pure browns and a larger proportion of mixed shades. It was seen (p. 115) that precisely the same conditions were observed in this special group in relation to hair colors.

CORRELATION OF EYE AND HAIR COLOR.—In order to make the presentation of the records here dealt with as clear as possible, it will be necessary to show, besides the separate data on hair and eyes, also the associations of conditions. Not every light eye is accompanied with light hair, thereby enabling us to class the subject as blond, nor every dark hair with a dark eye, giving us a well-marked brunet. There are

many exceptions in fact to such associations. Conditions were found in brief as follows:

OLD AMERICANS: CORRELATION IN EYE AND HAIR PIGMENTATION
BOTH SEXES

EYES	HAIR			
	Lights	Medium	Darks	Reds
	<i>Percent (round numbers)</i>			
Pure Lights.....	37.5	48.	12.	2.5
Mixed	20.	50.	26.	4.
Pure Browns...	9.5	43.	46.	1.5

Persons among the Old Americans with light eyes that show no mixture have in nearly two-fifths of their number also light hair, while in approximately one half of the cases the hair is medium, and in nearly one-eighth it is dark. Red hair occurs, but in slightly lesser proportion than in the general average.

Those with mixed eyes (lights with more or less marked traces of brown), have light hair in only one fifth, medium hair in one half and dark hair in one fourth of their number. In respect of both the light and dark hair they start, as might be expected, practically midway between the pure light-eyed and pure brown-eyed series. But they show more mediums, *i. e.* more blonds, and decidedly more reds. The latter condition demonstrates the close association of perhaps as many as half of the cases of red hair with mixture of the lighter and the darker racial elements in the population.

The brown-eyed show but a few light-haired and these generally of the least blond variety; they have, somewhat less frequently than either the light or the mixed-eyed, hair of medium shade; but they show in nearly half the instances dark hair to black. Also they show the least reds and those only in association with the lighter browns of the iris.

Still further insight into these conditions may be obtained if the data are studied with a little more detail:

OLD AMERICANS: CORRELATION OF EYE AND HAIR PIGMENTATION—DETAILS
BOTH SEXES

EYES	HAIR:			
	Lights	Medium	Darks	
	<i>Per cent (round numbers)</i>			
PURE LIGHTS:				(Reds need not be considered in this connection.)
<i>Blues:</i> Light	53.	43.	2.5	
Medium	35.	48.	14.	
Deep	25.	50.	20.	
<i>Other Lights:</i>				
Greenish & Greenish-Blue	31.	50.	15.5	
Grey & Greyish-Blue	34.	52.5	13.5	
MIXED:	19.5	50.5	25.5	
PURE BROWNS:				
Light	22.5	50.	27.5	
Medium	9.5	50.	38.	
Dark	4.	22.5	73.5	

The above figures show conditions very clearly. The lighter the blue eye the greater the proportion of light hair, and the smaller that of medium and especially dark hair; the deeper the blue, the *less* light, the more medium, and especially the more dark hair. It is plain that there is a direct correlation between the depth of the blue in the iris and the amount of pigment in the hair. This corroborates the view that the pigment in the blue eye is not different from that in the brown eye, but is merely less in quantity and differently deposited. The greenish and greyish eyes in relation to hair are much like the medium blue, though showing somewhat more medium hair—possibly they hide some mixtures. The brown-eyed show the same type of correlation as the blues—the darker the eye the less light and even medium and the more dark the hair. Those with dark brown eyes have no blonds proper, but a few instances of light brown not blond hair, and less than one-fourth of medium, but in nearly three-fourths the hair is dark to black.

The above shows that in general the more pigment there is in the eye, the more there is also in the hair. There are individual exceptions where the hair is lighter than the eyes, but they are not numerous.

ANOMALIES OF EYE PIGMENTATION.—Eye pigmentation shows occasionally interesting anomalies. They are limited to the “mixed” eyes, and seem to be more frequent in females. Also most of them came

from the southern states, which however may be an accident. Those observed were as follows:

Age	Locality	Hair	Eyes
<i>Males:</i>			
51	Va.	dark brown	Mixed; <i>right</i> shows more brown than <i>left</i> .
43	Va.	medium brown	<i>Right</i> greenish; <i>left</i> fine medium blue.
43	Va.	near black	<i>Right</i> grey, traces brown; <i>left</i> , medium brown traces of grey.
23	Md.	medium brown	<i>Right</i> medium blue; <i>left</i> medium blue, traces brown.
<i>Females:</i>			
18	Va.	dark brown	Mixed; <i>right</i> shows very perceptibly more brown than <i>left</i> .
18	Mixed	dark brown	Light blue, slight tinge of brown in <i>left</i> ; more in <i>right</i> .
25	Va.	light brown	<i>Right</i> grey; <i>left</i> lighter than <i>right</i> .
30	Mixed	medium brown	Grey; <i>right</i> traces of brown, <i>left</i> pure.
32	Mixed	medium brown	<i>Right</i> dark brown; <i>left</i> greenish-brown.
34	Pa.	dark brown	<i>Right</i> pure greyish-blue; <i>left</i> same, but with a speck of brown.
45	Va.	golden brown	<i>Right</i> pure deep blue; <i>left</i> same with brown patch.
<i>Triangular Wedges or Segments:</i> ¹³			
<i>Females:</i>			
24	Va.	medium brown	<i>Right</i> pure medium blue; <i>left</i> same but with large segment of yellow brown.
24	N. C.	medium brown	Light greenish; in <i>left</i> a nice wedge or segment of medium brown. ¹⁴
30	Va.	medium brown	Medium grey; <i>right</i> shows a clear-cut wedge of medium brown.

No case was observed where one eye would be brown and the other light, though one was learned of.

The most interesting of the anomalies are the wedges or segments of brown in one of the otherwise pure and uniform light eyes. They remind one distantly of the eyes of lizards. The phenomenon is of course a sign of mixture, and probably also of a peculiar histological condition in the given iris.

¹³ Beginning at a point on the inner and diverging towards the outer border of the iris.

¹⁴ Father has brown, mother light eyes.

VIII. BLONDS AND BRUNETS

The terms "blond" and "brunet" are general terms which have as yet no scientifically fixed meaning. As a result when two persons and even two scientists speak of blonds and brunets their meaning may differ.

"Pure blonds" may be defined as those persons who have flaxen, blond, golden, yellow or light brown (near blond) hair, with pure (unmixed) light eyes. More ordinarily, or loosely, all those persons are regarded as "blonds" who have light hair of one or another of the above varieties, with light eyes, whether the latter are pure or would on close examination show traces of brown. And in a still more general way there may be classified as "fair" all those who have hair lighter than medium (including all reds except those of the darkest shades), with light eyes, whether the eyes are pure or would show a mixture on closer scrutiny.

As to "true brunets," that class naturally comprises those with dark to black hair and medium to dark brown eyes. "Apparent brunets" would be all those with dark to black hair regardless of the color of the eyes.

Those who do not enter into any one of the above classes are necessarily the "intermediates."

If we arrange our records on this rational basis, we obtain the following interesting showing:

OLD AMERICANS: BLONDS AND BRUNETS

	Pure Blonds	Ordinary Blonds ¹⁵	"Fair" ¹⁶	True Brunets	Apparent Brunets ¹⁷	Intermediates
	<i>Per cent</i> (in round figures):					
Males (1009)	3.	5.	21.	6.5	26.	53.
Females (914)	3.5	6.5	24.	11.	31.	46.

The above table shows clearly that over one-half of the Old American males and nearly one-half of the females are neither blonds nor brunets, but intermediates. True and even ordinary blonds are scarce, while true brunets are but little more frequent. Using the most general classification we see that approximately but one-fifth of the males and one-fourth of the females may be classed as "fair"; and a little over one-

¹⁵ Includes of course the "pure blonds."

¹⁶ Includes the pure and ordinary blonds.

¹⁷ Includes true brunets.

fourth of the males with a little over three-tenths of the females as "dark" or apparent brunets. The nature of these results is a good expression of ancestral light and darker types, with the latter probably slightly in predominance.

The females, even better than in their separate determinations on the eyes and hair, show plainly somewhat more blonds and "fairs" and again more darks, with less intermediates; thus preserving better than the males the ancestral conditions.

REGIONAL DISTRIBUTION. The regional distribution of the blonds and brunets is shown in the next table:

OLD AMERICANS: BLONDS AND BRUNETS ACCORDING TO REGION
BOTH SEXES

	Pure Blonds	Ordinary ¹⁸ Blonds	"Fair" ¹⁹	True Brunets	Apparent ²⁰ Brunets	Intermediates
	<i>Per cent in round figures</i>					
New England (106)	(13) 12.	(18) 17.	(32) 30.	(4) 4.	(22) 21.	(52) 49.
Eastern States & Mixed-State An- cestry (788)	(29) 4.	(49) 6.	(171) 22.	(8) 10.5	(256) 32.	(361) 46.
South (903)	(19) 2.	(38) 4.	(211) 23.	(77) 8.5	(250) 28.	(442) 49.
Appalachians (126)	(3) 2.5	(6) 5.	(16) 13.	(1) 1.	(19) 15.	(91) 72.

It is seen that conditions appear with especial clearness in this form. New England stands well above the other groups in the proportion of blonds, and is also below all except the Appalachian group in the proportion of darks; but it has as many intermediates as the south and even a few percent more than the east and mixed states.

The south shows less than all the groups, of true blonds, but the "fairs" in general are fully as common as in the eastern states, while brunets both true and apparent are even more numerous in the Americans of eastern and mixed state ancestry than in those of the south.

¹⁸ Includes pure blonds.

¹⁹ Includes pure and ordinary blonds.

²⁰ Includes true brunets.

The Appalachian group is, as has already been shown, quite exceptional; showing but few blonds and even "fairs," but few brunets, and a very large proportion of intermediates.

The relative darkness of the Old Americans of the eastern states and of mixed-state ancestry is not easy to explain, but they have doubtless more Dutch and German and also Irish ancestry, which may account for the showing.

IX. COMPARATIVE

The interest of the results of the observations on pigmentation that form the subject of this paper would be much enhanced could we contrast them with observations on Americans at large and on related peoples. An ideal condition would be if we could also compare them with similar data on the early representatives in America of the families involved, as the present data may perhaps eventually be compared with those on the Americans of the future; but we have no old records of this nature.

The ancestors of the Old Americans, as apparent from the information given the examiner, were very largely, probably more than four-fifths, immigrants from the British Isles. They were English, Welsh, Scotch, Scotch-Irish, with a scattering of Dutch, French (Huguenots), Irish and German. In the absence of old American records on pigmentation it would in the second line be most desirable therefore to have such data from the XVII to XIX centuries from Great Britain, but these are also wanting. All that is available are data on the English speaking people from this and the latter part of the last century, and even these we can use only to a limited extent, the observations having been made and recorded in a different manner. As to data from Holland, Germany or other countries, they could hardly be of help in this connection.

As to data on Americans in general, there are only the very imperfect records of the Civil War, and those equally imperfect obtained during the demobilization after the end of the World War. In neither case were the observations made by scientific or properly trained men. Baxter (Statistics etc. I, 60) says of those in the Civil War: "The instructions given to surgeons of boards of enrollment were framed with a view to the speediest achievement of the object of the draft, and not to the acquisition of anthropological facts. Thence arose defects in the data, from a scientific point of view, which have often been regretted during the preparation of this work."²¹ The "Army

²¹ For originals see Gould (B. A.)—The Military & Anthropological Statistics of the War of the Rebellion. 8°, N. Y., 1865; Baxter (J. H.)—Statistics, Medical &

Anthropology" volume of the World War²² charitably says nothing about the *actual* method of securing the data, though it would have been better to make a straightforward statement. It may suffice to say that the actual examinations and recording, though under the general supervision of good men, had to be made in this case after a brief and insufficient instruction and often under stress and hurry, by numbers of unselected men from the ranks assigned for the "work" by the officers of the camps; men who had no heart in the work, who had never done anything similar, were unacquainted with the metric system, had inaccurate instruments as well as classification, and were often seen by the writer, who specially visited some of the camps to satisfy himself as to the nature of the examinations, to be grossly careless. Moreover the World War records on the pigmentation of the American-born were made wholly worthless by an incomprehensible inclusion into these data of those on the "colored." It would be useless to try to contrast such data with those that are the subject of this paper.

As to England, the foremost students of pigmentation in the British Isles so far were Beddoe,²³ Gray and Tocher,²⁴ Fleure and James²⁵ and Parsons.²⁶ From their data it appears that the pigmentation of the hair and eyes—the skin has not been considered—differs very materially in the different districts and portions of the isles, due to ancestral differences, to an imperfect fusion of the heterogeneous elements of which the population is composed and to local survivals or domination of certain types. The classification of the color of the hair used by these observers agrees fairly well with ours and we shall be enabled to make some general comparisons; but with the English data on eye-color comparison will be very difficult.

Anthropological, of the Provost Marshal-General's Bureau, 4°, 1875, I, 60. See also Statistical Report of Sickness & Mortality in U. S. Army from 1839 to 1855. 4°, Wash., 1856; and Military Statistics of United States of America, 4°, Berlin, 1863.

²² Davenport (Charles B.) with A. G. Love—Army Anthropology, 8°, Vol. XV of Statistics Med. Dept., U. S. Army, Wash., 1921.

²³ Beddoe (John)—Races of Britain, 8°, London, 1885.

²⁴ Gray (John) & Tocher (J. F.)—The physical characteristics of adults & school children in east Aberdeenshire. *J. Anthropol. Inst.*, 1900, XXX, 104-124; also *Trans. Buchan. Field Club*, 1897.

²⁵ Fleure (H. J.) & James (T. C.)—Geographical Distribution of Anthropological Types in Wales. *J. Anthropol. Inst.*, 1916, XLVI, 35-153.

²⁶ Parsons (F. G.)—The Color Index of the Brit. Isles. *J. Anthropol. Inst.*, 1920, L, 159-162.

The English records were recently partly summarized by Parsons.²⁷ Following Beddoe, the English observers classify the hair into fair (corresponding to our "light"), red, brown (our "medium"), dark and black; while the eyes are classed as light, dark and intermediate. The relation of this classification to ours will appear best in the following form:

CLASSIFICATION OF HAIR AND EYE COLOR IN ENGLAND AND IN OLD AMERICANS

	ENGLISH	OLD AMERICANS
<i>Hair:</i>	Fair	Light { blond golden & yellow light brown (near blond)
	Brown	Light brown (not blond) Medium
	Dark brown	Dark
	Black	Black
	Red	Red
<i>Eyes</i>	Light	Pure Lights { Blues { light medium deep Greenish Greyish
	Intermediate or Neutral	Mixed
	Dark	Pure Browns { light medium dark

In the case of the hair the two methods agree fairly closely, except as to our "light brown (not blond)" which class is omitted from the English records. In the case of the eyes, however, there is much less agreement. Some of the light browns had probably been recorded by the English among the "intermediates"; many light eyes with a brown ring about the pupil or some brown spots, which in our records are all marked as mixed, were doubtless counted by the English among the "lights"; and the slate blues with some of the darker mixed they very likely included with the darks.

An additional difficulty for comparing our results arises from the way in which the English records are published. Neither Beddoe nor his

²⁷ o. c.

followers have given us the general averages for the whole of England and Scotland. They report their observations by counties, cities and other localities, which is of but little use for our purpose. We have no means of finding out from just what parts of England and Scotland the ancestors of the Old American families were derived, and the best we can do in trying to find what changes, if any, there are now between the people of Great Britain and the Old Americans, is to compare the combined records of the latter with similarly combined records on Great Britain or at least England and Scotland. In order to make some such comparison possible it was necessary to count up Beddoe's detailed data as given by Parsons.²⁸ The results, contrasted with ours, are as follows:

COLOR OF HAIR IN ENGLAND AND SCOTLAND, AND IN THE OLD AMERICANS

MALES

Hair	Old Americans	Present England & Scotland
	(1000)	(14,557)
	<i>Per cent</i>	<i>Per cent</i>
Lights proper	6.4	16.7
Light brown (not blond)	16.4	
Medium	50.4	38.3
Dark	23.7	34.8
Black	0.4	5.8
Red	2.7	4.4

These figures are rather striking. Even if we allow for some error in assigning the different colors to their proper classes on each side, enough seems to remain to show that the English present a greater heterogeneity in hair pigmentation. The Old Americans have apparently less real blonds and certainly less darks and blacks as well as reds, with more blends or intermediates. While the total amount of pigmentation is not greatly different in the two units, in the Americans it shows fewer extremes, which is just about what could be expected from their great intermixture. To make the two series still more comparable, the proportion of the "light brown (not blond)" hair among the Americans could probably be safely distributed one-half to the "fair" and one-half to the "medium" series, in which case we obtain the following relations:

²⁸ *J. Anthropol. Inst.*, 1920, 168-9.

COLOR OF HAIR IN ENGLAND AND SCOTLAND, AND IN THE OLD AMERICANS

MALES

Hair	Old Americans	Present England & Scotland
	<i>Per cent</i>	<i>Per cent</i>
Fair	14.6	16.7
Medium	58.6	38.3
Dark	23.7	34.8
Black	0.4	5.8
Red	2.7	4.4

We still have for the Old Americans less blonds and reds, less darks, and decidedly more intermediates.

So much for the men. With the females the conditions are similar:

COLOR OF HAIR IN ENGLAND AND SCOTLAND, AND IN THE OLD AMERICANS

FEMALES

Hair	Old Americans	Present England & Scotland
	(900)	(11,172)
	<i>Per cent</i>	<i>Per cent</i>
Fair	12.4	13.1
Light brown (not blond)	10.	
Medium	40.3	38.1
Dark	29.4	39.3
Black	0.6	4.8
Red	4.7	4.7

On the whole the British and the Old American females seem to agree better as to hair color than the males, but like the males show a considerably larger proportion of dark hair than occurs in the Americans.

The records on eyes show the following conditions in the two groups under consideration:

COLOR OF EYES IN OLD AMERICANS CONTRASTED WITH THAT IN GREAT BRITAIN

MALE

FEMALE

	Light	Intermediate or Mixed	Dark (Medium & Dark Brown)	Light	Intermediate or Mixed	Dark (Medium & Dark Brown)
Old Americans	<i>Per cent</i> 31.	57.	12.	24.2	58.	18.
England, Wales & Scotland	88. 66.		34.	53.3	82.2 15.2	31.5
					68.5	

In view of the manner in which the English records were made there are no means of separating the pure lights from the mixed lights as in our series; but the English "dark" eyes ought to correspond more closely to our medium plus dark browns class. The results show, however, a very much larger proportion of "dark" eyes in Great Britain than among the Old Americans. The more common occurrence among the English of dark to black hair would lead us to expect also a moderately greater frequency in the same series of dark eyes; but the excess of dark eyes is so great as to justify the suspicion that the Beddoe "dark" eye series includes various eyes besides the medium and dark brown which makes it unfit for comparison with our data. After an earnest effort to utilize the English eye records we are thus left quite helpless. The probability is that the average present eye pigmentation in Great Britain differs only slightly from that of the Old Americans.

Since Beddoe the English observers have another and convenient though somewhat artificial method of expressing their records on pigmentation, and that is through their so-called "index of nigrescence." This index, as modified by Parsons,²⁹ is obtained by adding the percentage of the dark brown and black hair to that of the dark, plus one-half of the intermediary or neutral eyes, and dividing the results by two. Unfortunately as already seen, their classes of eye colors are very different from ours, which precludes any direct comparison.

However imperfect our efforts at comparison with the English may have been, they leave two impressions of value. The first is that both the Old Americans and the English, if classed by the mean value of their pigmentation, fall not into the "fair" but into the intermediary or medium-pigmented group, which tapers on one side to the fair and on the other to the brunet. The second fact is that the English show in their midst less intermixture with consequent blends than do the Old Americans.

The lack of marked difference in pigmentation between the Old Americans and the English does not denote, however, that no changes in this respect have taken place in the Americans since the arrival from Europe of their ancestors. It is quite possible that a gradual progressive darkening has proceeded in both groups. There are observers in both countries who incline to that opinion. Pigmentation is essentially an environmental and changeable condition, however slow the changes may be. Neither England, nor certainly the United States, are in the sphere of the nordic countries where blondness was produced and

²⁹ *J. Anthropol. Inst.*, 1920, 162.

where it is being sustained. And the composition, climate, habits and food of the people in the United States and Great Britain are so similar that the two people might well be assumed, on general considerations, to show a parallel line of changes in a physiological characteristic such as pigmentation.

The whole subject in both countries needs a thorough scientific re-study on a large scale. It would be a fallacy to believe that observations, however superficial they might be, if only made on a large enough number of subjects, would ever show true conditions; such data can at best only approximate, but may also more or less mask if not pervert, the real facts.

X. GREY HAIR

In 250 of the examined men and 200 women, special attention was given to the subject of the greying of hair.

The ordinary notions as to greyness are very empirical and superficial, yet there is much of interest to be learned in this connection. The condition, however, is not easy to study. Few elderly people remember correctly when they began to notice grey hairs or how the process progressed; and even for the scientific observer it is not easy to estimate correctly the many grades of the change.

The best way to proceed in the study of greying was soon seen to be the statistical, and the only effective way of recording was found to be by estimates in percentages of the quantity of the grey hair in relation to all the hair on the head. Accordingly the incidence of grey hair was recorded as: None; very few to few; some to 1/3; approximately 1/2 (2/5-4/7); 2/3 to nearly all; and all. The observations gave the following results:

OLD AMERICANS: GREYNESS

	None	Very Few to Few	Some to about 1/3	Approx- imately 1/2	2/3 to Near All	All Grey (More or less completely)
(250)	(107)	(47)	(33)	(11)	(41)	(11)
Males	<i>Per cent:</i> 42.8	18.8	13.2	4.4	16.4	4.4
(Mean age 42.6 y.)	(22-48 y.)	(24-55 y.)	(25-57 y.)	(37-58 y.)	(39-65 y.)	(48-65 y.)
(200)	(104)	(30)	(29)	(9)	(21)	(7)
Females	<i>Per cent:</i> 52.	15.	14.5	4.5	10.5	3.5
(Mean age 41.8 y.)	(24-48 y.)	(24-55 y.)	(30-58 y.)	(37-59 y.)	(39-60 y.)	(51-60 y.)

These data only show that greyness long before old age in both sexes is frequent; that there evidently is throughout adult life a slightly less tendency to it among females than among males; that for some perhaps not strictly physiological reason there is an undue frequency of the two-thirds to all greys in both sexes, and that both in appearance and progress of greying there is great individual variation.

Some further light on the condition may be had by arranging the data by age:

OLD AMERICANS: GREYNESS OF HAIR IN RELATION TO AGE

MALES

FEMALES

Age & No. of Subjects	MALES						FEMALES						
	None	Very Few to Few	Some to 1/3	About 1/2 (2/3-4/7)	2/3 to Near All	All	Age No. of Subjects	None	Very Few to Few	Some to 1/3	About 1/2 (2/3-4/7)	2/3 to Near All	All
24-30 (100)	74	18	6	1	1		24-30 (80)	8.5	11.2	3.8			
31-40 (63)	44.4	27.	19.0	3.2	6.4		31-40 (63)	47.6	25.4	19.0	4.8	3.2	
41-50 (44)	9.1	20.4	27.3	11.4	27.3	4.5	41-50 (29)	13.8	17.2	37.9	10.3	13.8	6.9
51-60 (35)	2.9	8.6	8.5	8.6	51.4	20.0	51-60 (28)	7.1		10.7	10.7	53.9	17.6
61-65 (8)					75.0	25.0							
Totals (259)	42.8	18.8	13.2	4.4	16.4	4.4	(200)	52	15.0	14.5	4.5	10.5	3.5

Thirty percent approximately of the Old American men and 11 percent of the women have a few to over one-third of grey hair before they pass their thirtieth year. Between 31 and 40 less than half of the males and a little less than three-fifths of the females are without grey hair, and the proportion of such persons is reduced to a little over 10 per cent during the next decennium. Over 35 percent of the males between 41 and 50, and 16 percent of the females between these ages show already greyness that involves from two-thirds of all the hair; and for those between 51 and 60 this proportion rises to very nearly three-fourths of the males and seven-tenths of the females.

The females show throughout slightly less tendency to greying than the males. Undue predominance of the two-thirds-to-nearly-all grey is shown again.

Some day, when we shall have equally detailed data on greying in other peoples, the above figures ought to make interesting comparison and lead to some definite deductions of anthropological nature.

TEMPORARY GREYNESS

The phenomenon of sudden or very rapid greying, generally under the stress of great fear, anxiety or other deeply disturbing nervous effect, is well known, though more so popularly than to science; but the sequences of such a change are only seldom mentioned. A striking case came to the writer's attention in the course of the studies here reported. It concerns General Greely, the arctic explorer. General Greely was born in 1844. His hair, when he reached the adult life, was "chatain" or rather dark brown, and it remained so, with probably the appearance of a few grey hairs, until 1884, or towards the end of his exceedingly difficult trip of arctic exploration. Then, within the period of some months, under the anxieties and privations of his position, his hair turned completely white. But upon a return to civilization the whiteness began gradually to disappear, until the hair returned to nearly its former condition, after which greying progressed naturally. The following brief personal statement will make a clear record of the case:

COSMOS CLUB
Washington, D. C.

March 8, 1922.

Dear Dr. Hrdlička:

Referring to our conversation a few days since, I confirm my statement that when rescued at Cape Sabine in 1884 my hair was entirely white, due probably to the *continuous* condition of semi-starvation from which I suffered for over 9 months. Within a year my hair darkened very considerably, though it never returned *entirely* to its original chataine coloring.

Yours,

A. W. GREELY

Major General.

XI. LOSS OF HAIR

In modern civilized man the hair of the head does not merely tend to grow grey earlier than in more primitive people, but generally also it is more or less shed as aging advances, showing a reduced vitality. It would be wrong to attribute either of these phenomena to any particular habits of civilized man or to pathological conditions, though both of these may play a part at times; the real causes are already hereditary and thereby of a phylogenetic nature. The hair tends towards an earlier senility and loss because it has become of less organic

use to man living under modern conditions, than it had been in the past, and nature does not tolerate for long what has become useless or weakened. Both early greying and physiological loss of hair are a part of the trend of present evolution in civilized humanity.

Unlike greyness, however, normal loss of hair is largely linked with the male sex. Women lose hair too, and that probably at an increasing rate, but not in the proportion in which the process goes on in the males.

A special inquiry into this subject among 250 male and 200 female Old Americans, taken without any selection, showed the interesting results given below. As all the females were examined with their hair undone and freely hanging down to permit the unimpeded taking of head measurements, there can be no question of the observer having been misled.

OLD AMERICANS: LOSS OF HAIR

Loss	MALES (250)			FEMALES (200)		
	Percent of Cases	Ages Average-Extremes		Percent of Cases	Ages Average-Extremes	
No plainly appreciable	45.2	(24-60)		85	(23-60)	
Slight	13.6	37	(24-60)	11	44	(29-55)
Some to 1/3	22.4	39	(24-57)	3		
Approximately 1/2	7.2	46	(29-65)	1		
2/3 to near all	11.6	49	(35-64)			

OLD AMERICANS: LOSS OF HAIR IN RELATION TO AGE

MALES (250)

FEMALES (200)

LOSS OF HAIR:

Age No. of Subjects	None Perceptible	Slight	Some to 1/3	Approx. 1/2 (3/4 -4/7)	2/3 to Near All	Age No. of Subjects	None Perceptible	Slight	Some to 1/3	Approx. 1/2 (3/4 -4/7)	2/3 to Near All
	<i>Per cent</i>										
21-30 (100)	68.	11.	17.	3.	1.	21-30 (80)	98.8		1.2		
31-40 (63)	46.	17.5	22.2	4.8	9.5	31-40 (63)	95.5	1.5	1.5	1.5	
41-50 (44)	29.6	18.2	34.1	6.8	11.3	41-50 (29)	85.	5.	10.		
51-60 (35)	8.6	8.6	25.7	20.	37.1	51-60 (28)	84.3	5.	7.1	3.6	
61-65 (8)		12.5	12.5	25.	50.						

The foregoing figures show that loss of hair in the Old Americans presents wide individual and even wider sexual variation. There were seen men and women of sixty in whom there was as yet no appreciable loss; but on the other hand plain thinning was seen not merely in some of the youngest male adults of the series but even in some subadults down to 18 years of age. The progress of the condition, once it has set in, is generally continuous though not always regular.

The great difference in the frequency and average grade of the loss of hair between the males and females is difficult to explain. Possibly the weight of the female hair acts as a tonic. The differences between the head covering in the males and females may also have an effect. But in all probability a more or less male-linked predisposition to the condition is already inherited.

In this case, again, we have no similar data on other peoples that could be used for comparison; but as interest in these secondary manifestations will grow such data will doubtless be forthcoming.

XII. CONCLUSIONS

The above data on the eyes and hair permit the formulation of the following conclusions regarding pigmentation, and the other conditions here studied, in the Old Americans:

SKIN. 1. Two-thirds of the old stock males and three-fourths of the females show skin that may be classed as medium.

2. In only 5 per thousand in males, but in 52 per thousand in the females, is the skin plainly lighter than the medium. All of these cases are associated with pure light eyes and light or red hair.

3. In a little over one-fourth of the males and in one-sixth of the females the skin is perceptibly darker than medium. Such skin is generally associated with brown eyes and medium to dark hair.

HAIR. 1. Only 1 among 16 males and 1 among 14.5 females has real blond hair.

2. One-half of the males and over four-tenths of the females show medium (or "medium brown") hair.

3. In one-fourth of the males and three-tenths of the females the hair is dark ("dark brown"), to near black.

4. In approximately 1 percent in the males and but a little more in the females the hair is fully black.

5. In 2.6 per hundred of males and 4.9 per hundred in females the hair is red or near red.

6. The females show a slight to moderate excess of true blonds

(especially golden and yellow), but also of darks, blacks and reds, over the males.

7. There are some areas in which hair pigmentation among the Old Americans, due to isolation and more thorough mixtures, differs from that of the group as a whole.

8. Differences between the "Yankees" and the "Southerners" in this respect are only moderate, the former showing somewhat more lights, less darks, few if any true blacks and less reds. But the southerners show almost identical conditions in regard to hair pigmentation as those of the central states and those of mixed-state ancestry.

EYES. 1. Approximately one-third of the eyes of the males and one-fourth of the eyes of the females of the Old Americans are pure lights.

2. One-sixth of the males and one-fifth of the females show eyes the iris of which is pure brown (light, medium or dark).

3. Over one-half of the males as well as females have eyes that show plain traces of brown in light (mixed).

4. There are on the whole more light and less dark eyes than there is of light and dark hair.

5. Regional differences are less marked than with the hair, except in isolated localities.

6. There is a considerable but not a complete correlation between the pigmentation of the eyes and that of the hair. Light eyes may in some instances be associated with dark (though not black) hair; but medium to dark eyes are as a rule accompanied by medium, dark or black hair.

BLONDS AND BRUNETS. 1. The classification of the Old Americans on the basis of both the color of the eyes and hair brings a number of the conditions relating to pigmentation out with special clearness.

2. Over one-half of the males and nearly one-half of the females are "intermediates."

3. Blondes are scarce, as are also true brunets, but the latter are plainly more frequent, especially in the females.

4. The females show slightly more blondes, more brunettes and less intermediates than the males.

GREY HAIR. 1. In general, greyness manifests itself early in the Old Americans.

2. In the males greyness proceeds appreciably faster than in the females.

3. There is wide individual variation.

LOSS OF HAIR. 1. There are great sexual differences in this respect. The males lose hair sooner, more rapidly and much more extensively than the females.

2. In males loss begins at times even before adult stage is reached; and after 55 there are very few men in whom some degree of loss at least has not taken place.

3. Wide individual differences exist also in this respect.

COMPARISONS. Suitable data for comparison are scarce. From what is available it appears that the pigmentation of both hair and eyes in the Old Americans is much like that of the present population of Great Britain, though the latter appears to show some excess of both dark eyes and dark hair.

As to changes with time, it seems probable that in both Great Britain and the United States there is taking place a slow progress towards a darker pigmentation of both eyes and hair, though the fact needs definite confirmation.