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Światowit 31, 281-291

1970

Artykuł został zdigitalizowany i opracowany do udostępnienia w internecie przez **Muzeum Historii Polski** w ramach prac podejmowanych na rzecz zapewnienia otwartego, powszechnego i trwałego dostępu do polskiego dorobku naukowego i kulturalnego. Artykuł jest umieszczony w kolekcji cyfrowej bazhum.muzhp.pl, gromadzącej zawartość polskich czasopism humanistycznych i społecznych.

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TIME-SPATIAL REGULARITIES IN THE DISTRIBUTION OF ANTHROPOLOGICAL STRUCTURES IN EGYPT

INTRODUCTORY

The anthropological structure of any human group may be defined as its internal pheno- and genotypical variability. Formally, this variability represents a matrix consisting of k -verses and n -columns when k -traits is used simultaneously in the description of n -individuals (see: A. Wierciński, 1965 and 1967). Usually, it is being reduced into:

a) a matrix of c -cubes with coordinated frequencies of f -individuals when each trait is divided into c -categories (Wanke's method of multiple stochastic correlations);

b) vectors of arithmetic means: $\bar{x}_1\bar{x}_2\dots\bar{x}_k$, standard deviations: $\sigma_1\sigma_2\dots\sigma_k$, relative frequencies of individuals placed in the categories of quantitative or qualitative traits: $f_1f_2\dots f_k$, or, of relative frequencies of genes: $p_1p_2\dots p_i$, calculated for simply inherited features (common procedure of the populationistic approach);

c) vectors of relative frequencies of individually diagnosed racial types: $ABC\dots Z$ (typological composition) or, of racial elements: $abc\dots z$ (racial composition) as a common procedure of the Polish Anthropological School.

Of course there exist some other methods of reduced descriptions.

The purpose of this Report is to present the results of comparative analysis of anthropological structures of different Egyptians series described by the method of racial compositions which assures a high degree of comparativeness between skeletal data and living material of the recent series. The whole material considered consists of:

a) 6 series of 214 crania from Gebelein, Abydos, Naqada, Badari, Maadi and Wadi Digla which are dated to the Predynastic Period;

b) 3 series of 104 crania from Abydos, Helwan and Sakkara which are dated to the Early Dynastic Period;

c) 21 territorial series of 678 living individuals which have been anthropometrically investigated by S. Zejmo-Zejmis, H. Stolarczyk, A. Wierciński and the members of I Joint Arabic-Polish Anthropological Expedition.

All the mentioned above craniological series, with exception those of Abydos and Naqada (taken from publications of D. Randall Maciver, 1901 and C. D. Fawcett, 1901) have been personally examined by the present author during his stay in Egypt in 1957 - 1959 and in Italy in 1965. There were taken into account the classic craniometric measurements according to R. Martin's technique and a set of cranioscopic traits established by use of photographic scales of I. Michalski.

The individual typological analysis was made by the present author for all the ancient craniological series (see: A. Wierciński, 1963, 1965 and 1968) and by I. Michalski (1964) for all the recent series derived from all the provinces of Egypt. The ultimate results of these analyses have been expressed in terms of the racial compositions of particular series, calculated by use of halving method of Michalski. Maybe, it would be useful to repeat here some most general assumptions of the typological analysis. They are as follows:

1) the internal phenotypical variability of any human population described by a number of racial traits simultaneously considered may be reduced to its typological differentiation;

2) the typological differentiation denotes a division into racial types, i. e. the groups of human individuals resembled to each other in a set of racial traits;

3) three kinds of racial types should be distinguished: a) racial varieties which show broad and regular geographic distribution from the point of view of the theory of adaptation; b) racial elements which reveal, more or less extreme combinations of traits within the frame of a given racial variety; c) intermediate types which show averagely central position between two racial elements;

4) the greater is a morphological distance between the racial elements assumed for a given intermediate type, the greater is the polymorphism of the latter;

5) racial composition calculated by halving method is reflecting, in a somewhat distorted way, the typological differentiation of a population as expressed in terms of the extreme combinations of traits, i. e. of racial elements.

A short space of this Report does not allow to discuss in details all the genetic, rasogenetic, statistical, developmental and other implications of the assumptions listed above.

Up to the present date, the representatives of the Polish Comparative

Morphological School have distinguished and described by a larger set of racial traits 3 racial varieties of man (White, Yellow and Black) and 17 racial elements, as well as, many intermediate types, This state of typological knowledge greatly facilitated the analysis of Egyptian materials since the definitions of particular racial elements could be presented in the form of hal- intervals in a larger set of diagnostic traits, indices, modules and descriptive features.

A SUMMARY OF THE RESULTS OF TYPOLOGICAL ANALYSIS

PRE- AND EARLY DYNASTIC SERIES

As it was mentioned above, all the 6 Predynastic and 3 Early Dyanstic series have been already typologically analysed by the present author. At first, there were investigated the mutual relationships between the average characteristics of the series expressed by a set of arithmetic means and standard deviations calculated for linear measurements, modules and indices. They were tested by t-test of Student and F-test of Fisher and, then a number of diagrams of least differences of Czekanowski have been prepared. At last, all the diagnostic cranioscopic characteristics were studied by use of the discriminant cranioscopic distance method of Wierciński (1968a) to show taxonomic positions of particular series between the racial varieties of man. Also ,some mean characteristics in of the Egyptian series have been compared with those of synchronous Western and Central Asiatic series of crania (see: fig. 1). All these comparisons may be summarized as follows:

1) mean Position Indices (P) of all the 9 ancient Egyptian series show their undoubted affinities to the White variety and only very slight possible admixtures of the Black and Yellow varieties (table 1);

Table 1

THE CRANIOSCOPIC AFFINITIES OF ANCIENT EGYPTIAN SERIES BETWEEN RACIAL VARIETIES: BLACK AND WHITE

Cranioscopic distance	Gebelein	Bada-ri	Wadi Digla	Maadi	Helwan	Sak-kara	Po-land Kije	Ugan-da
Inclination of forehead	55,3	39,1	40,0	35,1	51,5	55,3	71,0	31,9
Profile of glabella	51,1	59,0	62,0	47,3	63,4	61,1	71,9	24,7
Height of nasal root	69,8	63,5	79,1	75,0	70,4	70,9	71,9	37,6
Prominence of maxilla	63,6	72,9	61,6	54,1	71,3	68,3	64,9	24,9
Prominence of nose	75,0	74,1	83,8	50,0	75,0	75,0	87,5	25,0
Prominence of nasal spine	59,5	59,0	58,3	53,3	60,3	60,6	64,5	11,8
Mean Position Index (P)	62,4	62,1	64,1	52,4	65,3	65,2	71,8	26,0

2) upper and Lower Egyptian types of Morant and Batrawy did not exist, as well as, a Dynastic Race of Derry since all the Egyptian series did not

reveal suitable territorial differentiation and, there appeared very clear continuation of populations from the Pre- to Early Dynastic times;

3) Egyptian series show connexions with Dravidian India on one hand and, with Mesopotamian and Iranian series, on the other.

		Dravidians modern	Tamils modern	Kolarians modern	Naqada Predynastic	Hissar II	Badari Predynastic	Abydos Predynastic	Wadi Digla Predyn.	Maadi Predynastic	Abydos Early Dyn.	Helwan Early Dyn.	Sakkara Early Dyn.	El Obeid	Turkestan eneolit	Ur	Tarofalt mesolit	Mechta mesolit
Dravidians modern	1	■	■	■	□													
Tamils modern	2	■	■	■	□		□											
Kolarians modern	3	■	■	■	■	□	□	□	□		□	□						
Naqada Predynastic	4	□	□	■	■	■	■	■	□	□	□	□	□			□		
Hissar II	5			□	■	■	■	■	□	□	□	□	□			■		
Badari Predynastic	6		□	□	■	■	■	■	□	□	□	□	□			□		
Abydos Predynastic	7		□	□	■	■	■	■	□	□	□	□	□					
Wadi Digla Predyn.	8				□	□	□	■	□	□	□	□	□		□			
Maadi predynastic	9			□	□	□	■	□	□	□	□	□	□					
Abydos Early Dyn.	10			□	□	□	■	□	□	□	□	□	□				□	
Helwan Early Dyn.	11				□	□	□	□	□	□	■	■	■	■	■	□		
Sakkara Early Dyn.	12				□	■	□		□	□		■	■	■	■	□		
El Obeid	31								□			■	■	■	■	□		
Turkestan eneolit	14				□	■	□					■	■	■	□			
Ur	51										□						■	
Tarofalt mesolit ^h	16																■	■
Mechta mesolit ^h	17																■	■

Then, the results of individual typological analysis of the same 9 ancient Egyptian series have revealed their very complicated racial structures. There were distinguished 35 different racial types which have been described in a detailed way. The commonest types appeared to be: Hamitic (BE) and Kushitic (BK). The racial compositions calculated on the basis of frequencies of the racial types distinguished show presence of 12 racial elements (see: table 2). All the results of typological analysis may be presented in the following way:

Table 2

RACIAL COMPOSITIONS OF PRE-AND EARLY DYNASTIC SERIES

Racial element	Sym- bol	Wadi Digla	Aby- dos Pred.	Aby- dos E.D.	Ge- be- lein	Na- qada	Ba- dari	Ma- adi	Hel- wan	Sak- kara
Nordic	a	—	2,0	10,9	4,3	—	4,5	2,5	9,7	12,5
Cromagnonoid	y	6,3	—	—	3,2	1,4	4,5	—	1,6	2,5
Berberic + Highland	b+q	21,9	38,0	32,6	41,5	47,1	47,0	40,0	40,3	37,5
Mediterranean	e	28,1	10,0	8,7	14,9	28,6	20,2	25,0	21,0	32,5
Oriental	k	34,4	40,0	28,3	22,3	14,3	20,9	20,0	13,7	2,5
Armenoid	h	3,1	2,0	4,3	—	—	2,2	7,5	6,5	2,5
Laponoid	l	3,1	—	—	1,1	—	1,5	2,5	4,8	10,0
Bushmanoid + Pygmic	n+o	—	8,0	6,5	5,3	8,6	—	—	0,8	—
Sudanese + Equatorial	s+x	3,1	—	8,7	7,4	—	2,2	2,5	1,6	—
Pacific	z	—	—	—	—	—	—	—	—	2,5
Number of items (m+f)		16	25	22	47	35	67	24	62	20

Remark: All the data of typological analysis were published in: A. Wierciński (1963, 1965a, 1968).

1) a core of Pre-and Early Dynastic series is constituted by the high frequencies of the Berberic (*b*), Mediterranean (*e*) and Oriental (*k*) racial elements which together with undoubted presence of the Highland (*q*) element indicate the Western & Southern Asiatic affiliations;

2) the admixtures of Negroid (Bushmanoid *n*) and Pygmic (*o*) elements appearing in Naqada, Gebelein and Predynastic Abydos might express some remote influences of an archaic Khoianian population which had possibly passed through the Nile Valley in the Sebilian Period (?) or, even earlier;

3) there existed slight influences of tall Negritic populations ascertained by the shares of the Sudanese (*s*) and and Equatorial (*x*) elements;

4) undoubted Semitic affiliations are evidenced by the high frequencies of the Oriental (*k*) element which were the highest at Pre-and Early Dynastic Abydos;

5) slight admixtures of the Cromagnonoid(*y*) element might be explained by the influences going from the North-Western Africa since, since it had been so numerous in Afalou bou Roumell and Tatoralt;

6) traces of Levantinian World were left by the shares of the Armenoid(*h*) and Laponoid(*l*) elements while those of the Nordic(*a*) component were related to the ancient Aegean insulars.

At last, the migratory conception was advanced, namely, that a mass of the ancient Egyptian populations have been created by the two great migrations, one going from a continental part of Western Asia and passing through Sinai peninsula and, a second one from the Arabian peninsula passing through Bab-el Mandeb.

RECENT EGYPTIAN SERIES

All the 21 recent territorial series from Egypt have been typologically analysed by I. Michalski (1964) by use of the same taxonomical procedure and the same halving method of calculation the racial compositions. Thus, there exists a possibility of the comparison of recent data with the ancient series analysed by the present author.

The racial compositions published by Michalski have been too mapped by him according to a sequence of greatest percentages of the most frequent racial elements (see: fig. 2). The main conclusions of Michalski's analysis may be summarized as follows:

1) all the studied recent Egyptian series have revealed a very complicated racial structures ascertained by distinguishing 53 racial types as derivations of the 14 racial elements;

2) a core of the recent Egyptian series has remained unchanged from the ancient times since it is consisting of the same racial elements i.e. Berberic(*b*), Mediterranean(*e*) and Oriental(*k*) which are concentrated at the main agricultural areas with the compositions of the kind: $b \geq e \geq k$ (Gharbiya, Daqahliya, Giza, Cairo and Fayum);

3) the Coptic composition: $b \geq e \geq a$ as an effect of European infiltrations into primary „Ancient Egyptian” structure appears regularly in the provinces of Asyut, Qena and Beni Suef;

4) modern Egyptian structure of the kind: $\geq b \geq k \geq e$ has resulted from the arabisation of primary composition and, it may be seen in the provinces of Minufiya, Kafr el Sheikh and Minya;

5) the Northern nomadic tribes of Western Asia have left their traces in the biblical „earth of Gossen” (province Sharqiya) as the composition: $b \geq k \geq h$;

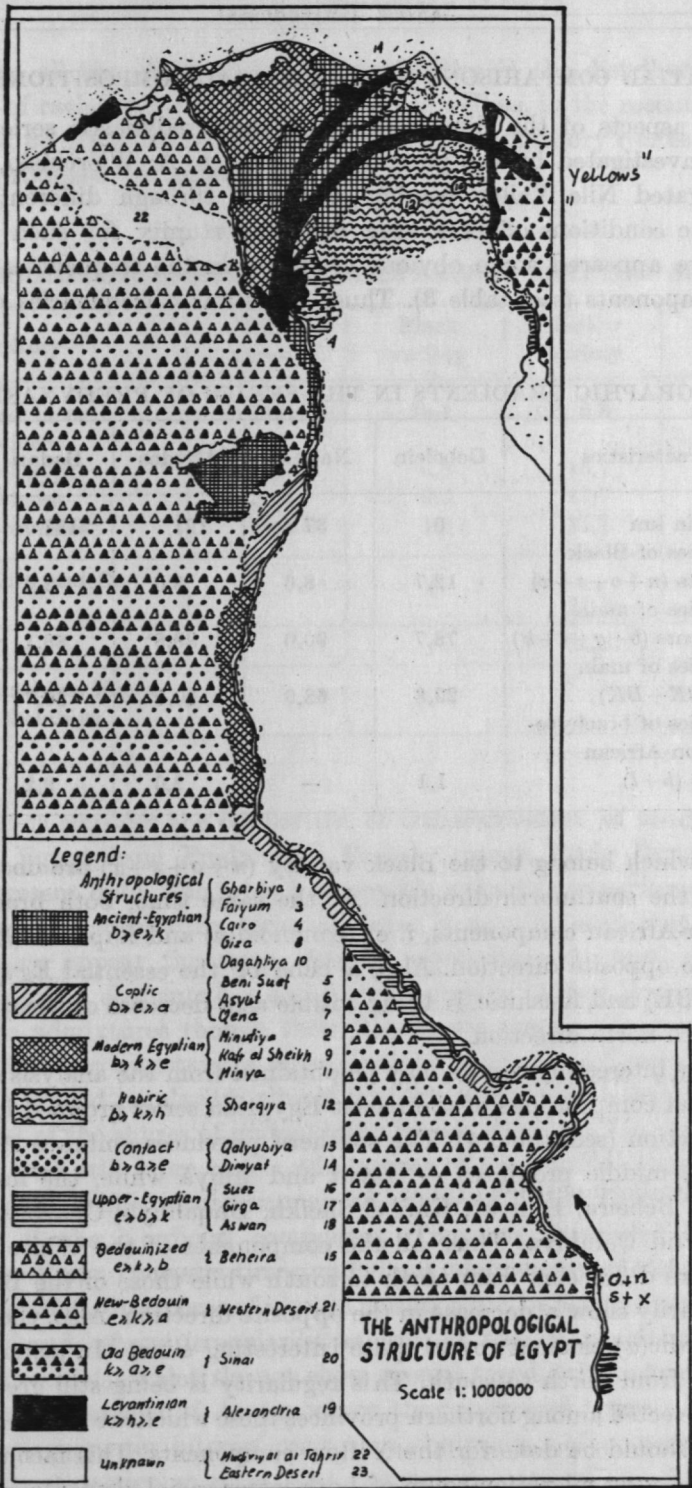
6) Beheira, Western Desert and Sinai represent a beduinisation of typical Egyptian structure transformed into compositions: $e \geq k \geq b$, $k \geq a \geq e$ and $e \geq k \geq a$ respectively;

7) a typical composition of the modern Upper Egypt appears to be: $e \geq b \geq k$ (Aswan, Girga and Suez);

8) only Alexandria show an undoubted Levantinian composition: $k \geq h \geq e$;

9) strange influences of the classic components of the Yellow variety like: Pacific(*z*) and Mongoloid(*m*) and, the admixtures of the Laponoid(*l*) element might be explained by military garnisons of Alban-Caucasian-Turkish or, even Kiptchak origin;

The undoubted great regularities of the results of Michalski's analysis should be most firmly emphasized.



TIME-SPATIAL COMPARISONS OF THE RACIAL COMPOSITIONS IN EGYPT

Some aspects of the clinal analysis of the Predynastic series have been already investigated by the present author (see: A. Wierciński, 1968) since the elongated Nile Valley passing gradually through different geographic & climatic conditions offers a very nice opportunity for such studies. So, there have appeared some obvious gradients in the frequencies of different racial components (see: table 3). Thus, the sums of frequencies of the racial

Table 3

THE GEOGRAPHIC GRADIENTS IN THE SERIES OF PREDYNASTIC PERIOD

Characteristics	Gebelein	Naqada	Abydos	Badari	Maadi + W. Digla
Distance in km	0	37	121	191	434
Frequencies of Black elements ($n+o+s+x$)	12,7	8,6	8,0	2,2	2,8
Frequencies of main components ($b+g+e+k$)	78,7	90,0	88,8	88,1	84,7
Frequencies of main types ($BE+BK$)	29,8	68,6	60,0	56,7	48,1
Frequencies of brachycephalic non-African elements ($h+l$)	1,1	—	2,0	2,2	5,3

elements which belong to the Black variety ($n+o+s+x$) are decreasing gradually in the south-north direction. At the same time, both brachycephalic, surely non-African components, i. e. Armenoid(h) and Laponoid(l) are increasing in the opposite direction. Also, a cline of the essential Egyptian types: Hamitic (BE) and Kushitic is being visible as a decrease of their percentages in the south-north direction.

Equally interesting results may be obtained from the analysis of gradients in the racial compositions of the recent Egyptian series grouped in the south-north direction (see: table 4). The southern provinces embrace Aswan, Qena and Girga, middle provinces — Asyut and Minya while, the northern ones consists of Beheira, Dimyat, Kafr el Sheikh, Daqahliya, Gharbiya, Sharqiya, Minufiya and Qalubiya. Thus, all the components of the White and Yellow varieties are decreasing from north to south while those of the Black variety very regularly show a decrease in the opposite direction. Also, the frequencies of the Nordic(a) element reveal quite interesting cline. In general, they are decreasing from north to south. This regularity is being still greater if there would be selected among northern provinces these which are situated along Nile. The same should be done for the Yellow components. This fact throws some light on the very migration route of both latter racial elements.

Probably, all the observed spatial regularities in the distribution of the frequencies of racial elements in the ancient as well as, in the recent Egyptian series should be explained as evidences of different migratory routes combined with the processes of genes flow.

Table 4

THE GEOGRAPHIC GRADIENTS IN THE RECENT EGYPTIAN SERIES

Territory	White variety	Black variety	Yellow variety	Nordic(a) element
Southern provinces	74,1	16,1	9,8	9,5
Middle provinces of Upper Egypt	79,7	4,6	15,7	9,9
Middle provinces	80,4	2,0	17,7	13,5
Northern provinces	84,6	1,3	14,1	9,8
Minufiya, Giza and Dahliya			21,1	
Sinai			21,4	
Dimyat, Gharbiya, Minufiya and Qalubiya				14,0

Now, let us consider the regularities of transformation of the racial composition in Egypt from Predynastic Period through Early Dynastic times up to the present date. The table 5 represents suitable comparisons of all the corresponding geographically series of data. It may be seen that in all the 5 comparisons appear the same striking regularities. At first, everywhere essential Egyptian elements *b*, *e* and *k* are decreasing in time lapse on account of accessoric admixtures though their frequencies remain the greatest in all the series. This fact ascertains a great stability of the core of racial structures in Egypt. A second regularity, almost without exceptions, is based on a gradual increase of the shares of undoubtedly foreign elements, i. e. Armenoid(*h*), Laponoid(*l*) and still more exotic admixtures of the Pacific(*z*) together with Mongoloid(*m*). Another situation may be observed in the distribution of the frequencies of the Nordic(*a*) component. They are increasing everywhere from Pre- to Early Dynastic times and the *n*, they remained the same in the present time. The admixtures of always unimportant in Egypt Cromagnonoids (*y*) are small and behave irregularly, as well as, the frequencies of elements of the Black variety which do not show special trend, with exception of the most southern province of Aswan where they increased twice.

Lastly, of a greater interest may be a comparison of a degree of racial heterogeneity of particular series. As a common measure of this degree author

Table 5

A COMPARISON OF RACIAL COMPOSITIONS OF EGYPTIAN POPULATIONS IN TIME

Racial element	Gebelein	Aswan	Naqada	Qena	Abydos Pred.	Abydos E.D.	Girga	Badari	Asyut	Maadi W.Digla Pred.	Helwan Sakarka	Cairo Giza Qalub.
Nordic (<i>a</i>)	4,3	5,0	—	13,0	2,0	10,9	10,5	4,5	14,8	1,3	11,1	11,3
Cromagnonoid (<i>y</i>)	3,2	2,5	1,4	—	—	—	3,9	1,5	1,1	3,1	2,0	3,5
Berberic + Highland (<i>b+q</i>)	41,5	17,5	47,1	28,3	38,0	32,6	25,0	47,0	25,0	31,0	38,9	30,2
Mediterranean (<i>e</i>)	14,9	25,0	28,6	15,2	10,0	8,7	23,7	20,2	18,2	26,6	26,8	19,8
Oriental (<i>k</i>)	22,3	10,0	14,3	10,9	40,0	28,3	15,8	20,9	13,6	27,2	8,1	11,2
Armenoid (<i>h</i>)	—	7,5	—	10,9	2,0	4,3	10,5	2,2	8,0	5,3	4,5	6,6
Laponoid (<i>l</i>)	1,1	2,5	—	6,5	—	—	1,3	1,5	5,7	2,8	7,8	10,0
Mongoloid + Pacific (<i>m+z</i>)	—	5,0	—	8,7	—	—	1,3	—	6,8	—	1,3	5,2
Bushmanoid + Pygmic (<i>n+o</i>)	5,3	10,0	8,6	2,2	8,0	6,5	7,9	—	5,7	—	0,4	2,0
Sudanese + Equatorial (<i>s+x</i>)	7,4	15,0	—	4,3	—	8,7	—	2,2	1,1	2,8	0,8	0,2
Sum: $b+q+e+k$	78,7	52,5	90,0	54,4	88,0	69,6	64,5	88,1	56,8	84,8	73,8	61,2
$-\Sigma p_1 g_2 p_4 = H_{int}$	2,347	2,993	1,820	2,887	1,912	2,456	2,731	2,075	2,916	2,412	2,446	2,694

has suggested in one of his previous publications a concept of informational entropy (see: A. Wierciński, 1964) expressed by the equation:

$$H_{\text{inf}} = -\sum p_i \lg_2 p_i$$

if binary units have to be used.

Again, our time series reveals regular trend with no exception. It is based on the increase of the values of H_{inf} in all the cases being the smallest in the Predynastic period, medium — in Early Dynastic and the greatest recently. Thus, we may say that the racial structure in Egypt is becoming gradually more and more complicated. But, there appears too a regularity in the spatial distribution of the values of H_{inf} . Namely, with exception of most southern Gebelein series, all the other Predynastic series show the increase of racial heterogeneity in the south-north direction. In the Early Dynastic times and recently, this regularity seems to disappear. This fact might be explained by intensive intercrossing process along the Nile Valley which equalized the degree of racial heterogeneity. The exceptional position of Gebelein with its high value of H_{inf} in the farthest south is not strange owing to the greatest admixtures of the components of the Black variety which heterogenize this population already in the Predynastic Period.

At the end of these considerations a general conclusion should be inferred that the individual typological analysis makes possible a discovery of very striking regularities in the time-spatial interpopulational comparisons.

REFERENCES CITED

Fawcett C. D., 1901: *A Second Study of the Variation and Correlations of the Human Skull, with Special Reference to the Naqada Crania*. „Biometrika”, v. 1, p. 408 - 467.

Maciver Randall D., 1901: *The Earliest Inhabitants of Abydos*. Oxford.

Michalski I., 1964: *Remarks about the anthropological structure of Egypt*. „Publ. Joint Arab. Pol. Anthropol. Exp.”, Part II, p. 209 - 238.

Wierciński A., 1963: *Analiza struktury rasowej ludności Egiptu w epoce przeddynastycznej*. „Materiały i Prace Antropologiczne”, v. 56.

Wierciński A., 1964: *An attempt to formalize the theory of racial differentiation of man*. „Homo”, v. 4, p. 193 - 200.

Wierciński A., 1965a: *The analysis of racial structure of Early Dynastic populations in Egypt*. „Materiały i Prace Antropologiczne”, v. 71, pp. 48.

Wierciński A., 1967: *The applications of the method of multiple stochastic correlations to anthropology*. „Acta Congr. Ceskosl. Antropol.”, Brno, p. 279 - 284.

Wierciński A., 1968: *The comparative analysis of racial structure of Pre-and Early Dynastic populations in Egypt*. „Fundamenta”, (in press).

Wierciński A., 1968a: *A new method of establishing the affinities between Great Racial Varieties on the basis of cranioscopic traits*. „Materiały i Prace Antropologiczne” (in press).