

The alchemy of human variation: Race, ethnicity and Manoiloff's blood reaction

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ABSTRACT This paper examines the research on race determination conducted by Russian biochemist E.O. Manoiloff in the 1920s. Manoiloff claimed to have discovered a method which detected racial identity of an individual by a simple chemical reaction performed on a subject's blood sample. The method was published in one of the leading anthropological journals and it was not questioned for some time. It is obvious today that Manoiloff's claims were nothing short of ridiculous. The present study, based on the experimental history of sciences, tries to elucidate Manoiloff's procedures and reasons for his 'success'. His experiments were repeated using both original and modern equipment. It has been demonstrated that Manoiloff's procedures, although rigorous at first glance, were highly arbitrary and methodologically flawed. It would appear that the socio-political and scientific contexts of the early twentieth century which favoured belief in the existence of clearly distinguishable racial types played a crucial role in the initial positive response to Manoiloff's research.

KEY WORDS: race, typology, history of science

Anthropologists ... are absorbed in their intellectual history – in learning from the mistakes of earlier generations of scholars. The more we understand those conceptual errors, which usually are visible only in hindsight, the more the science of the human species can grow – by the very process of proposal and disposal by which science functions.

Jonathan Marks (1995: 3)

The power of racial science

The race concept, now generally abandoned by a large majority of American and western European physical anthropologists [e.g., LIEBERMAN *et al.* 1989; CAVALLI-SFORZA *et al.* 1994; CARTMILL 1998; KASZYCKA and ŠTRKALJ 2002;

WANG *et al.* 2002; KASZYCKA and STRZALKO 2003*a,b*; LIEBERMAN *et al.* 2004; ELLISON and GOODMAN 2006], dominated the study of human variation for centuries. Until the mid-twentieth century, this typological framework formed the basis of racial research within which a large number of studies were

generated [e.g., STOCKING 1968, STEPAN 1982, BARKAN 1992, WOLPOFF and CASPARI 1997, BIONDI and RICKARDS 2002, BRACE 2005]. As a result, racial science at the end of the nineteenth and the beginning of the twentieth century was transformed into a veritable mania of classification that hid more than it revealed about the nature of human biological variation. Typologically based racial science came to an end only with the scientific and social changes in the second part of the twentieth century, such as the emergence of population concepts in biology and general social frustration with the effects of racial policies after the Second World War.

One of the ways in which population concepts reached anthropology was through the study of genetics. However, in the beginning of the twentieth century human genetics, in the form of racial serology, was configured as a different method of infraspecific classification of the human species rather than as a discipline in which racialism would be questioned. Indeed, some of the early studies are paradigmatical examples of typology [MARKS 1995]. One of these early studies, a study which today with the benefit of historical hindsight we perceive as bordering on the ridiculous if not insane, was research carried out by Russian biochemist E.O. Manoiloff (sometimes spelled 'Manoilov'). The present paper uses techniques of the experimental history of science in an attempt to re-examine Manoiloff's research.

Manoiloff, the racial alchemist

Manoiloff seemed to be impressed with the possibility of using ABO blood typing in establishing racial boundaries.

He wanted, however, to take this further by utilizing blood in classification. He postulated, in analogy with hormones (the presence of which in blood may be used to distinguish sexes), the existence of "something correspondingly specific of race in the blood of different races of mankind" [MANOILOFF 1927: 16]. Indeed, Manoiloff [MANOILOV 1924, 1929] had already devised a biochemical method for sex determination in plants and animals, including humans. This method raised considerable interest and was implemented by other scientists with partial success [e.g., SATINA and DEMEREC 1927, FALK and LORBERBLATT 1927, ABROMAVICH and GARDNER LYNN 1930]. As the same level of biological reality was ascribed to 'race' as it was to 'sex', Manoiloff's broadening of research to race determination followed naturally. Blood, pregnant with symbolic meaning [MARKS 1994, 1995], appeared to many early twentieth century scientists as a substance that contained a code that would unlock the secrets of life, thus fulfilling a role nowadays afforded by DNA [cf. NELKIN and LINDEE 1995].

It would appear that by a trial and error method in which he used different chemical reagents, Manoiloff went in search of the 'racial ingredient'. Although he could not explain what this racial ingredient was, he claimed that he managed to discover the ingredients which, when applied to blood, would detect that element by colouring blood differently. The reagents used were: (1) 1% alcoholic solution of methyl-blue (Grübler), (2) 1% alcoholic solution of cresyl-violet (Grübler) (Nissl Stain), (3) 0.5% solution of silver nitrate, (4) 40% solution of hydrochloric acid, and (5) 1% aqueous solution

of potassium permanganate. These were applied to blood using the following formula [MANOILOFF 1927: 18]:

add to 3 cc. of unheated emulsion of red blood corpuscles (3 to 5 per cent) or directly to the coagulum of blood three to four times as much (in volume) sodium chloride (physiological solution) and mix with a glass stick so as to obtain a rather thick emulsion. The initial step was the addition of 12 ml of physiological solution (phosphate buffered saline) to the coagulum of blood. The reagents were then added in the following order: add 1 drop of the first reagent, shake; 5 drops of second reagent, shake again; 3 drops of third reagent, shake; 1 drop of fourth reagent, and, lastly, 3 to 5 drops of the fifth reagent.

However, MANOILOFF [1927: 18] noted that in order to get better coloration it was sometimes necessary to

add not one, but two or three drops of the fourth reagent in which the same was applied to reagent five, whereby it may be necessary to add not three, but from five to eight, and sometimes even more, drops of potassium permanganate.

This addition proved to be one of the keys to understanding Manoiloff's apparent success (*vide infra*). Manoiloff used this 'alchemical recipe' to distinguish between two 'races', namely Russian and Jewish. He used only individuals who could be certain of their ancestry. This was determined by their knowledge of at least three 'truly' Russian and Jewish ancestors from both maternal and paternal sides. On application of the formula, Manoiloff discovered that Jewish blood coloured blue or blue-green as the distinct colour of cresyl violet disappeared "entirely or almost completely" [MANOILOFF 1927: 18], while in Russian blood this did not happen as the

cresyl violet remained partly insoluble. As a result, Russian blood stayed blue-red in colour. Based on this, Manoiloff claimed that he could establish with 91.7% accuracy to which of the two groups the individual belonged.

It appeared, therefore, that an easy method for establishing racial type of an individual had been devised. The method seemed to work as Manoiloff and his collaborators subsequently successfully applied it to other groups, showing a virtual rainbow of 'racial' blood colours, i.e., Esthonians and Letts – reddish-brownish, Poles – reddish-greenish, Koreans – reddish-violet, Kirgis – bluish-greenish, etc. [POLIAKOWA 1927]. Possibly the most frightening aspect of the research was its possible application in paternal testing. Manoiloff's protégé, Anna POLIAKOWA [1927], claimed that it might be useful in establishing paternity of children of 'mixed origin' because the blood of these individuals coloured differently to that of each of the parents. For, example, if the father was a Pole (reddish-greenish blood) and the mother Russian (reddish), the child's blood must, when Manoiloff's reagents are applied, colour a paler reddish.

It is too easy to dismiss this research merely from the benefit of historical hindsight. In the 1920s, however, the study was generally accepted with very little scepticism about its methodology and results. The very fact that it was published in the *American Journal of Physical Anthropology*, then and now one of the most respected journals in the field, speaks loudly enough. However, aside from Manoiloff and a few of his Russian followers, no other subsequent reports of replication of these experiments were ever published. Earnest Hooton, in his

1931 classic *Up from the Ape*, seemed to be one of the first anthropologists to openly raise doubts about Manoiloff's research. The reason for Hooton's scepticism was the fact that Manoiloff was distinguishing between ethnic groups, not biological races. He emphasised "it is inconceivable that all nationalities, which are principally linguistic and political groups, should be racially and physiologically distinct" [HOOTON 1931: 410]. Magnus HIRSCHFELD [1938], in one of the anti-racist tracts that appeared in 1930s when the first reports of Nazi concentration camps started to spread, ridiculed Manoiloff and noted that anthropologists in Germany had struggled unsuccessfully to repeat his experiments. Indeed, Otmar VON VERSCHUER [1938], one of the leading German anthropologists of the Nazi era also noted that no one had managed to repeat Manoiloff's procedures successfully.

Experimental history of science

Although it is now obvious that Manoiloff's views on race are desperately flawed, the question as to 'what made his procedure so successful' still remains. Was he simply a fraud who lied about his results or were the circumstances more complicated? It would appear that the most profitable way of elucidating Manoiloff's racial research would be to employ experimental history of science. This approach is based on the assumption that "past experiments can be studied by the help of a (modern) reproduction of them" [KRAGH 1987: 160]. In the field of anthropology, GOULD [1978, 1981] applied the experimental history of science in his classical analysis of S.G. Morton's research on crania of different races.

In this study two sets of blood analyses were conducted, one based strictly on Manoiloff's procedure and the other in which modern equipment was used on the blood samples from the same individuals. To obtain 'drops' (as suggested in Manoiloff's formula) scientists of the 1920s generally used the Pasteur pipette. Using the pipette, however, (even for an experienced individual) meant that the volume of the drop is arbitrary.

The Pasteur pipette, therefore, was used for the first blood analysis. When the procedure was repeated with modern equipment, a micropipette was used and the size of the drop standardised. The size was calculated as the average drop size made by a Pasteur pipette. In both cases (Manoiloff's and the modern), visual colour estimation was made by means of simple observation. In addition, digital images of all specimens were taken and analysed by means of the Corel Photo Paint programme. The difference in colouration of the samples were statistically analysed by Student's *t*-test.

Blood was taken from thirty-six volunteers. Owing to geographical constraints there were not enough Russian and Jewish subjects for examination. Instead, thirty-eight subjects belonging to populations commonly represented in South Africa were recruited. They were separated into four groups: individuals of European, African, Indian and mixed European and African (commonly referred to as 'Coloured' in South Africa) origin. The justification for this division was that if indeed there are any differences between 'races' in Manoiloff's blood reaction, then one would expect to find it also between these four groups because of their different ancestry.

Results of the application of Manoiloff's original technique did show different colouring (albeit not in the vivid colours as he had described them). However, there was no pattern apparent as the differences were idiosyncratic and did not exist between populations. Blood between two siblings collected during the course of the research, for instance, also coloured differently. When the same technique was applied with the modern instruments, although minor individual differences were still observed, there again was no difference between populations. Statistical analysis of the blood coloration obtained for both procedures (using old and modern equipment) showed no significant difference between populations ($p < 0.05$).

Where do Manoiloff's rainbow colours come from? As mentioned earlier, Manoiloff advised that if the original formula did not provide satisfactory coloration, additional drops of the fourth (hydrochloric acid) and fifth reagents (potassium permanganate) should be added. It would appear that this was the secret for obtaining the different colorations of blood. If a different number of drops are added to the same specimen, results vary dramatically. It seems that the undefined volume of the drop, together with the possibility of the addition of extra drops, opened widely the doors of arbitrariness which resulted in the coloration of blood to any desired degree. Fraud (conscious or unconscious) must have been at the bottom of the method because Manoiloff or his technicians doing the work must have known the 'racial identity' of their subjects beforehand. The reason for the observed wide range of individual differences in the procedure using a Pasteur pipette (Manoiloff's original technique) can also be attributed to the arbitrary size of the drop.

Conclusion: Blood does tell!

Under the ironic title 'Blood will tell', MARKS [1994] used Manoiloff's research as an example that clearly shows some of the weaknesses of old-fashioned racial science. This paper, based, as it is, on the experimental history of science which has re-examined Manoiloff's experiments, corroborates Marks' analysis and shows that blood really does 'tell'. It tells that racial science is indeed defunct. Although perhaps an extreme case, Manoiloff's research is only one of many examples of the cumbersome ridiculousness that is exhibited in the old typologically orientated racial science. Although in most [but not all, cf. KOHN 1995] of academic anthropology, typology has long been dead, this does not apply to non-academic racist discourse. In amongst this, not only typology but even Manoiloff's research may be found quoted as examples of reliable methods for race determination [cf. SIMPSON 2003].

Manoiloff's research shows that provided there is an adequate theoretical framework and social context in place, almost anything might become acceptable in science.

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Streszczenie

Artykuł omawia metodę badań przynależności rasowej ludzi, jakie prowadził w latach 20. ubiegłego wieku rosyjski biochemik E.O. Manoiloff. Badacz ten twierdził, że odkrył sposób określania „rasy” osobnika przy użyciu prostych reakcji chemicznych wykonanych w próbce jego krwi. Z dzisiejszej perspektywy pomysł Manoiloffa wydaje się po prostu śmieszny, jednak na początku XX w. sprawę tę traktowano całkiem poważnie. Metoda, o której mowa, została opublikowana w *American Journal of Physical Anthropology*, jednym z najważniejszych amerykańskich czasopism antropologicznych i przez długi czas pozostawała niezakwestionowana.

W przedstawianym artykule autorzy omawiają historię „odkrycia” Manoiloffa i późniejszej jego falsyfikacji z wykorzystaniem nowoczesnej aparatury i metod. Badania Manoiloffa są charakterystycznym przykładem słabości rozwijanej w początkach XX w nauki o rasach, kiedy to, ze względu na stan wiedzy przyrodniczej i warunki socjo-polityczne, nawet tak absurdalne wyniki spotkały się początkowo z pozytywną reakcją środowiska naukowego.