

# A History of Anthropology in Turin's Faculty of Sciences

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## Foreword

"I feel the blood freezing in my veins" (not the usual figure of speech) wishing to present a history of anthropology in Turin between the two congresses held to celebrate anniversaries of Italian unification! This presentation, which Emma Rabino kindly proposed to me, concerns my personal memories (with the help of colleagues, whom I thank) from my admission to the Institute of Anthropology onward, while I leave to Renato Grilletto the task of recounting the "historical memories" of those times! I wish to apologize for the lack of depth in relation to scholars of other anthropological institutions in Turin and Piedmont, such as Giacomo Giacobini, distinguished anatomist and paleoanthropologist now engaged in the creation of the Museum of Man, the directors and inspectors of the Egyptology and Archaeology Superintendencies (among whom I wish to cite Silvio Curto), the many freelance scholars of the discipline, but above all, Francesco Remotti and the School of Cultural Anthropology with whom we always tried to build a "bridge between paradigms" to strengthen "the uncertain alliance" enunciated by Luciano Gallino.

## Anthropology in Turin before 1961

Before considering the main subject of this presentation, let me make a brief digression to mention some important events concerning the origin of anthropological studies in Turin after Italian unification, specifically with regard to the establishment of the first chairs of Anthropology in the Faculties of Humanities. A chair of Anthropology and Education was established in Turin in 1867 by Minister Broglio and it was held by Giuseppe Allievo (1830-1913). Other important figures in anthropology were: Antonio Garbiglietti (1807-1877), a physician who devoted himself to studies of anthropology and was director of the Royal Academy of Medicine's Craniology Museum; Filippo De Filippi (1814 -1867), who spread the principles of Darwinism; and of course the world famous figure of Cesare Lombroso (1835-1909).

The study of physical anthropology, with a natural overview, had plenty of room to grow in Turin. The fact that the city was a world centre of Egyptology created a fertile environment for the development of this type of

approach. Archaeologists and anthropologists found Egypt and its ancient populations to be a prominent topic of investigation. The scientific training of Professor Giovanni Marro, founder of the Institute of Anthropology, took place within this cultural environment. Only in the early nineteenth century would anthropology take its typical place as a natural science in the fullest sense of the term, freeing itself from its medical roots. Giovanni Marro contributed to the emergence of physical anthropology, as we understand it today, with his cultural shift from medical doctor to naturalist. Savina Fumagalli wrote about Giovanni Marro: "He conceived Anthropology as a Natural History of Man, as the height of natural disciplines, making an allowance for each event or hidden expression in anatomy and physiology, in osteology, in ethnography, archaeology, prehistory and history, framing every observable biological fact within the natural environment."

From 1911 to 1935, Giovanni Marro participated as an anthropologist in the Italian Archaeological Mission in Egypt led by the Egyptologist Ernesto Schiaparelli (1856-1928). This mission was unique among all foreign Egyptian expeditions in combining a purely archaeological endeavour with an anthropological one. In 1923, Marro assumed the official teaching post in Anthropology. He founded the Institute and Museum of Anthropology and contributed to the success of the discipline. Nevertheless, we regret to have to mention his adherence to the racist ideology that characterized those times.

After the death of Giovanni Marro, his work was continued by Savina Fumagalli (1904-1961), who went on to develop a global vision of anthropology, assisted in succession by Maria Licinia Piacenza, Menico Torchio (later professor of Marine Biology in Cagliari and Pavia), Raffaello Volta, Domenico Davide, Melchiorre Masali and Renato Grilletto. Savina Fumagalli treated the ethnographic aspect of the museum with particular attention, as she had become an expert on the subject from the study and cataloguing of materials she had begun to rearrange after Marro's death. As executrix of Marro's will, she supervised (assisted by Domenico Davide and Renato Grilletto) the classification of the collections and the reinstallation of the Museum of Anthropology and Ethnography, which had been moved from Palazzo Carignano to its current site of the former San Giovanni Battista Hospital in Via Accademia Albertina. In particular, she reorganized and made a first catalogue of the osteological collection of Dynastic and Predynastic

Egyptians, and she restructured the rooms of the museum. The reorganization was completed in 1961 during the celebrations for the centenary of Italian unification.

### Anthropology in Turin since 1961

After Savina Fumagalli's death, the teaching of anthropology passed *ad interim* to Melchiorre Masali and then from 1962 to Brunetto Chiarelli. The University of Turin acquired the collections of the Museum of Anthropology and Giovanni Marro's library for the Institute of Anthropology in exchange for a life annuity to Fumagalli's sisters. In this way, Professor Marro's collections were incorporated into the museum attached to the Institute. In subsequent years, as discussed in the paragraph dedicated to the museum, these collections triggered very strong activities of research and dissemination of anthropological knowledge and culture in the city of Turin. The discipline would later evolve into new fields and new perspectives of investigation mainly due to scientific and methodological improvements and the development of innovative techniques.

Turin experienced a revival of the science of man in the 1960s, and one of the reasons was the effect of the "Torino '61" Congress of Anthropology, Ethnology and Folklore, organized by Savina Fumagalli on the occasion of the centenary of Italian unification. This was the first real national conference held by Italian anthropologists, bringing together scholars from the different anthropological disciplines, at times scattered too thinly among various fields of knowledge. The congress was planned along the lines of the international congress (*Sciences Anthropologiques et Ethnologiques*) held the year before at the Sorbonne in Paris and attended by the Italian congress organizers. According to that model, a deliberate attempt was made to bring together physical and cultural anthropologists, ethnologists and paleontologists, perhaps helping to halt the diaspora that would soon make anthropologists specialists in well-defined fields.

An event that had a major influence on the orientation of the Turin School was the foundation of the Higher Institute of Physical Education (ISEF) by Anna Maria Di Giorgio. Indeed, the teaching of the discipline by Savina Fumagalli was proposed as "anthropology and anthropometry", thus giving the latter a quasi-independent characterization that opened the way to ergonomics research.

The two decades following Marro and Fumagalli were characterized by the directorship of Brunetto Chiarelli, who took office in 1962 after the interim period of Melchiorre Masali, and the passing away of Savina Fumagalli in the autumn of 1961. Brunetto Chiarelli ushered in a period of renewal that called into question much of traditional anthropology, particularly emphasizing its natural and organic foundation, albeit without forgetting the social aspects of the discipline (within a naturalistic perspective). In fact, the universal validation of human biology and ethnicity was starting to emerge, particularly under the pressure of UNESCO. Although racism appeared to be out of date in the field of politics, racial taxonomies continued to be used by scientists until the following

decade when anthropologists began to question them. Not by chance, a seminar held in the ancient amphitheatre lecture hall of the Institute of Anthropology and organized by Brunetto Chiarelli and Melchiorre Masali to discuss C.S. Coon's treatise "*The Origin of Races*" raised the question in Turin of considering human variability in a perspective of "*Anthropology without Races*". Today we might call this a problem of intraspecific biodiversity, but at the time it was considered a major break with a very compromised past. Nevertheless, the title of the text for the anthropology course taught by Savina Fumagalli "*Elementi di Storia Naturale dell'Uomo*" (Elements of a Natural History of Man) had already indicated the new direction of physical anthropology, and its contents reflected a toning down of the harsh racial language derived from the literature of the time.

With Chiarelli, the emphasis turned to the biological concept that anthropology should be framed primarily within the context of primatology, due to the similarities with our own species. Indeed, Brunetto was appointed to the first chair of Primatology, established in Turin in 1969. Following the aforesaid activation of the post of Anthropology and Anthropometry in the Physical Education Institute (S. Fumagalli and from 1961 M. Masali), anthropometric and postural research was carried out by various lecturers, researchers, and sports technicians. This led to the teaching of Anthropometry and Ergonomics by Enrica Fubini in the Biological Sciences degree course and to the teaching of Anthropology and Anthropometry in the School of Specialization in Sports Medicine by Brunetto Chiarelli and then Giuseppe Ardito in the 1980s. It is also important to mention the contribution by Marco Moiatta, an assistant in the I.S.E.F. in increasing anthropometric surveys in sports (in terms of both the survey methods and tools and the applications) and in teaching the Anthropology and Anthropometry course in Voghera.

### The establishment of university departments (1984)

The establishment of university departments led to the foundation of the Department of Anthropology, Archaeology and Territorial History (Dip.SAAS) by the archaeologist Giorgio Gullini, the cultural anthropologist Francesco Remotti, the geographer Paola Sereno, and the physical anthropologist Melchiorre Masali. At this point, the researchers of the former Institute of Anthropology made different choices essentially motivated by their research interests: Melchiorre Masali, Alberto Mottura, Enrica Fubini, Franca Ligabue Stricker and Tiziana Doro Garetto joined the above-mentioned department, while Emma Rabino Massa, Giuseppe Ardito, Laura Lamberti, Maria Paola Bigatti, Maria Stella Siori, Maria Jole Monchietto, Marilena Girotti and later Alberto Mottura joined the Department of Animal Biology. After some years, all the Turinese physical anthropologists united in the renamed Department of Animal and Human Biology, bringing together the different strands of bio-anthropological research in the newly restored premises of the former Convent of the

Canonichesse Lateranensi. In this new form and with the recruitment of two new researchers (Rosa Boano and Margherita Micheletti Cremasco), Turinese anthropology has also addressed the recent issues of university reform and the merging in 2012 of all Turinese bio-naturalists in the Department of Life Sciences and Systems Biology.

## Research areas of Turinese anthropologists since 1961

### *Skeletal biology*

The morphometric study of skeletal remains from archaeological sites can provide useful information to understand the characterization of individuals and the structure and dynamics of ancient populations. Thus comparisons can be made within the same population and between human groups separated in space and time. Osteological studies in Turin have been oriented in many directions, contributing to the study of very large population samples of different ages and at both the regional and national level. With the departure of Savina Fumagalli, the study and organization of the Institute's skeletal collections were shared in the early decades by Domenico Davide and Renato Grilletto. Later, the driving force of Turinese osteological research was Tiziana Doro Garetto. Her ability to organize laboratory research and convey skills and motivation to the laboratory staff and external collaborators enabled the collection and study of many important skeletal series. Tiziana Doro created a true "school" that has fuelled ongoing collaboration with Valle d'Aosta (Rosito Gerbore), the Museum of Alba (CN) and the University of Genoa (Ezio Fulcheri). Moreover, field studies have involved the participation in several excavations, including those in Iraq. Among her many pupils, we recall particularly Rosa Boano and Margherita Micheletti Cremasco, now university researchers. Tiziana Doro's passing away was a great loss for Turinese anthropology!

A special opportunity for osteological studies was provided by collaboration with archaeologists from the Department of Anthropology, Archaeology and Territorial History in research on medieval Piedmontese populations, especially at the site of Trino Vercellese, as well as in studies on various human groups from other sites in Italy and the Near East. Other active collaborations were with the Archaeological Superintendencies of Piedmont, Veneto and Southern Etruria. The abundance of skeletal remains from the medieval period studied in Turin's Laboratory of Anthropology sparked a series of meetings of Italian anthropologists and medieval archaeologists/historians held in various locations (Aosta 1996, Sestino 1999, Montiglio Monferrato 2002 and Turin 2004).

In addition to classic osteological studies, the laboratory activities have focused on studies of specific types of materials or methods. These have included: cremated bone, with experimentation on alterations of bone tissue at different temperatures; discontinuous skeletal characters, used as parameters to assess the biological distance

between populations; functional skeletal stress indicators, now much in fashion but whose parameters for evaluation and interpretation had not yet been defined at the time; diagnostic paleopathology, the significant and systematic contribution of Ezio Fulcheri from the University of Genoa was paramount in these studies; assessment of the levels of skeletal and dental preservation and decay in order to infer the taphonomic history of artefacts and the burial site; improvement of methods for the estimation of biological age at death through sections of hard tissues; osteometric assessments of growth.

### *Paleopathology*

The biological history of a population is incomplete if the state of health or illness of individuals is unknown. The arrival between 1912 and 1935 of the anthropological collection from the Egyptian archaeological excavations allowed Professor Marro to conduct a comprehensive program of anthropological, paleopathological and paleobiological studies, directing the interest of the Turin school towards studies on the biology of ancient populations. To him we owe the first descriptions of medical and anthropological peculiarities in the collection and subsequent paleopathological reports: 15 essays in anthropology and paleopathology, and about 20 annotations concerning archaeological sites.

The interesting biological material and the activities of Marro's successors attracted many Italian and foreign scholars to Turin in the second half of the twentieth century, including A.T. Sandison, Merton Satinoff and Don Brothwell, who helped promote the paleopathological studies, particularly those on the histology of mummified tissues performed mainly by Emma Rabino and her research team. In 1978, the central role of Turin in the study of paleopathology was further emphasized by the II Symposium of the European Paleopathology Association organized by Brunetto Chiarelli and Emma Rabino. In particular, the research conducted in those years combined traditional morphological studies with histological ones, including chemical investigations and molecular immunology leading to paleogenetic investigations that helped solve the problem of haemoglobin variants responsible for thalassemia.

Among the various lines of study undertaken by Emma Rabino and developed in recent years with Rosa Boano, we should mention the study of congenital malformations and developmental disorders, analysed with the most modern methods of medical investigation.

Paleopathological research also involved the study of recent populations (Medieval and Modern Age), with particular attention to the Piedmont region. As an expression of this trend, some members of the group, such as Emma Rabino and Ezio Fulcheri, founded the "Anthropology Sector - Paleopathology Centre" at the "F. Eusebio" Alba Municipal Museum in 1979, with the purpose of organizing a meeting place for the study of anthropological material from local archaeological sites for a "Territorial Paleopathology". Since 1983, Paleopathology has been taught as part of the Natural Sciences degree course in the former Faculty of Sciences.

## Human paleontology and prehistory (paleoanthropology)

Although Italy is generally very rich in prehistoric remains on account of its age and geological formation, the Piedmont region was once considered virtually uninhabited by man in the earliest periods of human evolution. This old opinion is proving less and less sustainable, as evidenced by increasing discoveries in recent decades. Paleolithic man was investigated in Piedmont for the first time in the 1960s and 70s by means of pioneering excavations conducted by Turinese anthropologists in caves and rock shelters on Mount Fenera in a peri-alpine environment. The studies were carried out by Francesco Fedele, presently professor of Anthropology in the University of Naples. Despite the difficult conditions, other important sites have been discovered and investigated in both northern and southern Piedmont. Therefore, we can conclude that the whole area of the western Po Valley, up to its peri-alpine margins, was inhabited by archaic human populations at least from the late Middle Pleistocene (250,000 to 200,000 years ago). In addition to these phases of the early Paleolithic documented in different lowland contexts (Asti, Vercelli and Cuneo), other more recent occurrences in the late Paleolithic and beyond ("Epigravettian" hunters of the Late Glacial Maximum and the subsequent "Mesolithic" traditions of the early Holocene) were revealed by University of Turin anthropologists, in particular the team of Alberto Mottura, by means of excavations and surface studies. Recent examples of these discoveries are the sites Pratomorone (Asti) and Bastia Mondovi (Cuneo). In the latter case, rather unusual human behaviours with respect to what is known for other (better documented) north-eastern and peninsular areas have been recorded, related to the climatic conditions during the most intense cold pulse of the last glacial period.

### Morphometric study of the auditory ossicles

A very particular aspect of osteological research concerns studies of the small bones of hearing conducted in Turin since the 1960s. However, the foundations for this research were laid by great Turinese scholars like Giuseppe Gradenigo who, along with Emilio de Rossi, founded the journal *Archivio Italiano di Otologia, Rinologia e Laringologia* in 1893. We began to develop morphometric studies on auditory ossicles of non-human primates and man (Melchiorre Masali, Maria Stella Siori, with the contribution of Brunetto Chiarelli for primate taxonomy), and these studies confirmed the taxonomic and phylogenetic usefulness of ear bones. Further research focused on the possibility of characterizing ancient human populations and the possibility of applying discriminant analysis in a case study of morphological distance in the Roman-Egyptian settlement of the Antinoe site (thanks to Renato Grilletto). Analyses of the different auditory structures and their biomechanical functions (Silvana Borgognini Tarli) were also considered important sources of paleobiological information in the study of the evolutionary history of

primates and humans; the results were compared with those of the few existing international specialists, such as Arensburg and Nathan, Rak and Clarke. More recently, Rolf Quam, D.J. De Ruiter and Jacopo Moggi-Cecchi conducted studies of the ossicular chain of *Paranthropus* and *Australopithecus*. At present, Maria Stella Siori and Margherita Micheletti are reorganizing and revising the Turinese historical collection of ear bones, enriching it with new specimens and new taxa, and combining morphometric studies with those of genus- and species-specific diagnostic characters.

### The Biological Archive

The more traditional studies in physical anthropology have been interpreted, within the cultural heritage context, as a "Biological Archive" (this expression was proposed in a discussion in San Gimignano with Giorgio Gullini and Silvana Borgognini). The term relates to the biological material used in the diachronic reconstruction of microevolutionary events of human populations. In the field of anthropology, such investigations provide information and tools allowing the study of morphometry, genetics and population dynamics, i.e. their variation over time. Knowing these aspects allows the reconstruction of the process of microevolution, the basis of the most evident evolutionary process, and the phylogeny of ancient populations. Notwithstanding the important information it provides, skeletal material has some limitations in terms of the characterization of biotypes and paleopathological diagnoses. Therefore, it is important to highlight how the study of mummified remains and non-bony tissues such as teeth, hair, stones, concretions and calcifications can provide a new and significant contribution to paleobiological research. In Turin, these areas have provided the subjects of various PhD research projects. The studies on mummies have been conducted by Emma Rabino Massa, who was in charge of them as Museum Curator and promoted the early histological studies of Egyptian mummies.

The Biological Archive has been the subject of various projects, including the "Progetto Finalizzato Beni Culturali" of the Italian National Research Council (CNR) proposed by Giorgio Gullini, which equipped the departmental anthropology laboratories with high-level instrumentation suitable for the study of bio-archaeological materials. This project also provided the Department of Human Anatomy and Physiology with the opportunity to acquire a scanning electron microscope for innovative applications in shared research.

### Micromammal faunas and stratigraphic sequences

The chronological and paleoecological reconstruction of the prehistoric world requires the correct ordering of the sequence of stratified sediments in deposits preserving traces of humans, as well as the identification of their

temporal relationships and the search for environmental indicators to record the past habitats and climatic fluctuations. To this purpose, there has been strong interest among paleoanthropologists in "micromammals", a group that includes insectivores, bats, rodents, lagomorphs, small carnivores and the normal prey of owls. This research field is gaining increasing importance in the fine determination of geological time, as the remains often accompany the filling of human-inhabited caves. Because of their strict adaptation to narrow well-defined habitats, individual species of mammals are ecological and climatic indicators that are very sensitive to environmental changes. Hence the study of temporal successions of such fossil faunas allows the reconstruction of climatic fluctuations and changes in the paleolandscape. Microtine rodents (voles) appear to be the best chronological ("biostratigraphic") indicators owing to their rapid evolution and speciation during the Pleistocene. The study of micromammal remains, accompanied by that of macrofaunas, by the Turin School (in particular by Maria Stella Siori) led to the dating to the Low Biharian of an important human-inhabited Piedmontese site (Castagnone, northern Monferrato), calibrated in the Jaramillo subchron by magnetostratigraphic studies.

### **Biodemography and human population biology**

Since the 1970s, the research group, first led by Brunetto Chiarelli and then by Emma Rabino Massa with Marilena Girotti, Nadia Salis and colleagues, has examined the ecosystem of isolated populations in the Western Alps to investigate the environmental adaptation and biotransformation in isolated communities using bio-demographic parameters: anthropogenic characters such as genetic markers, dermatoglyphs, DNA polymorphisms and eco-sensitive indicators such as haemoglobin variants. This research began with the study of population and depopulation of the Occitan Valleys (mainly Varaita and Maira) promoted by Brunetto Chiarelli with the cooperation of distinguished scholars such as Francesco Fedele, foreign population biologists such as M. Crawford, Gabriel W. Lasker, B.A. Kaplan, and the cultural anthropologist Sandra Wallman. The anthropological-ecological research project has also helped to collect wide-ranging evidence of Occitan culture.

Recently the interest has shifted to the study of rural populations which, in more or less recent times, have experienced migrations or opening to the outside world. In particular, a community in the Trebbia Valley (Fontanigorda) in the Ligurian Apennines and the towns that formed part of the ancient Dauphiné were analysed in collaboration with the French school of Gilles Boetsch (Université de la Méditerranée in Marseille). These investigations led to the establishment of the Université Européenne d'Été, a training workshop for anthropological researchers. At present, the research continues on populations of the Susa and Cenischia Valleys as part of a project in collaboration with the Italian Alpine Club (CAI), the municipalities of Venaus and Giaglione, and the University of Parma.

An ongoing bio-demographic study by Marilena Girotti is dealing with the recovery of population records kept in municipalities and parishes via the digitization of documents and the subsequent creation of a non-perishable archive for easy reference. Research is being conducted to identify how historical and economic events have affected the population structure. The analysis of genetic polymorphisms and biochemical markers, clinical and anthropometric data, dietary habits and socio-cultural factors is aimed at understanding the roles of genetics and the environment. In the biomedical field, it is important to assess the relationship between genetics and susceptibility or immunity to certain degenerative diseases.

### **Primatology**

Knowledge of primates is a major contribution to a wider and more adequate understanding of human biology. Moreover, the different populations of primates that currently exist in nature, often in very different conditions, represent the best "experimental models" to study the relationships between phenotype, genotype and environmental conditions, while providing useful information on the evolution of human social structure. These were the reasons behind the "explosion" of primatology following the studies of Yerkes, Adolph Hans Schultz and Emile Zuckerkandl, which led to the worldwide dissemination of this branch of learning.

With regard to Italy, we must mention the pioneering studies on cranial characters by Fabio Frassetto (1876-1953) and the study of a skull from the collection of Florence's Anthropology and Ethnology Museum on which Enrico Hillery Giglioli (1845-1909) described a new chimpanzee species (*Troglodytes schweinfurthii*, now *Pan troglodytes schweinfurthii*). These studies demonstrated that primatological collections could satisfy the specific requirement of studying the human species in an evolutionary context and in a comparative manner with respect to the apes.

In 1917, Gioacchino Sera founded the "*Giornale per la morfologia dell'Uomo e dei Primati*" in Pavia. Among the specific aims of the new journal was that of broadening the comparative studies of different human populations and, at the same time, more detailed studies of non-human primates.

In Turin, the appointment of Brunetto Chiarelli to the chair of Primatology in 1969 gave recognition and impetus to primatological studies. Nevertheless, we can recall several examples of pioneering studies before his arrival, among which the lecture "*L'Uomo e la Simia*" by Filippo De Filippi, the exhaustive "*Anatomia del Cimanzé*" by Sperino (1897), and the experiences of the surgeon Andrea Marro who pioneered the glandular transplant following Voronoff's techniques. With Brunetto Chiarelli and most of his research group, chiefly Giuseppe Ardito (subsequently professor in the University of Florence), Laura Lamberti and Maria Paola Bigatti, the primatological studies were mainly oriented toward karyology, morphometry, evolution and the establishment of the first Primatology Centre

at the Municipal Zoological Gardens. This centre tended to reproduce, albeit on a much reduced scale, similar structures in Atlanta (Georgia), Oregon and Koshima Island in Japan. Many studies have been undertaken since then, including those on the hypothesis of the origin of the human karyotype by "centric fusion" from the karyotype of African apes. Important traces of these studies can be found in various conferences and seminars, mainly promoted by Brunetto Chiarelli, among which "*Taxonomy and Phylogeny of the Old World Primates and the Origin of Man*" held in Turin in 1967 (with the participation of eminent scholars such as Osman Hill) and the NATO Advanced Study Institute "*Comparative Genetics in Primates*" held in Erice (Sicily) in July 1970.

Primatological research carried out over the years by the Turinese research team can be summarized in the following main areas: karyological evolution of primates, with particular regard to the nucleolus organizer regions (NOR); chromosomal polymorphisms and *in situ* hybridization with specific molecular probes; DNA molecular analysis, both nuclear and mitochondrial, for phylogenetic and taxonomic purposes; investigation of potentially mutagenic effects on the frequency of isochromatid exchanges using chimera subjects of *Callithrix jacchus* as an experimental model.

### Cytogenetics and human biomonitoring

Human cytogenetics began in 1956, when Tijo and Levan and Hamerton and Ford almost simultaneously reported that the human chromosomal structure was represented by 46 chromosomes. Since that time, the morphology of human chromosomes has been analysed in depth and codified.

With regard to human populations, cytogenetic analysis allows an assessment of the genetic load, in practice the accumulation of transmissible genomic damage. The Turinese research group has dealt in particular with biomonitoring studies based on cytogenetic techniques. In recent years, it has become increasingly evident that many environmental factors can cause damage at the chromosomal level. In biomonitoring studies, generally conducted in subjects exposed to genotoxic substances (i.e. harmful to the DNA), cytogenetic tests were performed to assess the frequency of chromosomal damage. The tests, carried out on lymphocytes, included analysis of the frequency of chromosomal aberrations (CA), sister chromatid exchanges (SCE) and micronuclei (MN). These studies are able to quantify (with high sensitivity) the exposure to mutagenic or carcinogenic causes, although the long-term effects of the measured anomalies are not clearly defined.

The MEDB project (Molecular Epidemiology Data Bank), aimed at directly assessing the association between genotoxicity and increased risk of cancer, was established in 1991 and coordinated by the National Institute for Cancer Research of Genoa. This research project, involving most Italian laboratories active in the field of human biomonitoring (including that of Turin), was also intended to encourage a greater standardization of methods. The

results of the epidemiological study revealed an association between the frequency of chromosomal aberrations in lymphocytes and the probability of tumour induction, validating the importance of such tests for the detection of early biological damage.

Many experimental works have demonstrated that a possible reason for genetic predisposition to cancer is genetic instability, which in some cases is expressed as chromosomal instability. This instability is sometimes hidden and must be revealed by suitable techniques.

For example, when stimulated with a "clastogen", cells of people with slightly defective DNA repair systems may show a higher rate of chromosomal aberrations than those of "stable" persons. Research on this topic has been conducted by the Turinese cytogenetics group.

The study of the distribution of genetic instability in the population, probably responsible for the hypersensitivity of some individuals to genotoxic environmental factors, and the highlighting of some hidden instabilities has provided a big boost to anthropologists dealing with human genetics and cytogenetics. Indeed, this represents an area of great interest in the field of applied anthropology. We should mention Roscoe Stanyon as one of the researchers who strongly promoted this research field in Turin.

### Anthropometry

Anthropometry, or "the measure of man", is a body of knowledge aimed at the assessment of the quantitative aspects of the human body via two major phases: i) metrology, i.e. the identification and measurement of physical characters; ii) biometric statistics, allowing general conclusions from the recorded metrics.

Some members of the working group (Melchiorre Masali, Enrica Fubini collaborating with Ivana Coniglio, Marialuisa Masali Castelli) contributed decisively to the largest surveys of anthropometric data carried out in recent years on the Italian population, especially regarding parameters for applications to clothing and ergonomic design. In particular, Italian anthropologists (Luigi Brian, Luca Bondioli, Ivana Coniglio, Daniele Formenti, Renato Grimaldi, Melchiorre Masali, Carlo Maxia, Maria Grazia Manfredi Romanini) with the aid of the statisticians Mario Montinaro and Giovanna Nicolini conducted a survey of about 15,000 schoolchildren aged 6 to 19 years in the period 1975-79 on behalf of the Italian Fashion Board (Ente Italiano della Moda). Later, with the organizational cooperation of the Ancon Centro Sperimentale di Design, they planned the anthropometric survey of the Italian population known by the slogan "L'Italia si misura". The project was carried out in the 1990s on a stratified sample of about 5,000 working age people throughout Italy. This research recorded the anthropometric variability of Italian adults in the late 20<sup>th</sup> century, i.e. their differences by gender, by age and by geographic area.

This research led in 1992 to the first draft of the Italian Standard UNI 10120 "*Definition and measurement techniques of anthropometric variables essential for ergonomic design*" and, after several steps, international recognition in ISO 7250-1

"Basic human body measurements for technological design - Part 1. Body measurement definitions and landmarks" which, in the latest version of 2010, sets international standards that are currently in use. In recent times, the updating of the anthropometric database of "L'Italia si misura" to regulatory criteria permitted the inclusion of the Italian database (at least the most significant parameters) in the current ISO 7250-2: 2009/2011.

Turin's anthropometry (Melchiorre Masali, Enrica Fubini and Margherita Micheletti Cremasco) is currently oriented toward the creation of a database of measurements and analyses of human dimensional variability, referring in particular not only to samples of working age people but also to younger and older samples in order to monitor the secular changes and some emerging problems, such as the increase of overweight/obesity in growth and ageing.

### "Outer Space" anthropology

The adaptability of humans to the technological environment of interplanetary space provides significant opportunities for studies in the fields of anthropology, ergonomics and proxemics. These studies were initially made possible by Thales Alenia Space Italia and were conducted by Marinella Ferrino. The research group created and contributed to the construction of virtual anthropometric mannequins using the then advanced CATIA design software (conceived by Dassault for the design of supersonic aircraft) on the mainframe computers of the inter-department Laboratory of Computer Sciences (LAFORITE) in collaboration with Sergio Dequal from the Turin Polytechnic. This research led to anthropological studies for the design of manned space environments carried out by Irene Lia Schlacht in a doctoral project in the Technische Universität Berlin.

### Ergonomics

Ergonomics (whose name derives from the Greek *ergon*, work, action, and *nomos*, law, government) deals with human activities in relation to different environmental, organizational and instrumental conditions. Its current aim is to contribute to the design of objects, services and living and working environments that respect human limitations and enhance human operational capabilities.

In Turin, we have perceived since 1975 the close links between ergonomics and physical and cultural anthropology, of which ergonomics can be considered an applied and planning branch. According to this philosophy, technological design operates with regard to user characteristics and the dimensional aspects of interfaces take into account the population's anthropometric characteristics. The application of anthropometric knowledge to industry allowed us to define mannequins and simulation models of the human body for uses in the ergonomic design of virtual environments. Enrica Fubini's move from Fiat Auto to the University of Turin in 1993 was a great opportunity to transfer industrial

knowledge to the field of ergonomics, both through the development of basic research and the creation of the first Master of Ergonomics in Italy, in accordance with the Centre for Registration of European Ergonomists (CREE) requirements. At the same time, the studies have increasingly assumed an applied nature and collaboration agreements have been undertaken with various industrial companies, in particular with Thales Alenia Space for the study of microgravity body movements for the humanization of three-dimensional computerized mannequins. Cooperation with Fiat Auto was aimed at studying the ergonomic needs of the elderly as a function of car use.

The basic studies of Fubini's research group have been oriented especially to subjects in the extreme age classes who are not protected by personal ergonomic legislation. They have dealt with analyses of the lifestyles of children and adolescents to understand the relationship between obesity, type of nutrition and physical inactivity due to the spread of new technologies. Moreover, the ergonomic needs of the elderly were analysed as a function of the physiological changes associated with ageing. Several of these studies have been carried out in collaboration with the Department of Psychology, resulting in the creation in 2009 of LIDEA (Interdepartmental Laboratory of Applied Ergonomics) by Enrica Fubini and Margherita Micheletti Cremasco, together with Alessandra Re, to promote the development of skills and equipment resources related to ergonomics and anthropometry. An example of this interdisciplinary collaboration is the involvement in an ongoing project (Act on Ageing Piedmont - Appeal for Human and Social Sciences 2008). The target group is elderly people and the project is aimed at identifying and evaluating different physical and cognitive training programs in order to prevent the decline of elderly people's abilities and to increase their well-being and independence. The growing interest in ergonomics recently led to an extension of its teaching from the Faculty of Sciences to postgraduate courses in Motor Sciences.

### Proxemics

In the little-known article "Proxemics" appearing in the *Journal Current Anthropology* in 1968, E.T. Hall defined the "science of proximity" as a set of animal and human behaviours that prove the existence of interpersonal distance factors. After reading Hall's article, we asked a Physical Education student (M. Alessio) to conduct research on interpersonal distances of teenagers playing on the beach. It was probably the first proxemic study in Italy. Proxemics became common knowledge in Italy about a decade later with the translation of Hall's "The Hidden Dimension" and the discipline was made known and formalized especially by Francesca Pregolato Rotta Loria. For the physical anthropologist, proxemics may appear to be a borderline approach since, especially in humans, the symbolic aspect and thus "culture" might seem prevalent. However, there are some indications that the distances may be related to interpersonal sensitivity to

“spatial frequencies” expressed by human or technological interactions.

### **Human ecology and eco-ethology**

The teaching of Human Ecology began in Turin in 1993 with the arrival of Franca Ligabue Stricker in the Faculty of Sciences. Indeed, Turin was the second place in Italy to teach this discipline. Since man is part of the environment in which he lives, this discipline studies his social interactions and the means of communication that underlie them (mime, speech, chemical cues). In this context, the “*evolution of human sociality*” is analysed in biological terms. The main Turinese studies on human eco-ethology have dealt primarily with topics related to the chemical senses in humans and man’s relationship with natural or work environments.

Regarding the man-environment relationship, we tried to focus on a new approach to environmental impact assessment in order to analyse the effects of environmental changes on fitness and the current problem of infertility. In this context, we evaluated the possible causes of infertility determined by the particular workplace and lifestyle.

Our study evaluated the various abiological factors that can influence human reproductive capacity and, prior to biological evaluation of environmental damage, we selected the physical parameters that could be accurately measured and reproduced in the laboratory. To evaluate the impact of “electrosmog” (power lines and mobile phones), we paid particular attention to the effects of mobile phones on human sperm motility. Thanks to the cooperation of the Department of Electronics of Turin Polytechnic and Cuneo ARPA, it was possible to modify and test electromagnetic field-generating equipment. We then tested human semen samples within regularly monitored fields. The semen parameters were examined in the Pathology Laboratory of St. Anna Hospital in Turin before and after exposure to the electromagnetic fields. The samples showed variations of the Index of Sperm Motility and of the various types of spermatozoal movement after irradiation at 900 MHz and even more so at 1800 MHz (mobile). The results can help people make better use of their mobile phones.

A multidisciplinary project also dealt with the man-man relationship. The goal was to demonstrate the existence of pheromonal processes in humans, which would provide a biological explanation of various proxemic behaviours. In this very complex research, involving researchers from different disciplines (endocrinology, genetics, psychology, etc.), we analysed the olfactory perception of pheromones at various ages and in different social contexts, and its relationship with the hormonal and immune system (histocompatibility antigens). These studies were conducted in hospitals, elementary schools, middle schools, high schools, universities, as well as in a community of visually impaired people and in groups of subjects with different sexual orientation. Among the various results, it was possible to demonstrate in humans a relationship between pheromone perception, hormonal system and immune system. Moreover, the choice of partners is based on

genetic, olfactory and pheromonal factors, and there is a balance between partners in long-term couples. The results are currently being used to analyse the relationships and interpersonal behaviour among the crews of artificial microenvironments detached from normality, such as in terrestrial spacecraft simulators used mainly in the design of lunar and planetary settlements (Irene Schlacht’s current experiment in the Moon-Mars simulator in the Utah Desert Station).

### **The Museum of Anthropology and Ethnography since 1961**

From 1962 to 1968, Brunetto Chiarelli oversaw a redevelopment phase of the museum.

The new exhibition provided the visitor, even the non-specialist, with guidelines and useful information for a comprehensive study of the natural history of man. Chiarelli was assisted by Emma Rabino Massa, at that time museum curator, by Laura Levi and later by the architect Roberto Pagliero. For decades, the museum was very popular in schools, for which there were guided tours, talks and laboratory activities.

From 1984, the Museum could no longer provide the public with permanent collections for security reasons. Tiziana Doro Garetto, the new Curator, made a photographic archive of the specimens. Thereafter they were protected by air-conditioning and cabinets equipped for conservation through a project sponsored and conducted by Emma Rabino Massa, who had since become museum director and professor of Anthropology. Since then, museum specimens have been regularly displayed in exhibitions aimed at the presentation of single collections or research topics. Thanks to this exhibition activity, the museum continues to be a dynamic centre for research, teaching and dissemination of knowledge about man. A specialized laboratory for the management of the Biological Archive and the Anthropological Research Centre for the study and preservation of mummies has been active in the museum for several years. The activities of the laboratory, under the scientific responsibility of Rosa Boano, are designed to coordinate and conduct scientific research on museum exhibits, with particular emphasis on the protection and enhancement of cultural heritage. The areas of investigation and intervention on the museum collections are very different, including: actions to verify the stability and suitability of storage conditions (environmental monitoring, periodic inspection of specimens, routine maintenance); investigations of the mummified tissues to identify and quantify damage caused by micro-organisms (histological analysis and ultrastructural observations); calibration of protective measures.

With regard to improved protection and enhancement of anthropological archives, the museum has been collaborating for years with national and international research groups working in the fields of cultural heritage (Tufts University, National Museums Liverpool) and medical diagnostics (Institute of Radiology and Intervention, San Giovanni Battista Hospital, Turin). A further development of



this trend is the close collaboration established since 2004 with the Science and Technology for Cultural Heritage degree course of the University of Turin. The partnership has fostered several research projects to determine the materials making up the ethnographic specimens and their conservation status.

The museum is currently closed to the public and opens only during temporary exhibitions, in anticipation of its transfer to the university's Museum of Mankind.

## **African and South American missions**

### *Africa*

For many years, Alberto Salza, scholar, journalist, explorer and writer, has collaborated with the Department of Anthropology in teaching and research. These activities express the interaction between the academic world and the reality of exploration and investigation in the field. As a person free of formal commitments, Salza is able to conduct fieldwork with an efficiency and commitment otherwise difficult to achieve. His studies have dealt with advanced issues of the hominization process and the relationship between man and the environment in Africa. The non-profit collaboration has been expressed for over a decade with seminars and workshops to update the scientific and technical staff, but especially undergraduate and graduate students. The topics most frequently discussed stemmed from his research on San hunter-gatherers of the Kalahari and his thirty-year experience with anthropological sites of Lake Turkana in Kenya. Another important aspect is related to ethnographic research of particular interest to the Museum of Anthropology and Ethnography and the links that he has established. For over ten years, the work done in collaboration with our university has resulted in "applied anthropology" missions with various international institutions and associations for humanitarian aid to Kenya, Ethiopia, Somalia (Ogaden), South Sudan and Burkina Faso.

### *Central and South America*

The need to clarify some of the many questions posed by materials conserved in our museum collections led to the 1983 University of Turin mission in South America: "*The human population of South America, recovery of biodiversity and cultures*". Organized by Gabriella Enrica Pia, the project

was recognized in 2002 and from 2008 to the present as a regularly financed official mission of the Italian Ministry of Foreign Affairs. In 2004-2005, the project was conducted in collaboration with the IILA (Istituto Italo Latino Americano). The aim of the mission is to investigate issues that may have a close relationship with some exhibits of the Museum of Anthropology: burial rituals, trophy heads, cranial deformation, skeletal morphology, cranial and skeletal anthropometry, osteological diseases, dental morphology, native cultural expressions such as ritual ball games, shamanic rituals, drugs, medicinal plants, rock art. The study of native peoples has been carried out with multidisciplinary studies based on the analysis of materials found in land and underwater excavations. In this way, living systems and burial rituals of the people who once inhabited the area have been investigated. Archaeological specimens and living subjects have been studied by craniometry, anthropometry, dermatoglyphics, blood groups, teeth and genetic markers. The material collected during the mission has given rise to many publications, exhibitions and the set-up of local museums.

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## **References**

This is a confession of an octogenarian a propos of the period between the 1961 Congress of Anthropologists and the 2011 Congress dedicated respectively to the 100<sup>th</sup> and 150<sup>th</sup> anniversaries of Italian Unification of memories, not a scientific paper. Many studies have been cited in the text and the full list is available from the author at the following e-mail address: melchiorre.masali@gmail.com.