

The Transparent Man – some comments on the history of a symbol

The desire to peer into the interior of the human body is ancient, but the realisation of this dream has, typically, required the destruction of life. In Christian societies, this has been regarded as a sinful injury of the body that God gave to man, and across cultures and historical epochs such mutilation has been a taboo as strong as the urge for knowledge. An alternative means of acquiring knowledge of the interior of the human body is offered by the “Transparent Man,” the transparent model that has been on display in the German Hygiene Museum in Dresden since 1930.¹ The model, whose German name “Gläserner Mensch” can be translated literally as the “glass human,” is life-size and, under a transparent plastic skin, contains the light metal mould of a human skeleton, with artificial internal organs, coloured and accurately shaped and arranged, and the arterial, venous and lymphatic systems represented by finely rolled painted wire. The Transparent Man is not made of glass: “Gläsern” is simply a metaphor for its transparency. How did this model come to be envisaged; how was it brought into being; how is one to view it now?

For all its transparency, there is an ambivalence about the model: it can be seen in terms of both entertainment and enlightenment, in terms of cultural symbolism within diverse traditions, and even in terms of its commercial value. What role, one may ask, can the Transparent Man have in the context of modern health care? Its historical significance gives the model additional interest: it has associations with the history of the German Hygiene Museum and, more broadly, with nearly a century of Germany’s past.²

The Open Body – Anatomy, Dissection and Abduction Twixt Repulsion and Delight³

Before examining the aesthetics and accuracy of portrayal, let us consider the layperson’s impressions of modern anatomical dissection. I visited the study galleries of the Institute for Anatomy at the Medical Faculty of the Dresden Technical University. Three groups, each of about ten students, and each guided by a postgraduate, were operating on three bodies. My visit took place towards the beginning of the semester, so the dissection of the bodies had not yet progressed very far. Early fear that I would have to leave the room in haste proved unfounded. This was due largely to the carefully considered environment, the good lighting, excellent ventilation, and the preceding preparation of the bodies that still exuded a softly sweetish alcoholic scent. The quietly concentrated activity of the young

students, together with the friendly voice of my guide, were calculated to subdue any sensation of unmitigated horror.

This sobriety of the modern anatomical preparation room, and the sensation of an unusual but not horrific activity, are in extreme contrast to anatomy as experienced by Hector Berlioz in the nineteenth century. He recounts his participation at a dissection: “The appearance of this human meat hall, of chopped-off body parts, of grimacing heads, of the bloody cesspit in which we were running around, the disgusting smell that emanated from all this, it filled me with such disgust that I could not help fleeing, jumped through the window of the Anatomy, and rushed off as if Death himself with all his followers were chasing me.”⁴

There is a reverse side to horror: fascination. The anatomical demonstration room was as much a site of feelings of sensationalism as of research. The proximity of death without sorrow, the “high” of shock, the attraction of the sensational on the borderline of the bearable – all this might be experienced by the layperson both as horror and as titillation, although nowadays it is probably more readily communicated in blood-curdling measure through the modern mass media of cinema, TV and video.

How different the Transparent Man: glass-like and totally intact, whose smooth exterior contains well-ordered organs undisturbed by intermediate tissues, with intermittent illumination for some, but by no means all!

Excursion Into Anatomy: Ancestors and Founders of Anatomy – Dürer, Leonardo da Vinci, Vesalius

The Transparent Man can be understood as a twentieth-century attempt to express the human form artistically. Such endeavours have, of course, a great ancestry. Without possibly being comprehensive, it is worth reflecting on some of the artists of the sixteenth century who sought accuracy in addition to a new depth of expression. For them, creating a likeness of the human body presupposed knowledge of the human subject, but their approaches to an exact understanding of the human *corpus* differed.

Albrecht Dürer (1471–1528) stands for the observing and measuring eye: both in his artistic works and in his theoretical instructions he displayed a sensitivity to the exact mensuration of the human body.⁵ Nonetheless, he kept away from the dissecting table, relying on ruler, compass, wire-frame surround and the precepts of proportion for his extremely accurate images of man’s proportions. The precision of measurement replaced the mutilation of tissue. Accurate observation was not an end in itself for Dürer, but was intended to serve the portrayal of the diversity of human appearance in a new way: he sought to represent living and respiring bodies. In gauntness, age or illness, or in contentedness, dignity and pride, they all come to life in Dürer’s work with an intensity that moves the observer even today.

An alternative path was taken by Dürer’s contemporary, Leonardo da Vinci (1452–1519). Leonardo the artist, philosopher and engineer – and also

anatomist – ventured to explore the unknown and the unimaginable. The portrayals of the human body that Leonardo found in existing teaching texts did not accord with his own anatomical observations. That, as much as his urge for exploration, may have urged him to perform his own dissections. The sketches made on these occasions are of impressive accuracy and match even today's critical demands. At the same time, one is struck by the liveliness of the portrayals in Leonardo's anatomical studies: the bodies are not schematised, they are not anonymous; they show individuality, even emotion. This shows, on the one hand, Leonardo's mastery, both as anatomist and as artist, and, on the other, his search for underlying human dynamics. As humanist, he was not so much in quest of the mechanical body functions: in his anthropology, questions of art and science, philosophy and religion, all carried equal weight. Leonardo's studies do not just delineate corporeal structures; they reveal, through their omission of intermediate layers, a direct view into the human body.⁶

Conventionally, the creation of modern anatomy has been ascribed to Andreas Vesalius (1514–64). Born in Flanders, in 1537 he was eventually appointed to the first Chair for Surgery and Anatomy in Padua. With his exact observations, Vesalius overthrew the classical teachings of Galen that had hitherto been regarded as near sacrosanct. He published his epoch-making work, *De humani corporis fabrica libri septem*, in 1543:⁷ “muscle men” appear upright, in movement from picture to picture, against the background of an idealised Tuscan landscape. No longer “corpse on dissecting table,” but aesthetic appeal, the head stretched towards heaven, whilst the musculature is supported upon the earth.

Rays and Words – Röntgen and Freud

At the turn of the twentieth century, two new fields opened up hitherto unattainable insights into the human body – entirely without scalpel, without dissection and without the necessity of death – and aroused enormous public interest: X-ray imaging and psychoanalysis.

Wilhelm Conrad Röntgen (1845–1923), a physicist working in Würzburg, Bavaria, had discovered that, in experiments with electric tubes, rays were released that were also capable of penetrating through solid materials. To distinguish them from other rays, Röntgen called them “X-rays,” and in his first publication he stated that various materials showed varying degrees of permeability to the rays.⁸ From the earliest experiments, human bodies were irradiated and the early X-ray pioneers often used themselves, particularly their own hands, for tests. Medical applications evolved in parallel with the development and establishment of the new technology, and even became the force driving the testing of and further research on, the physical phenomenon.

From today's perspective, the rapid dissemination of knowledge about the new technique in the widest of circles appears quite as astonishing as the phenomenon itself. Röntgen discovered the effect in November 1895; it was

first published at the turn of the year 1895/96, and as early as January 13, 1896 Röntgen was able to show his experiments to the German Kaiser, Wilhelm II. Not just scientists were enthused by the novel experience of looking inside the body: the idea of the irradiated human quickly took root in caricatures and presentations in the popular press, theatre and elsewhere. Curiosity and fascination with the clear and entirely bloodless pictures and insights went hand in hand with a smirking voyeurism, which today finds its last dregs in so-called “X-ray spectacles” obtainable as joke items.⁹

At almost the same time as the discovery and triumphant progress of X-rays, psychoanalysis – a quite different approach, which would illuminate another aspect of the innermost part of man – was developed by an equally deep and courageous thinker. Sigmund Freud (1856–1939), whose career as a doctor and scientist in Vienna after his medical studies had not been particularly successful, was influenced by the work of Charcot, who achieved therapeutic successes with hypnosis at the Salpêtrière Hospital in Paris.¹⁰ His experiences in Paris, his attentive observation of his patients and, not least, the reflection of his own subconscious experience, led Freud painfully, step by step, to formulate his psychoanalytical philosophy. One of the first milestones was his theory of the meaning of dreams, which was published in 1899.¹¹ Further epoch-making works, *Psychopathology of Everyday Life* and *Three Essays on Sexual Theory* soon followed, in 1901 and 1905. Neither the scalpel nor the microscope but, purely and simply, words, had become the instrument for opening up insights for which there had been no precedent in conventional therapy.

Whereas Röntgen’s discovery has its continuation in the highest development of modern image-producing processes, Freud’s theory exerted its effects far into the fields of literature and art. The challenge of seeing into man, with its appeals to enlightenment and credulity that have always been ambiguous, has attracted an interest that lies beyond the narrow confines of science.

The Prehistory: A New Type of Exhibition – Hygiene Exhibitions

Millions of people have viewed and admired the Transparent Man in museums and exhibitions. To understand the phenomenon of this continuing interest, one has to consider the context in which this new art form was first presented. The forum for presentation of these transparent figures was a new type of exhibition: the social and hygiene (healthy living) exhibitions, and museums. At the end of the nineteenth century, the museum, originally created as a showplace of rarities for delectation of the nobility, and later as a forum for bourgeois devotion and strengthened self-assurance, gained a wholly new quality: as medium and as instrument of education. Contemporary with the development of social legislation in Germany, this new type of exhibition found its place in education and improvement, and thus was able to compete with the more far-reaching aspirations for emancipation by a working-class movement that was growing ever stronger.¹²

These enterprises were supported by the state, but also by private companies that wished to promote the spread of knowledge of hygiene and an appreciation of safety at work among the workers. Rapid industrialisation prompted rapid urban growth that was accompanied by inadequate sanitation. Concern for the preservation of a healthy working class, seen as vital to good productivity, prompted a multitude of hygienic endeavours. Under the guidance of Max Pettenkofer, a Chair in Hygiene was established by Munich University in 1865. Such men as Pettenkofer, Rudolf Virchow and Robert Koch not only had responsibility for the outcome of new research, they demanded prophylactic and educational steps towards the promotion of good health.

Early experience in building great international exhibitions was gained in the second half of the nineteenth century in France and in England.¹³ Exhibitions gained impetus from trade and industry exhibitions that culminated in the well-known world exhibitions. The world exhibition of 1867, in Paris, provided an opportunity for more than 600 enterprises to exhibit in a section for social services, where aspects of medical care and hygiene were given prominence. Eventually, in 1882, Berlin hosted a first-rate hygiene exhibition that was sponsored by the German Association for Public Health Care.

These exhibitions all showed a wide range of model installations and equipment, and the results of research into medicine and hygiene were also exhibited in an easy-to-understand manner. Thus, in the 1883 German General Exhibition for Hygiene and Safety, next to Robert Koch's bacteriological researches were exhibited new designs for working-class housing, models of modern public baths, and equipment for the mechanical production of ice and Nestlé's substitute for human milk.¹⁴ This trio of health education, industrial exhibition and scientific forum was also to be encountered in other hygiene exhibitions and museums.

Out of the Berlin exhibition, which had enjoyed great success with 900,000 visitors, arose the first Berlin Hygiene Museum. There were other state initiatives, and a corporate initiative worthy of mention: the AEG Hygiene Museum, dedicated to maintenance of the fitness of employees for work. Here, dramatic illustrations with models and life-like wax reproductions served to demonstrate the consequences of work injuries, poor nutrition or sexual diseases. An exhibition of prostheses was opened after the First World War, in response to the urgent requirements of the time.¹⁵

These public health and hygiene exhibitions were, typically, supported by the most modern technology of museum exhibition and teaching, incorporating demonstrations using working machines, slide shows and instructive films. Outside the major urban centres, the wider public were able to visit touring exhibitions. Through these museums and exhibits, the individual was guided towards a "sensible" lifestyle.

First International Hygiene Exhibition, 1911 – Transparent Organs

Following the formation of the Berlin Hygiene Museum, social and health concerns and aspirations current within the Kingdom of Saxony and its capital, Dresden (about 100 miles south of Berlin), led to a discussion of the merits of a local museum of hygiene. In 1883, the Dresden Association for the Protection of Nature and for Health Care addressed a “Petition for the Institution of a Hygiene Museum” to the country’s Parliament.¹⁶ While well received, the petition, for the moment, failed.

This Dresden vision was, nonetheless, ultimately realised, thanks to an extraordinary entrepreneurial personality: Karl August Lingner (1861–1916), inventor and marketing genius of the mouthwash “Odol.”¹⁷ He had earned a fortune based on new scientific insight into infections and the importance of oral hygiene, and on the inspired promotion of a brand name. His entrepreneurial ambitions were matched by a commitment to enlightenment and to social concerns, demonstrated by a multiplicity of charitable foundations. Lingner knew how to utilise modern means for large-scale exhibitions. Within the context of the great Dresden exhibition of 1903, “The German Cities,” he organised a special show with the title *Popular Illnesses and the Means for Combating Them*. More than 200,000 visitors saw this exhibition, on which Lingner commented:

This special exhibition was founded on the awareness that echoes, like a cry for help, through all social-political utterances, the conviction that the centre of gravity of all social hygienic activities lies in the hygiene education of the population ...¹⁸

Lingner laid out the exhibition along the lines of a textbook. The exhibition hall was structured as three chapters: *Origin, Spread, and Fight Against Population Diseases*. He laid greatest stress on accessible displays, and the material for instruction and exhibition had been specially commissioned for the exhibition. Amongst others, there were bacterial cultures, viewable through microscopes, much enlarged models of bacteria, alcohol-preserved medical exhibits and wax models of the manifestations of various diseases, complemented by well-designed explanatory tables and statistics.

The success of this 1903 exhibition gave impetus to a much more significant project. On May 6, 1911, the First International Hygiene Exhibition opened in Dresden, under the aegis of the City of Dresden, the Kingdom of Saxony, and the German State. With 30 participating nations, around 100 specially erected exhibition buildings, and more than 5 million visitors, the enterprise could truly claim the status of an international exhibition. It was a milestone not just on account of its size, but because of its structure, which was in the vanguard of pedagogical practice and novelty of exhibits.

The Models of Spalteholz at the 1911 Hygiene Exhibition

The transparent organs on the *Der Mensch (Man)* stand were unprecedented, and proved a magnet for visitors. In 1906, the Leipzig medical practitioner



Figure 1. Rush of visitors at the pavilion Man at the First International Hygiene Exhibition, 1911.

Werner Spalteholz (1862–1940) had developed a process by which organs could be made transparent or translucent and stained in various colours.¹⁹ The process is based on dehydration of the removed organs and use of an optically transparent embedding material that has the same refractive index as the tissue of the organ itself. Extensive studies were of course needed for this.²⁰ The transparency and plasticity of the Spalteholz preparations are remarkable even by today's standards. They avoid evoking in the layperson the distaste that is stimulated by moist preparations. The preparations also acquire an almost unearthly radiant appearance when lighting is used to good effect.

Further novelties, each one a superb little technical masterpiece showing the way in which the organs of the human body function in "transparent" working models, were just as exciting. True to Lingner's principle that, without visible demonstration, the explanatory power of words is worth little, the transparent models made lively and comprehensible such complicated interconnections as the circulation of the blood: the arterial and venous systems were shown on a large diagrammatic model, and attached to this was a 365-litre glass tank containing the quantity of blood circulated in half an hour. The pressure that the cardiac muscle has to

overcome could be experienced by pressing a rubber ball on a liquid-filled glass tube (see Figure 2).²¹ The transparency and three-dimensional realism of the Spalteholz preparation remain striking today; for the layperson there is none of that alienating impression left by organs conventionally preserved in a liquid medium and, with the right illumination, the organs actually glow with an almost supernatural iridescence. These novel processes and models offered the layperson a means of understanding the interior of the human body. They were the antithesis of the anatomy room, which had a tendency to affect the senses more than the intellect. Free of bodily, sensual and transient emotions, these carefully designed models bore witness to a faith in the possibility of attaining a state of health and well-being.²²

The "Gesolei" 1926 – The Transparent Man

The great exhibition of 1911 had two lasting effects. First, its enormous success led to the aspiration of a permanent exhibition, a museum, and second, this first international hygiene exhibition became a model for similar endeavours in later years. Thus, in 1914, Stuttgart hosted an exhibition dedicated to public health care, with the active participation of the then National Hygiene Museum. After the First World War, health and social care exhibitions demonstrated the improved methods of therapy then available to the war disabled. Weapons of mass destruction, trench warfare and poison gas had resulted in an enormous number of disfigurements, amputations and bodily impairments. Apart from improved therapy, the re-integration of the wounded became an important issue in the politically unstable German society after the War.²³

The true heir of the 1911 exhibition, in size and importance, was the 1926 "Gesolei" ("*Gesundheitspflege, Soziale Fürsorge und Leibesübungen*," perhaps better rendered as "Hesobo" – the care of Health, Social Concern, Bodily Fitness). Thanks to the initiative of the medical doctor Arthur Schloßman and the co-operation of the architect Wilhelm Kreis, an exhibition of ambitious scope had been put in place in Düsseldorf.²⁴ A substantial proportion of the exhibits was furnished by the German Hygiene Museum. That museum, which was in the initial stages of construction, lent 22 furniture vanfulls of exhibits. The Dresden partners in the exhibition venture assumed responsibility for the core section, *Man*, which, in turn, centred on the subsection *The Transparent Man*. The Dresden museum was concerned to achieve ever more effective techniques of presentation:

It deserves to be emphasised that today's museum's exhibits are based on techniques that differ substantially from those that supported the 1911 Dresden Hygiene Exhibition. Continuing development of means for presentation accelerates obsolescence of hygiene museum exhibits more rapidly than is experienced in other museum fields. Furthermore, account has to be taken of recent advances in scientific research. This imposes curatorial responsibilities for continual review of existent exhibits, their supplementation or modification. The current exhibits therefore comprise relatively few that date back to 1911.²⁵

Martin Vogel, Scientific Director of the German Hygiene Museum, had been seconded to co-operate in the planning of the Gesolei exhibition. For Vogel, the continuity between the exhibition on *Man* in Dresden in 1911 and the subsection on *The Transparent Man* in the Gesolei of 1926 was obvious.

As the Transparent Man first came to be “re-awakened” in 1921, it could not be denied that age had already taken its toll and that he could no longer escape critical contemporary review. Since that time, however, he has benefited from continuous recovery, rejuvenation, and growth, and in this process he has evolved in the fashion of a truly well-adapted organism. The enthusiasm of the inspired exhibition-concept creator has indeed linked the medium intimately to the message, the exhibition of the model of man, to man. Our new and most recent jewel in the crown is the “Transparent Man.” For the first time, he is now being presented in Düsseldorf to a wide public. The name is no wordplay for here, indeed, the individual organs of man are being presented in such a manner that they can be viewed right through different kinds of tissue, through the bones themselves, and through the blood vessels right down to the finest branchings.²⁶

Apart from the technical perfection of the methods of preparation of individual organs, it is the *mise-en-scène* of the Transparent Man that

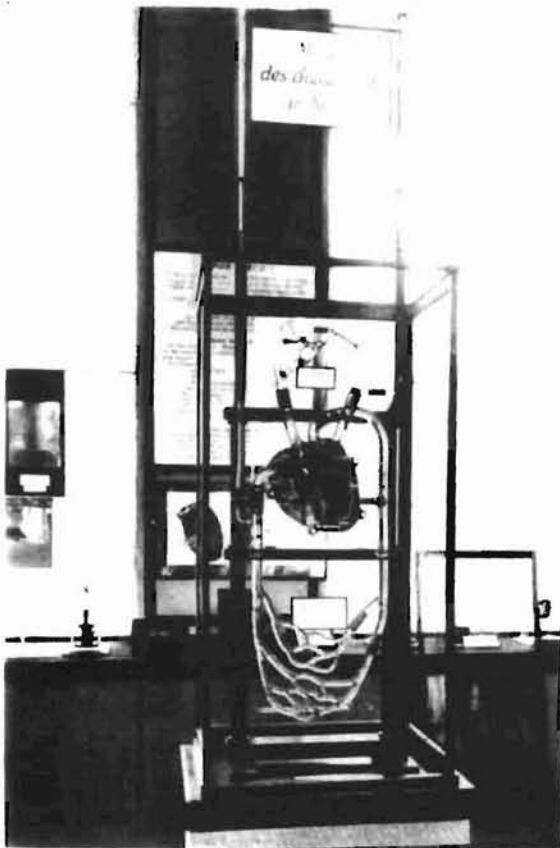


Figure 2. Blood circulation model, 1911.
Reproduction Volker Kreidler

impresses so greatly. Notwithstanding his fascination with the attainments of technology, Vogel never lost sight of the totality:

Starting with the functions of the organism and of the organs, the museum's exhibits aim to bring about an understanding of the human body as a whole and in its parts, and in a deeper sense the still inadequately understood importance of the laws of organic life for individual and social conduct of living. In particular, the collection "man" presents much material that is relevant in this context, but other special sections, for instance "propagation, inheritance, and racial hygiene" are conducive to recognition of the same important insights.²⁷

The first exhibition dealing with racial hygiene had taken place the year before, from September to December 1925. Building on the ideas of Darwin, Spencer and Galton, eugenics teaching had found a lively response even in socialist and progressive circles. In Britain and the USA too, eugenic themes were widely propagated and were the subject of numerous exhibitions. Independently of Galton, in Germany Alfred Ploetz had developed the concept of "race hygiene," founding a society in 1905.²⁸

Man as Prototype of Organisation

The Gesolei presentation of Transparent Man represents the culmination of a vision and of its technical realisation that can be traced back to the ideas of Lingner. A self-made man and successful entrepreneur, Lingner had promoted his visions of health-care enlightenment not merely for their own sake, but always in the context of their value for society as a whole. His credo was summarised in the title of his address when he received an Honorary Doctorate from Bern University: "Man as Prototype of Organisation."²⁹ The aim of health care is always the smooth functioning of all the organs of the system "man," just as the functioning of the parts of the system "factory" or "state" is a condition for the maintenance and development of those complex systems. In this, Lingner did not proceed from the assumption of an egalitarian-democratic commonality, but from that of a hierarchical ordering.

In a logically ordered system of division of labour, particular organs were therefore the recipients of commands. On this basis, the organisational model of the human organism was equally applicable to Lingner's domain of "the factory." In his manufacturing operations, Lingner placed reliance on new techniques and new technical developments, he was also a pioneer of methods and principles of scientific work organisation, including the conveyor belt, time study and piecework payment. In popular interpretation, the man-machine analogy found its expression in representation of the human digestion system as a factory and, moreover, specific products of the German hygiene museums that seized upon the technique of the Transparent Man and applied it to technical representations: the "Transparent Engine" and the "Transparent Factory." Lingner may not have been the inventor of the man-state or man-factory analogies but, as entrepreneur, he stressed the long-term financial savings

and advantages that enlightenment about a healthy and “rational” lifestyle could bring about for the benefit of state, economy and communities.

Presentation in the German Hygiene Museum

In the immediate wake of the successful First International Hygiene Exhibition, consideration had been given to the establishment of an important and central national hygiene museum in Dresden. Oskar von Miller, founder of the Deutsches Museum in Munich, was a committed advocate. When the great exhibition was coming to its end, space had been rented for storage of the great number of exhibits from all the participating nations, and there were also some, perhaps more rudimentary, exhibition areas available for smaller specialty shows. Expectation of an early re-opening of the exhibition stimulated the creation of studios and workshops for the production of exhibits for the museum, and totally new developments through a novel approach to the ideas of transparency. “There was a continuing urge to advance comprehensibility of the structural complexity of the human body. For instance, organs were micro-sliced, each slice individually encapsulated between glass plates, the whole then assembled and bound in book form, so that, in a manner of speaking, the organ could be leafed through.”³⁰

However, the German Hygiene Museum (after 1918 no longer the National Hygiene Museum) still remained without adequate accommodation. These circumstances were to change only after the museum had participated in the Gesolei. Then, at last, and after the requisite financial resources had been obtained, Wilhelm Kreis, architect of the Düsseldorf exhibition complex, was charged with planning a new building for the German Hygiene Museum in Dresden.

Throughout the period of waiting for a final museum building, the development of attractive models and techniques of display had continued. Valuable experience had been gained in the utilisation of a new plastic known as “Cellon.”³¹ “One can obtain this material in totally translucent form, in varying degrees of opacity, and in any imaginable colour, one can form its surface to any desired shape, it can be sculpted, drilled, sawn, or milled, one can melt it, press it, blow it like glass, etc., in short one can do anything with it.”³²

Franz Tschakert, Creator of the Transparent Statues

These characteristics of Cellon were familiar to Franz Tschakert, employed by the museum from 1913 till 1925 as “preparer” and after 1925 as chief of the Cellon section in the museum. Around 1926, Tschakert attempted a totally new kind of statue-model; while he does not appear to have left any personal account of this, we do have one from a witness at the time.³³ The birthplace of the statue was not actually the museum itself, but a little closet in a small Dresden enterprise, the manufacturers of almonds,

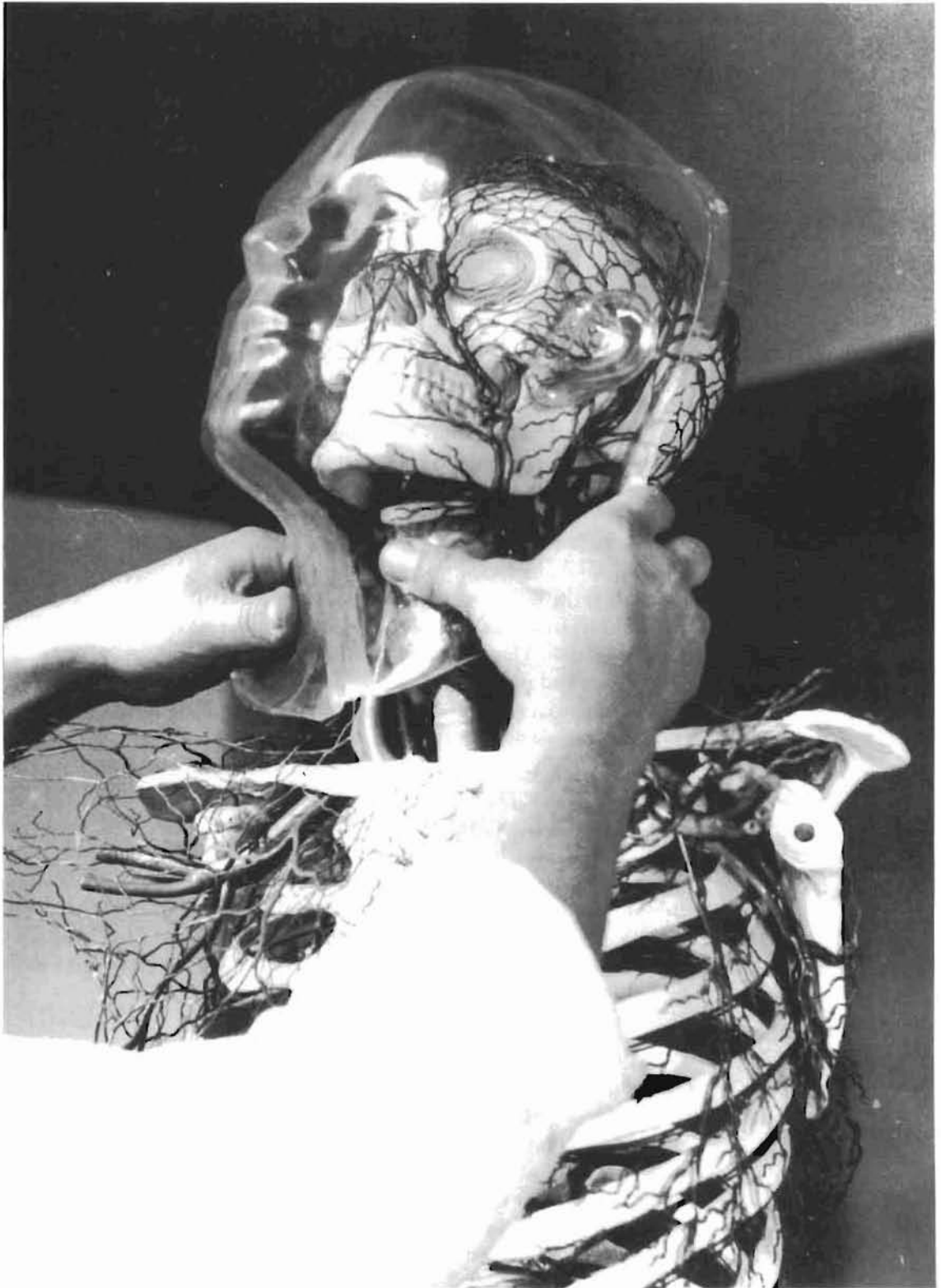


Figure 3. Applying the Cellophane skin.

preserves and marmalade, Siemank & Ringelhahn. Tschakert had been friendly with Ringelhahn, who let him have the space, equipped with a steam line, required for the shaping of the Cellon parts. To begin with, Tschakert managed to obtain a human skeleton that he endowed, under the eyes of inquisitive neighbouring children and with the help of some wires and supports, with an erect stature. Next, the skeleton had to be given a human appearance. For that, "Jumbo" was stuffed with wood chips and covered with layers of gypsum until he had attained a human shape. "Gypsumjumbo" then served Tschakert for production of a multi-part mould. Each part was closed with a lid, then, between lid and form, Tschakert inserted a sheet of celluloid that could be subjected to steam pressure via the lid and heated, softened and forced into the mould by the steam pressure. After subsequent water cooling, a moulding of the exterior shape could be withdrawn from the form. This could be cut, and the different parts glued together. The arms, legs, parts of the torso, etc. could then all be put together around the skeleton, in dismountable manner.³⁴ The inner organs were derived from wax models in a nearby school where the director was a friend of Tschakert's. The organs were thus formed in the same manner as the exterior body, and afterwards they were painted according to their original colours. Finally, the system of blood vessels was represented in red for arteries and blue for veins, and supplemented by the principal nerves, portrayed in green (*see* Figure 3).

Tschakert found a growing interest among the curators and management of the museum. When the statue was completed, awaiting only completion of the exterior skin, Werner Spalteholz (inventor of the aforementioned transparent organs) was invited to make an appraisal. "He was astonished and enthusiastic when he saw the statue. He had never imagined the feasibility of such perfection and attainment of scientific exactitude."³⁵ Eventually, Tschakert and his almost completed statue were able to leave his rudimentary workshop and move to the museum workshops. In June 1927, the Board of Trustees examined "a newly constructed model, 'Man as a Prime Example of Technical Perfection,'" although, pending patent applications, it was not yet to be exhibited.³⁶ Construction of the transparent statue was finally completed in the museum workshops.

As an artisan, Tschakert had achieved an advance that the scientists within the museum had held to be desirable, but had not themselves been able to achieve: the transition from the presentation of individual organs to a model that presented all essential parts of the body in their true positions, in functional relation, and within a complete body. Tschakert may be seen as having been truly predestined for this achievement, for he had joined the museum within the lifetime of Lingner, and had become manager of the Cellon workshops. With his expertise in the handling of this versatile material, he was more capable than anyone else of building, first the parts, and then the complete human body.



Figure 4. The Transparent Man, 1930.

*The Grand Opening – the Transparent Man, the New Museum,
and Second International Hygiene Exhibition*

The first Transparent Man was to be unveiled on a special occasion, underlining its importance to the management of the German Hygiene Museum. After many years during which the museum had functioned only in temporary premises, complemented by mobile exhibitions, the management had at last succeeded in gaining the combined support of the German State, the Federal State of Saxony and the town of Dresden in financing the museum. The foundation stone was laid on October 7 and 8, 1927. Two years later, the staff moved into the new premises. Only a few months remained in which to fill the galleries with exhibition material, and to organise the Second International Hygiene Exhibition in Dresden, to be held within the grounds of the museum to mark its official opening.

The museum itself was an impressive building, with congress and exhibition halls around an inner courtyard. Fronted by two towers flanking the impressive colonnade of the main building, the museum measured 100 × 160 metres, and the main building reached a height of 29 metres. Part of the inner courtyard was covered, and contained the central exhibition *Man*. Above all, the position of the museum was made impressive through its location on the kilometre-long access from the “great garden,” an enormous landscaped garden containing Dresden’s first baroque buildings, which cut through the centre of the museum. On that transept through the museum, Wilhelm Kreis had erected sculptures by two other German academicians. A little further along that main axis, he had added an apse, almost a chapel to *Man*, as the site of the museum’s chief attraction, a unique masterpiece: the Transparent Man. On May 16, 1930, the portals of the museum opened for the first time. The hopes that accompanied the opening of the new institution were expressed in deeply moving terms by Oskar von Miller, who concluded his inauguration speech with the words: “I hope that the Hygiene Museum will see the day when a man at my age of 75 years shall no longer be seen as a well-preserved old man of hoary years, but as one still in alert youth.”³⁷

**The Career of a Principle: The Transparent Man
in the Period of National Socialism**

In Exalted Posture – the “Adoration of the Sun” as an Ideal

The symbolism of the model was expressed by its position within the inner sanctum of the museum, by its bearing, and finally by the material itself. Bruno Gebhard, who had been scientific collaborator in the setting up of the museum, refers to an illustrious prototype of the figure, the Greek statue “Adoring Youth,” that is ascribed to Boedas of Byzantium (c. 300 BC). In fact, the fine arts of the nineteenth and twentieth centuries have long been influenced by the model of the erect figure with outstretched arms. That prayer stance (erect, arms bent or stretched out, palms open, gaze directed obliquely upward) conveys to the viewer, even to one not versed in the canons of religious gesture, a consciousness of appeal to the superhuman-divine. The same stance had been adopted by the adherents of new life reform movements in the first decades of the twentieth century. In the “light adoration” the unclothed body is turned to the sun, in expectation of a this-worldly health bestowed by light and air, while at the same time striving to overcome the here and now in conscious appeal to the sun as salvation, in place of a rejected, traditional deity that is to be sloughed off with its bourgeois society and customs.³⁸

It is not only the posture of our statue that is designed to overcome corporeality, with its association of uncleanness; it is, above all, the vitreous figure, the transparency. The individual characteristics of an individual’s appearance – skin and hair, muscle and fat – are all missing in the Transparent Man. He is transparent right through; nothing remains

hidden. The figure firstly symbolises, in utmost clarity, the claims of an unchallenged natural science that believes itself bound less and less by any secrets, and secondly, it belongs to the aesthetic school of the Bauhaus, which even the monument-inclined Wilhelm Kreis could not escape, and which is responsible for the most successful aspects of its buildings. The elimination of all ornamentation, and a striving for clarity and transparency were principles which the directors of the Bauhaus (originally in Weimar, then from 1926 as the State College in Dessau) carried through in their aesthetic programme, from architecture, via fashion, to the construction of industrially manufactured everyday articles. The distinguished architect Walter Gropius, for example, designed the door-latches for the German Hygiene Museum. The architectonic style of the Bauhaus found its continuation and worldwide extension in the “International Style.”

The fact that the Transparent Man is not made of glass, but of a plastic, has endowed him over the years with an unexpected, although very human, quality, namely that of ageing. Thus the oldest preserved models, of the size of a present-day 12- to 14-year-old, appear, when removed from their plinths, fragile, almost in need of protection. The skin of the plastic has lost its cool lustre, which has given way to a warmer tone; the transparency is diminished and almost hides the inner organs. To the people of the time, however, the figure was in many ways a symbol: for the claims of modern natural science in understanding and explanation of complex connections; for a transparency that, in its attitude of adoration, achieved a transcendency; and, finally, for a time that aimed, through rationality and enlightenment, to dislodge traditional social and aesthetic conventions. The fact that the German Hygiene Museum continues, to this day, to be regarded as a temple of hygiene, appears to confirm the symbolic power of the unusual exhibit.

Transparent Figures – German Achievement of Quality

After the successful inauguration of the vitreous man on the occasion of the opening of the museum buildings, the model became a star attraction of numerous special exhibitions. Interest had awakened, not only in Germany but in numerous countries abroad. One high point in the attainments of Berlin exhibitions before the Second World War was doubtlessly the display *The Miracle of Life*. The German Hygiene Museum sent Bruno Gebhard to Berlin, where he organised the show covering an area of 40,000 square metres (approx. 400,000 square feet) around the Berlin Radio Tower. It was Gebhard's aim to “achieve health education with visual methods.” The design can be described as modern even today: for example, the entire 3,200 square metres (approx. 32,000 square feet) of the ceiling of one hall was painted bright red, in order to demonstrate the surface area of the red blood corpuscles of a single person. The most modern methods of visualisation, such as the so-called “microvivaria” – microscopes with projection facilities that could demonstrate the propagation of single



Figure 5. *The Transparent Man in the Buffalo Museum of Science, 1934.*

cells – stood out alongside others of unrefined nationalist pathos. The chief attraction, again, was the Transparent Man.

An International Success

The “German Achievement of Quality” found admirers beyond the frontiers of the country, for example at the Paris World Exhibition of 1937. A complete pavilion was provided here for the “Homme de Verre” and attracted such a flood of visitors that it had to remain open well into the night.³⁹ Greater even than that in Europe was the admiration (and market) for the Transparent Man in the USA, as was also the case for *Eugenics in the New Germany*. The German Hygiene Museum had an exhibition on that theme in 1934–35 in Los Angeles, in Portland and in Salem, Oregon, and finally also in Buffalo, New York. In Buffalo, the Museum of Science now also hosted the exhibit of a further statue from Dresden (*see* Figure 5).⁴⁰

The strong US export market was sustained by the American infrastructure surrounding the popularisation of science and health

education. After 1930 there were close contacts with the American Public Health Organisation, which counted some 10,000 members. In 1934, members of this organisation invited the German Hygiene Museum to participate in an annual exhibition. The Americans proposed, and the Germans accepted, the theme of *Eugenics in the New Germany*.⁴¹ Existing international contacts and a certain admiration for the choreographic attainments of German exhibition organisers prepared the way for the triumphant tours of the transparent men through the United States. The donors of the “Transparent Woman” advertised themselves in the trade publication of the underwear manufacturers: “‘Know thyself’ has now become a scientific possibility for every woman. By seeing herself in the transparent woman, she can gain an appreciation of the value of medical science, and with this information on the mechanism of her body, she can learn how to guide its well-being and control and correct its appearance.”⁴²

There is no exact information about the number of transparent people that were made before 1945. We can, however, deduce from the diverse sources available, a rough history of the careers of the following statues:

- Franz Tschakert’s first creation was shown in the German Hygiene Museum from 1930 onwards. It was totally destroyed in 1945.
- A statue was made for the World Exhibition of 1933 in Chicago, and has since been in the Mayo Medical Museum in Rochester, New York.
- After 1934, the Buffalo Museum of Science exhibited the figure that has already been referred to. As an outcome of research for a joint exhibition of the German Hygiene Museum and the German Historical Museum, *Visitations of the Body. Views of the Body in Five Centuries*, Dresden 1990, the figure came into the possession of the German Historical Museum in Berlin, where it remains today.
- For the design of the Berlin Exhibition *Miracle of Life*, a figure was specially made, and was later shown in many repertory exhibitions. It was probably this figure that was also to be seen in post-1945 repertory exhibitions.
- Another figure that was exhibited to a wide public had been produced for a 1936 exhibition in Stockholm under the theme “Mother and Child,” and was also shown in 1937–38 at the World Exhibition in Paris. The figure then began a migration throughout Europe; it was shown in Madrid in 1944, but nothing further is known about its whereabouts since that time.
- It is claimed, although there are no official records, that there was another female figure that was shown in the USA in connection with the presentation of corsetry. This may refer to a Transparent Woman, donated by the corsetry manufacturer, S. H. Kemp of Jackson, Missouri. After first showing in 1936 in the New York Museum of Science and

Industry, that model, which was also known as “Miss Science” migrated through shows in 100 towns of the USA and ended in the Science Centre in St Louis, Missouri. Like the model from Buffalo, this model is today in the possession of the German Historical Museum, Berlin, and is exhibited on loan in the German Hygiene Museum in Dresden.

- A Transparent Man was made in 1937 for a museum in the Japanese town of Nagoya. No further details are known of it.
- Another model was made in 1937 for the USA, on the order of the Oberland Trust and the Carl Schurz Memorial Trust, and was shown for several years in a hygiene touring exhibition. Nothing is known of its fate after it reached Texas.
- Even during the War, under difficult conditions, work progressed in the German Hygiene Museum on another Transparent Man. Essential parts had been stored in a cellar and survived bomb attacks, to provide parts-support for post-war production.

The Transparent Principle: Transparent Engine, Transparent Factory

The success of the Transparent Man led to an enthusiasm for its explanatory principle. There was an attempt to render other complex connections transparently demonstrable. Thus the Auto Union AG in Chemnitz commissioned the Plexiglas Workshops of the German Hygiene Museum to make a transparent engine. A full-sized, 2.7 litre, six-cylinder engine was made in Dresden and shown at the motor exhibition of 1938 in Berlin (*see* Figure 6). It is not easy to demonstrate to a layperson the sequence of events within an internal combustion engine, but the new techniques of transparent modelling permitted a ready explanation of the normally invisible combustion stages. In the same way that the Transparent Man was a purely transparent creation, without fleshiness or scent, without fat or muscle, so also the transparent motor could be devoid of petrol, hot oil, cooling waters and combustion products, heat and violent movement. The transparent engine remained a unique creation. In 1945, Soviet troops took it to Moscow to the Polytechnic Museum.

The attractiveness of the principle in demonstrating technical connections had now been well confirmed and was extended in a Transparent Factory. It is not known who prepared the draft designs for this lavish model; however, Tschakert, the Museum’s Workshop Manager, certainly had some responsible involvement in its production. The entire model was a work commissioned for the *Healthy Living – Happy Production* Exhibition held in Berlin in 1938. New ideas were presented on a larger scale.

Why “Transparent Factory”? Health and the ability to work are the most precious possessions of the German people. The recognition that everything must be done to conserve and promote them, gains more and more acceptance, and gives assurance that enterprises take all requisite measures ... This method of fabrication of transparent



Figure 6. Hitler and Göring at the viewing of the Transparent Engine at the Berlin Car Show, 1938. Reproduction Volker Kreidler

models is now also to be employed in the service of propaganda for factory hygiene. The model of a factory was designed with walls made of the German synthetic material "Plexiglas." Like the Transparent Man, the model was manufactured in the experienced workshops of the German Hygiene Museum.⁴³

Like the model Man a few years earlier, the Transparent Factory gained renown as a masterpiece. The details were indeed impressive. Manufactured to a scale of 1 : 15, 6 metres high, with a diameter of 8 metres, a total weight of 1250 kg, assembled with 3000 screws, 1½ km of electric wiring, made in 2850 hours, and rendered transparent through 107 square metres of the new synthetic, Plexiglas, it could be rotated for presentation to the viewer.

The factory model is designed to give the viewer the impression of a well-ordered mechanism. It is not a question of working time, of profit or loss; the factory appears as an organic whole that has been optimised for the preservation of health and work as the acclaimed highest of objectives. The factory is no Moloch, does not frighten; rather it is light, and equipped with all facilities, inclusive of a sports stadium. Sweat and smoking chimneys do not exist in this ideal factory, any more than blood courses through the veins of the Transparent Man. Lingner's thesis of man

as an organising principle finds its highest expression in the Transparent Factory – in a state in which a virtual reality of propaganda whitewashed the factory organisation of a whole state, including the factory-like removal of all undesirables.

New Edition of a Successful Product: Transparent Man in Post-War Germany

New Beginning in Dresden

Even in the final years of the Second World War and of National Socialism, the German Hygiene Museum continued with its exhibitions. Apart from racial propaganda, and in spite of the environment of crisis and the advance of the allies, there were also non-political themes designed to suggest the existence of a kind of normality and of the everyday world – for instance a “sauna exhibition” was opened on June 18, 1944.

Immediately after the arrival of Soviet troops in Dresden, the German Hygiene Museum was subordinated to the Soviet military administration. In parallel with the operations to clear up the destroyed museum building, the completion of a preserved Transparent Man was energetically pursued, for it was intended as early as October 1945 that the supervision of the museum was to pass from the occupational administration to the new German Central Administration for Health, then the Soviet Zone of Occupation. A celebration on November 23, 1946 was the first occasion for the Museum to demonstrate a newly created transparent figure and explain the scope for future work. Dr Neubert, appointed as Director in March 1946, explained the threads linking past and present:

The Hygiene Museum does not aim at fixed prescriptions, it will not give superficial instruction, it will aim to mediate a profound knowledge of man, so that every individual may participate with personal understanding in the ordinances of the health authorities. Thus deeper understanding will teach people to distinguish between the genuine and the phoney, the true needs of men and the superficial stimulants of advertisements. It teaches a proper ranking of needs and therefore leads straight to the planned economy, or, in other words, to socialism.⁴⁴

However, the positive advances of a planned economy were not yet quite in evidence, and the production of the first Transparent Man of the post-war era was characterised by expediency: a wooden plinth had to take the place of a metal plinth, and in view of the expense of frosted glass, window glass had to be frosted by hand.

Competition in the West

This first post-war Transparent Man was not the only representative of its species, for there had been another figure touring in Western Germany during the years preceding the War's end, and in November 1946 the authorities in Dresden learned, through a former prisoner of war who had been held in Schleswig-Holstein (an American zone of occupation), that

a German Hygiene Museum statue had been found there, in the attic of a farm in the neighbourhood of Eutin.⁴⁵ That was no great surprise to the museum. One Johannes Erler had been in the employ of the museum as manager of external touring exhibitions until May 1944. In correspondence between Erler and Dresden in October 1945, instructions from Dresden for the return of a statue to Dresden had been evasively answered, and Erler eventually began his own exhibition activity in Kiel and Lübeck, with the implicit permission of the museum.

The post-war inauguration of the Transparent Man in West Germany may thus be seen to date from the beginning of July 1946 in Kiel. In the face of considerable difficulties, Erler wandered through various towns, carefully observed from a distance by the German Hygiene Museum. At the beginning of 1950, he arrived with his exhibit in Cologne, and had it brought up to date in the hygienic-anatomical laboratories of the Office for Health Affairs. This signified the beginning of the end of the activities of the Dresden Museum in West Germany, for these laboratories were already under the authority of the newly established German Health Museum in Cologne.

Erler found support for his activity in Cologne. Georg Seiring, the President of the German Hygiene Museum who had entered into its service in 1913 when Lingner was still alive, and who had also been in charge of the museum during the Nazi period, had emigrated to West Germany with a considerable number of colleagues, including Franz Tschakert.⁴⁶ There, in Cologne, a new German Health Museum was to be founded, modelled on the Dresden original. In addition to permanent exhibitions, the proven success of touring exhibitions was to be continued, and a health academy was to train teachers in matters of health care. Furthermore, the production of educational material and of models was also to be restarted in Cologne, and with it that of the Transparent Man. From January 1950, they toured the Dresden-made statue that had been part of Johann Erler's touring exhibits.

While, in Dresden, conditions had changed, Seiring and his colleagues were immediately able to resume their pre-war contacts. It is therefore not surprising that the first statue from Cologne, after an exhibition in London, found its final destination in the Health Museum in Cleveland, Ohio. A snide, if not quite accurate, comment was addressed to former Dresden colleagues: "The Transparent Man from Dresden has emigrated to Moscow. Now a new generation is departing from Cologne to the Western world."⁴⁷ The formerly proud symbol of German health education had become a bone of contention in East–West conflict.⁴⁸

The Eastern world reacted to the Cologne provocation with socialist indignation under the title "Western Lies about the Transparent Woman:"

These defamations by the West are too obvious to disguise their true intent. The staff of the German Hygiene Museum raise their voice in protest and respond with

strengthened resolution for improved performance and heightened quality, in dedication to a peaceful, united, and democratic all-Germany.⁴⁹

An Excursion to Moscow

The promising expectation of a new generation of transparent men did in reality have a greater chance of realisation in Moscow. A Dresden “Transparent Couple” travelled to Moscow; not abducted, but presented to the brotherly Occupation Power. In response to a proposal by the personnel of the German Hygiene Museum, the government of the State of Saxony had passed a formal resolution to that effect in December 1949. The statues were to cost around 80,000 Marks. The occasion was not an unimportant one: the statues were to be presented to “Generalissimus Stalin for his 70th birthday as a token of the quality of achievement attainable by co-operation of brawn and brain.” On December 15, 1949, the Society for German–Soviet Friendship acknowledged receipt of six dispatch containers; this left just six days for transport and for the organisation required in Moscow in order to meet the date of the birthday on December 21. It is not known how pleased Stalin was with this birthday gift from Dresden.⁵⁰ The Transparent Couple was eventually to be displayed to the Soviet people in travelling exhibitions.⁵¹

It was not clear, either, whether this gift was totally spontaneous, or whether it was an imposed, if delayed, reparation. For the observer of today, however, the Transparent Couple seems to perfectly symbolise Stalin’s concept of new man. A tightly organised existence within the State and the economy that imposes a socialist lifestyle right down to the minutiae of privacy, is perfectly represented by the Transparent Man in his ambivalence. He represents life not as it is, but as the victory of science over the imperfection of individuality; he represents the negation of corporeality that, like all individuality, obstructs thorough organisation. Above all, the Transparent Man shows that there is nothing to hide, that the last darkness has been removed, and that nothing can be kept from the devotees of such symbols. That, of all occasions, the Transparent Woman and the Transparent Man were to be joined on the occasion of a Stalin birthday celebration, can also be taken as signifying the transparency of even the private life of interaction and intimacy, even of its dissolution in favour of the creation of a new generation that is only aware of the supremacy of society.

Socialist Production I: A New Transparent Man

Early objectives, envisaged since the First International Hygiene Exhibition in 1911, for economic support of the German Hygiene Museum through production and marketing of high-class exhibition materials and models for the advancement of health education, were again realised by Georg Seiring in Cologne. The price of the transparent figure that was sold to Cleveland was 50,000 Marks; nevertheless, the growing production of Transparent

Men in Dresden during the years after 1950, in the face of continuing problems of shortage of materials cannot be explained exclusively in terms of expectations of profit, especially as a substantial proportion of the figures were delivered to socialist brother countries. Instead, the Transparent Man served the consciously promoted self-confidence of the East German State that elevated it above an article of commerce to a symbol of the truly socialist state that, for the first time, devoted itself seriously – and above all more intensively than the capitalist countries – to the objectives of popular health education. In addition to sales, therefore, there were gifts: to comrade Stalin, to institutions of needy allied countries, and to the World Health Organisation. On the occasion of the 26th Congress of the WHO in 1974, East Germany, always concerned about its international reputation, donated a Transparent Woman, still to be seen there, to the Geneva office of the Organization. The Health Minister, Mecklinger, was saluted by the heads of the WHO.

The everyday problems of East Germany, an economy characterised by material shortages, stood in contrast to the image presented in public. One episode in the history of the Cold War was mirrored in the museum's production of its model. Despite Ulbricht's claim that no one intended to erect a wall, the government directed an enquiry to the Dresden Hygiene Museum on August 8, 1961 in relation to "dependence of our production on imports, and steps taken to correct it."⁵² Whereas raw materials needed for building the Berlin Wall after August 13, 1961 could be obtained without difficulty, there were problems in procuring plastics. Stocks of Cellon were not large, and hence production of the Transparent Man had to be changed to use of the East German plastic, Piacryl. However, the special adhesive required to glue Piacryl was still obtainable only from West Germany. The resolution of these technological problems must be attributed to a recognition by the East German government that the Dresden institution was not just a constituent of the nation's health system, but an important factor in its economy too.

Socialist Production II: Transparent Animals

Notwithstanding supply difficulties, the transparent figures had become articles of value and were widely exported. Available records show that, between 1945 and 1997, a total of 114 statues were manufactured and sold – 67 Women and 47 Men. Whilst the range of transparent products had been supplemented during the National Socialist time by an engine and a factory, this range was now widened by two of the most important domesticated animals: the cow and the horse. A ministerial letter dated June 2, 1950 asked for initiation of the production of a "Transparent Horse" and a "Transparent Cow". The request reflected practical motives.⁵³ Growing rationalisation of agriculture in East Germany called for a core of well-trained experts that needed to be supported by adequate educational aids. The need for foreign currencies, procurable through exports, may have

been equally relevant. The ambitious project was, however, delayed for years by shortages of expertise, so that the inauguration did not take place until June 2, 1956, in the presence of the Health Minister, Luipold Stredle, during the 750th anniversary celebrations of the town of Dresden.

Production had been taken in hand with great care and with the co-operation of diverse scientific institutes. The original proportions of the animals in question had been minutely observed, and their realisation represented a remarkable scientific, technical and artistic achievement. After 1959, the Dresden product range constituted almost a glazed Noah's ark. These were not the fantasy products of their creators, who in the last resort were also their marketeers; the transparent animals had been created through substantial efforts and at costs that might have been harder to justify under the principles of a market economy, but were intended as new and important objects of symbolism in a state that also organised its agriculture according to rational, factory-inspired principles. The worldwide uniqueness of the figures, combined with their high visual attractiveness, secured for East Germany a high reputation, particularly in countries that were technically less developed and had emerging economies and a predominance of agriculture.

The Legend Lives

Today, there are still transparent figures in the German Hygiene Museum. Many visitors ask first at the ticket desk, not for the current special exhibits that the museum mounts in considerable numbers, but for the location of the Transparent Woman. She stands, as in the display of earlier years, in a kind of temple, although today's visitors no longer have to stand in admiration, for an amphitheatre of benches is provided for an audio lecture. Within its staged setting, the model continues to evoke an astonishment that is quite incomparable to that of, say, an X-ray picture.

It is unimaginable that a visitor to the Museum would miss the statues, and certainly none would wish to miss the reactions of nostalgic visitors. The Transparent Man remains an effective, well-designed model for the graphic presentation of the basic principles of human anatomy.

The marketing of the Transparent Man has not ceased. The interests of the museum no longer centre on the attainment of volume output, however. It aims to retain its fund of experience and the technical know-how of the people who make the models, but the statues' uniqueness to Dresden is to be emphasised, and so sales within Europe have stopped. Enquiries for transparent men are numerous; videos are made, particularly for TV productions with medical or humanistic-scientific contexts; museums and major specialty exhibitions frequently approach the museum requesting loans of the statues. The museum has two "travel figures" available for this last requirement. However, all enquiries are critically reviewed, to avoid excessive exposure of the figures and of their reproductions.⁵⁴

The Competition

Can the Transparent Man, with his perhaps now old-fashioned technology and aesthetic presentation, not to mention the burden of his symbolic significance, compete in any way with other media? These are now numerous, and only a few can be mentioned here. The fascination of a view into the human body has become a very high-tech, high-cost, difficult-to-manage system of image production. Ever since the development of X-ray technology for medical diagnosis and treatment, the use of modern imaging techniques has become indispensable for popular scientific demonstrations. Apart from the well-established X-ray systems, since the 1970s there has been computed tomography [CT], now supplemented by positron emission tomography [PET], which enables a view of biochemical processes. Another development offering great prospects is magnetic resonance imaging [MRI]. Furthermore, according to the experts, truly novel insights may be gained from a combination of methods, for example an imaging process in combination with brain scanning [electroencephalography, EEG]. Thus it is probable that, not



Figure 7. Young visitors with the Transparent Woman, 1997. Photograph André Rival

only the anatomy of the body, but also its inner dynamics will be opened to view – a radical advance in the observation of the interior of the human body.

The other side of the coin of the flood of information is the problem of its administration. It is said that the image archive of a large hospital grows by a cubic metre each day.⁵⁵ Still more pictures stem from computers with great capacities that are capable of transforming images into totally new, dynamic, three-dimensional views. This technique can create pictures of high aesthetic appeal, some of which have already become classics, such as “Voxel Man” and the “Visible Human Project.” The “Virtual Head” from the computer centre of the Hamburg University Clinic has already been reproduced many times in popular scientific magazines. In contrast, the digitalised frozen slices of a corpse, made by the University Clinic of Colorado, have a strange effect on many viewers because they are those of an executed criminal. This does not in any way detract from its fascination, and above all its popularity: like the Hamburg head, the body from Colorado can be viewed on the Internet.⁵⁶ Thus, we come full circle from our introductory sentences, for Vesalius also is to be found on the Internet. The father of all anatomy gives his name to a data bank that stores material for specific anatomical views.⁵⁷

Future of a “Wonderwork”

If Vesalius represents a data bank, is the computer-supported sliced man from Colorado the new Transparent Man? At any time and anywhere, he provides a view, not only of essential structures, but of innumerable details. Or, is it the Human Genome Project – which aims to decipher the totality of human genetic material within the next few years – that represents the fulfilment of the wish for a view into the most profound interior? In the face of the wealth of data involved in these projects, of the numbers of scientists who are involved, and of the amounts of money required, these statues have become a relic of scientific history, a fossil of science popularisations. However, it is a property of fossils that, beyond the artefacts themselves, they offer insight to the times of their creation. Thus it is that the Transparent Man, as he appears today in the German Hygiene Museum, is less a popular science-mediating object but rather more a piece of history; he is a unique testimony, not only to the Dresden Museum, but also to concepts of progress, enlightenment and producibility. At the turn of the millennium, in his 70th year, he will thus attain a further pinnacle, for the German Hygiene Museum is preparing a large exhibition section for the World Exhibition, Expo 2000, in Hanover, to be called, as it was 70 years earlier, *Man*. Fascinating new insights of human sciences are to be shown there, and there, too, will be, in all its modesty, the Transparent Man. One thing will become clear within the flood of information: that the true miracle work is not the plastic statue, but Man.

Notes

In approaching this subject, I have relied in the first place on the excellent work of Rosmarie Beier and Martin Roth, who have been the first to deal historically-critically with the creation and the repercussions of this unique model. Hearty thanks also go to Barbara Köster, who edited the article. A further thank you to Marion Schneider, archivist of the Deutsches Hygiene Museum, for her very helpful research. I am very obliged to Prof. Richard Funk, Institute for Anatomy at the Medical Faculty Carl Gustav Carus, Technical University Dresden, for making it possible to visit the rooms in the Institute and for his numerous explanations. The editors and author are grateful to Martin Bud and Evelyne Draper for translating this article.

1. The German description "Gläserner Mensch" is far better suited to show the symbolic and the quite ambivalent characteristics than the conventional translation "Transparent Man."
2. Rosmarie Beier and Martin Roth, eds., *Der Gläserne Mensch – eine Sensation. Zur Kulturgeschichte eines Ausstellungsobjekts* (Stuttgart, 1990).
3. "Anatomy" is translated from the Greek for "to cut"; today it is only used figuratively as a generic term for the science of the structure of living things. Anatomy explains the structure of the body, the organs, tissues, cells and the organic, and their co-ordination and function. In German, "Sektion" and "Obduktion" are no longer differentiated in everyday language. The Latin "sectio," which is today an established part of the study of medicine, was originally used for the actual opening up of a corpse to diagnose the cause of illness or death. The Latin "obducere" is translated as "to pull something over something." "Obduction" was used for the final covering of the corpse.
4. Quoted from H. Roessler, "Hector Berlioz und seine medizinische Karriere," *Medizinischer Monatsspiegel* 1 (1960): 2.
5. In the last years of his life, Dürer devoted himself to the completion of his theoretical writings: Albrecht Dürer, *Unterweisung der Messung mit Zirkel und Richtscheit in Linien, Ebenen und ganzen Körpern* (Nürnberg, 1525) and Albrecht Dürer, *Vier Bücher von menschlichen Proportionen* (Nürnberg, 1528).
6. Rosmarie Beier, "Der Blick in den Körper. Zur Geschichte des gläsernen Menschen in der Neuzeit," in Beier and Roth, eds. (n. 2 above), p. 14f.
7. Andreas Vesalius, *De humani corporis fabrica libri septem* (Basel, 1543).
8. Wilhelm Conrad Röntgen, *Eine neue Art von Strahlen* (Würzburg, 1896).
9. Bernike Pasveer, "Knowledge of Shadows: The Introduction of X-ray Images in Medicine," *Sociology of Health and Illness* 11 (1988): 360–81.
10. Octave Mannoni, *Sigmund Freud in Selbstzeugnissen und Bilddokumenten* (Reinbek, 1971); Ernst Freud et al., *Sigmund Freud. Sein Leben in Bildern und Texten* (Frankfurt, 1985).
11. Sigmund Freud, *Gesammelte Werke* (Collected Works), vol. 2/3 (Frankfurt). At the wish of the author the work bears the date "1900."
12. Cf. Gerhard A. Ritter, *Der Sozialstaat. Entstehung und Entwicklung im internationalen Vergleich* (Munich, 1991).
13. For exhibitions in general see, Paul Greenhalgh, *Ephemeral Vistas: The Expositions Universelles, Great Expositions and World Fairs 1851–1939* (Manchester, Eng., 1988). Social-economic and social-hygiene questions had already been raised at the Paris World Exhibition, 1855, within the framework of a "Galerie de l'économie." Martin Vogel, "Hygiene-Ausstellungen und Hygiene-Museen in früherer Zeit," *Hygienischer Wegweiser* 5 (1930): 145f. The Englishman D. Twining was a leader in endeavours "to set up an economic museum for the working classes." In 1852, he presented his ideas which, however, were not initially realised. Martin Vogel (above), p. 145. Tietze discussed hygiene exhibitions in Leeds (1871), Norwich (1873), Glasgow (1874), Brighton (1875), Liverpool (1876) and London (1881). Particularly noteworthy is the Great Health Exhibition of May 8 to October 30, 1884 in London, which occupied 1,600,000 square feet and attracted over 4 million visitors. Felix Tietze, "Die Internationale Hygiene-Ausstellung London 1884," *Hygienischer Wegweiser* 5 (1930): 149 ff.
14. In greater detail in Martin Roth, "Menschenökonomie oder der Mensch als technisches und künstlerisches Meisterwerk," in Beier and Roth, eds. (n. 2 above), p. 46 ff.
15. Victor Klemperer, *Curriculum Vitae*, ed. von Walter Nowojski (Berlin, 1996), vol. 2, p. 609.
16. Susanne Roefiger, "In aller Munde – das Deutsche Hygiene-Museum," in *In aller Munde. Einhundert Jahre Odol*, ed. Martin Roth, Manfred Scheske, and Hans-Christian Täubrich (Stuttgart, 1993), p. 52.

17. Karl August Lingner (b. 21 December 1861 in Magdeburg, d. 5 June 1916, Dresden). Trained as a businessman, in 1892 founded Dresden Chemical Laboratory, known after 1898 as Lingner Works. Lingner funded a variety of social initiatives in Dresden: 1897 the Central Laboratory for Dental Health and children's clinic and nursery; 1897 Disinfection centre and public reading room. In 1900 he became a commercial councillor and in 1912 was awarded an honorary doctorate by the University of Bern.
18. Karl August Lingner, "Einige Leitgedanken zu der Sonderausstellung: Volkskrankheiten und ihre Bekämpfung," in *Die deutschen Städte* (Leipzig, 1904), vol. 1, p. 533.
19. Hendrik Behling, *Das anatomische Labor am Deutschen Hygiene-Museum Dresden. Ein Beitrag zur Geschichte der Anatomie in Dresden* (Dresden, 1996), p. 18 ff.
20. Werner Spalteholz, *Über das Durchsichtigmachen von menschlichen und tierischen Präparaten* (Leipzig, 1914), p. 67, cited from Behling (n. 19 above), p. 18, among others: "1. preparation of body/organ (removal of scales, squama, hair, fur, etc.), injection, 2. fixation, 3. possible decalcification, 4. bleaching (with hydrogen peroxide, depending on whether acidic or weakly alkaline), 5. rinse thoroughly with water, 6. dehydration in increasing alcohol concentrations (up to 100%), 7. transfer into benzene (change twice) [fire hazard!], 8. immerse in final liquid, 9. evacuate to remove benzene in the air." (A mixture of bezyl benzoate, Safröl, Isosafrol and oil of Wintergreen was used as embedding fluid.)
21. *Official Catalogue of the International Hygiene Exhibition, Dresden, May to October 1911*. New Improved Edition, Berlin (n.d.), p. 383 ff.
22. The activities of the museum included further processes of preparation and representation of human organs, e.g. a "process for representing blood vessels by injection with a new mixture which chemically destroys the surrounding body tissues;" also, the Spalteholz process was further developed and achieved new results: "Thereby, it turns out that the process achieves particularly interesting results when it is applied to pathologically changed organs," in *Das National-Hygiene-Museum in Dresden in den Jahren 1912–1918* (Dresden, 1919), p. 12.
23. "One could not devise anything more tactless, anything more defeatist ... than this otherwise admirable exhibition, which, if I am not mistaken, travelled through all the German cities. It exhibits and demonstrates everything that was done for the war-disabled, and what should still be done: from the hospital to the home. A major part, therefore, was of a medical nature. Large models illustrated orthopaedic methods: stretching, resting, bandaging – all this was clean and comforting. But one could also see fresh and scarred wounds reproduced in coloured wax pieces, the condition before and after the resection, the transplant, the plastic surgery. For the surgeon, everything was indisputably artistic and edifying, for the lay person much was atrocious." Klemperer (n. 15 above), p. 609.
24. The "Gesolei" (GE–SO–LEI = Gesundheitspflege, Soziale Fürsorge und Leibesübungen) became a display of superlatives. The large exhibition for hygiene, social welfare and physical education in Dusseldorf was visited by 7.5 million visitors. *GE-SO-LEI. Große Ausstellung Düsseldorf 1926. Für Gesundheitspflege, Soziale Fürsorge und Leibesübungen* (Düsseldorf, 1927), 2 vols.
25. Georg Seiring, "Das Deutsche Hygiene-Museum in der Nachkriegszeit," *Hygienischer Wegweiser* 2 (1927): 27.
26. Martin Vogel, "Das Deutsche Hygiene-Museum Dresden," in *Grosse Ausstellung Düsseldorf 1926 für Gesundheitspflege, Soziale Fürsorge und Leibesübungen. Amtlicher Katalog* (Düsseldorf, 1926), p. 66.
27. *Ibid.*, p. 65.
28. Later, of course, while eugenics movements in Britain and the USA promoted voluntary or compulsory sterilisation, race hygiene would be used to justify the mass murder of the Nazi holocaust. See Daniel Kevles, *In the Name of Eugenics: Genetics and the Uses of Human Heredity* (New York, 1985); *Darwin und Darwinismus: Eine Ausstellung zur Kultur- und Naturgeschichte* (Berlin, 1994).
29. Karl A. Lingner, *Der Mensch als Organisationsvorbild*, guest lecture given December 14, 1912 before the professoriate of the University of Bern (Bern, 1914).
30. *Das National-Hygiene-Museum* (n. 22 above), p. 6. Particularly impressive was a similar presentation technique – the "frost-cut" or "cryosection" technique – which was demonstrated, for example, at the "Anahyga," the German anatomical-hygienic exhibition entitled *Man*: "well-shaped male corpses, frozen and hardened, were cut into slices after a method of Prof. Rüdinger. The preparation is fixed on a stand and can be leafed through like

- a book ... Particularly interesting for the lay person is the sagittal median cut in the middle of the body, reaching almost all organs which are then represented in the intersection." *Illustrierte Führer durch die Anahyga, deutsche anatome. hygien. Ausstellung "Der Mensch"* (Munich, 1929), p. 28 ff.
31. Cellon, also called Cellhorn, a translucent synthetic plastic made by the Röhm & Haas A. G. Company, Darmstadt, subsequent supplier Dynamit-Aktiengesellschaft, formerly Alfred Nobel & Co., Troisdorf. Cellon is a celluloid-like substance derived from acetylcellulose but it is less easily combustible than celluloid. It can be worked mechanically and can also be glued. It has the disadvantages of turning yellow over long periods and the tendency to shrink with ageing of the material.
 32. *Das National-Hygiene-Museum* (n. 22 above), p. 12.
 33. Typed report by Isolde Seyfarth, née Ringelhahn, September 20, 1972 and July 7, 1993, Deutsches Hygiene-Museum, Archiv, Nr. 73/46.
 34. Ibid.
 35. Ibid.
 36. Protokoll Vorstandssitzung DHM e.V. vom 24.6.1927, Deutsches Hygiene-Museum, Archiv, Nr. 18/6. Remarkably, this new development has not been protected by a patent. Relevant searches by the competent authorities remain fruitless.
 37. Quoted from Bruno Gebhard, "Im Strom und Gegenstrom. 1919–1937," *Beiträge zur Geschichte der Wissenschaft und der Technik* 14 (1976): 4.
 38. Konrad Wünsche, "Das Bildnis des durchsichtigen Gesunden oder: Die Wahrhaftigkeit des Gläsernen Menschen," in Beier and Roth, eds. (n. 2 above), p. 85 ff.
 39. After Roth in Beier and Roth, eds. (n. 2 above), p. 41.
 40. Gebhard (n. 37 above), p. 79.
 41. Gebhard (n. 37 above), p. 46 and p. 68 ff.
 42. "The Camp Transparent Woman," *The Corsetry and Underware Journal* (October 1936): 17.
 43. Hermann Hebestreit and Robert Koenig, *Die Gläserne Fabrik. Ein Beitrag zur Gesundheitsführung in den Betrieben* (Dresden, 1938), p. 2.
 44. *Report of the Scientific Management of the German Hygiene Museum: Central Institute for Hygienic Education*, 25 (1946), Deutsches Hygiene-Museum, Archiv, Nr. 46/36.
 45. Deutsches Hygiene-Museum, Archiv, Nr. 40/37.
 46. George Seiring, 1883–1972; first meeting with Lingner in 1906; Government Adviser before 1927; 1927, Honorary Doctor of Medicine of the Medical Faculty of Leipzig University; May 16, 1930, Honorary Senator/Councillor of the Dresden Technical College and President of the German Hygiene Museum; 1930/31, Managing Director and Vice-President of the International Hygiene Exhibition; moved to Cologne–Rheinfelden in 1947.
 47. *Kölnische Rundschau*, July 28, 1950, and *Rheinische Zeitung*, July 28, 1950.
 48. Not until 1955 was there once again a new Transparent Man from Dresden in West Germany, exhibited in Munich at the International Exhibition for Nutrition and Home Decor. Director Kunkel, back from Munich, reported in the *Sächsische Zeitung*, November 9, 1955, "If we explained to the visitors that our government spends over 30% of the budget for the health service, they would immediately compare this to the spending of the Bonn government. It became quickly obvious where the future of Germany lies."
 49. *Sächsisches Tageblatt*, September 7, 1950.
 50. H. Kern, who fired the transparent figures, was able to experience Stalin's birthday celebrations. His impressions of the celebrations were reported in a somewhat unconsciously ambiguous way: "The climax of the experience was for Kern the moment when he saw Stalin for the first time and was moved by the effect of this strange man ... this emotion almost gave him a feeling of rightness in his chest." From *Ein Dresdner sieht Moskau* (n.d., n.p.).
 51. Staatsarchiv Dresden: Landesregierung Sachsen, Ministerpräsident, Nr. 1650, p. 131 ff.
 52. Response of the German Hygiene Museum, dated August 19, 1961, Deutsches Hygiene-Museum, Archiv, Nr. 61/22.
 53. Letter from the Minister of Employment and Health Affairs of the German Democratic Republic dated June 2, 1950, Deutsches Hygiene-Museum, Archiv, Nr. 50/15: "It is a fact that great interest also exists in the field of veterinary medicine for such teaching material. These transparent animals would also represent an important article in our export trade."
 54. Modernisation of the Transparent Men had been the subject of much thought even before the German Hygiene Museum came under new management after the collapse of East

Germany and the fall of the Berlin Wall. **Very practical plans still survive from the years.** The intention was always to complement the static character of the figures by other media; however, not only a lack of finance, but also a fear that some feature of the attractiveness of the current presentation may be irretrievably lost, have so far left plans for change in abeyance.

55. Jörg Blech, "Bilderwut auf Krankenschein," *Die Zeit*, December 6, 1996.
56. Voxel-Man: <<<http://www.uke.uni-hamburg.de/Institutes/IMDM/IDV/VOXEL-MAN.html>>> and the Visible Human Project: <<http://www.nlm.nih.gov/research/visible/visible_human.html>>.
57. Vesalius: <<<http://vesalius.com>>>.