Herrn Peter Rivaldi überreicht mit besten Empfehlungen und allen guten Wünschen 188

Hermann Sailer 8.7.05

Influence of Craniofacial Surgery on the Social Attitudes Toward the Malformed and Their Handling in Different Cultures and at Different Times: A Contribution to Social World History

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A historic overview including the European, American, Asian, and African continents is given on attitudes toward and the handling of humans with congenital malformations in ancient cultures and on pertinent customs in some prehistoric peoples. Figures of early works of art showing malformed individuals are presented testifying to this worldwide and timeless problem of humankind. In parallel, analogous patient photographs from our hospital before and after reconstructive surgery are shown. Philosophies of ancient Greece, Rome, and China on the subject of malformed infants essentially did not differ from the known attitudes of the less developed tribes in Europe and pre-Columbian America, although the means of elimination of unwanted offspring were rather passive (exposure) than active (manual killing). A radical change in attitudes and practices occurred with the spread of the Christian religion and its political installment in Europe: The care for the underprivileged including the malformed ones was considered a Christian duty to be performed with compassion and love. In our century, the clocks have been and apparently are turned back again. Atheistic and Darwinian influences, political atheism, and the belief in "higher ethics" issued by "superman" have led to a relapse into barbarism, also within the medical system. We, as craniofacial surgeons, are privileged to have the means to turn the clocks forward again by rehabilitating the physically most underprivileged: those with conspicuous craniofacial malformations. The necessary techniques exist and are applied, as the figures of patients from our hospital demonstrate, but the will and the emotional strength for their consequent application require more than our hands.

Key Words: Congenital malformations, ancient cultures

The significance and the handling of malformed humans from archaic to modern times worldwide reflect the lifestyle and culture of the various populations at any time. According to extensive ethnological studies, mostly done in the second half of the last century, primitive tribes and peoples on all continents disposed of malformed infants immediately after birth, usually by drowning, strangulation, or suffocation or live burial [1]. Our survey is not claiming to be comprehensive but rather to show typical examples of behavior of ancient societies toward a painful and secret problem, and some modern trends in similar directions.

Behavior of Pre-Columbian and Some Contemporary Indigenous American Indians

Among culturally more developed peoples like the Indians of South and Central America (the Incas, Mayas, and Aztecs), ritual homicide or infanticide was frequently practiced, mainly by the Aztecs. Offspring were regularly extinguished when born under bad auspices (of calendar or stars). Congenital malformations were believed to be due to misbehavior of the mothers during pregnancy [2], but what happened to them or their "stigmatized" children is unknown. Excavated terra-cotta figurines of persons with cleft lips (Fig 1) and other facial abnormalities (Figs 2 and 3), mainly found in Mexico but probably stemming from the Inca Land Columbia, famous for ceramics manufacturing, may simply testify to the high frequency, even today, of facial clefts in these regions.

That the attitude of certain indigenous South American Indian societies toward malformed infants apparently has remained unchanged for millennia is

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judicious use of plate and screw fixation in critical areas requiring three-dimensional stability. Longer close follow-up of the patients is of paramount importance. The development of resorbable plates, screws, and bioceramic cements may make these concerns a moot point in the future [16, 17].

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Fig 1 Pre-Columbian vase in glazed terra-cotta showing unilateral cleft lip. (See also Figs 10 and 11.)

documented by the following report in the Neue Zürcher Zeitung of November 3, 1994. A Yanoama mother gave birth in a Brazilian hospital to a son. The midwife had to tell her that the baby had a minor genital malformation (possibly hypospadias). When the midwife left the room, the mother immediately killed the baby, stating that she was, by their customs, obliged to do this. The Brazilian magistrates, being aware of these unwritten laws of their indigenous people, exempted her from legal prosecution.

Customs in Early Asian Cultures

In Far East Indian culture, the handling of malformed children or otherwise handicapped persons was prescribed by laws of the four major castes. A pertinent passage in the Brahman *Laws of Manu* (translated into English in 1886) [3] reads as follows: "Eunuchs and outcasts, persons born blind or deaf, the insane, the idiots and the dumb as well as those deficient in any organ (of action or



Fig 2 Terra-cotta from Mexico probably showing left lateral facial cleft of nose and mouth (or possibly acquired loss of soft tissue). (Photograph by Prof. Perko.) (See also Figs 15 and 16.)

sensation) are disqualified to inherit. But a man who knows the law has to provide evenly to all of them, give food and raiment without stint, according to his ability. He who gives it not will become an outcast." Outcasts and madmen were not allowed to marry. Others (i.e., malformed ones) could do so. In some southern India circles, persons with facial malformations were given demonic attributes as exemplified by a mask from Ceylon used to exorcise demons (Fig 4).

From ancient China there exists a legal text of the Qu'in period (200 B.C.) on the subject of malformed or otherwise unwanted children [4]. The passage reads as follows: "Unauthorizedly to kill a child is punishable by tattooing and being subjected to forced labour (grain pounding)." However, "when a child is newly born and has strange things on its body, as well as when it is deformed, to kill it is not to be considered a crime" and later "letting a child die simply because one has too many children is a case of killing" (and therefore a criminal act).

According to a legal expert on Han law (Han period 206 B.C. to 220 A.D.) (cited in Behnke Kinney [4]), partly in use up to recent times, the method of punishment of those guilty of infanticide and abandonment was left more or less to the discretion of the local official in charge. This could vary from death sentence (rare) to tolerance without any consequences. A public document, probably from the Han period states: "Now under heaven, all families kill girls; there are even some that have killed more than ten" [5].

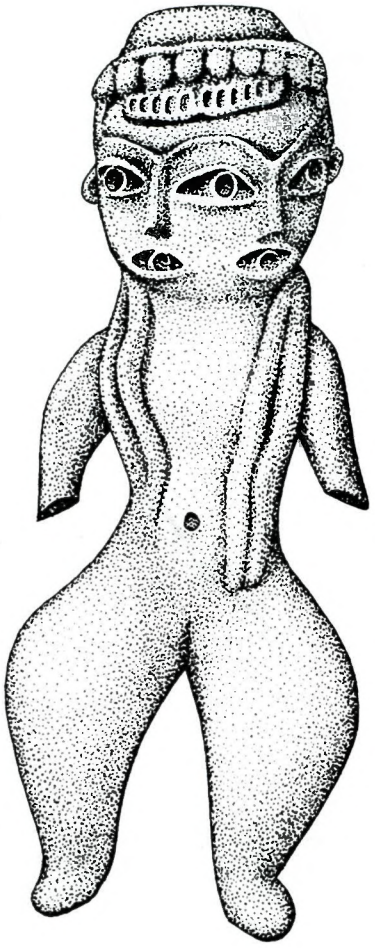


Fig 3 Clay figurine from Mexico, Zacatenco period (about 500 B.C.) with partial facial duplication (mouth and nose) and a third eye. (From Covarrubias M. Indian art of Mexico and Central America. New York: Alfred A. Knopf, 1957. Used with permission.) (See also Fig 17.)

Following religious tradition (as opposed to legal practice), the existence of a child was not officially recognized until the third day of life. During this time, the family (often consisting of five generations) had to decide whether to raise a child. If in doubt, the child was left for 3 days without food and shelter on a bundle of rags. If it survived, the parents were morally obliged to raise it.

Thus, tentatively summing up the attitudes in many ancient non-European cultures toward children with birth defects, the predominant tendencies were in favor of abandonment while delegating responsibility to supernatural authorities.

Attitude in Indigenous African Cultures

In some African cultures, malformations or congenital diseases may have been of ambivalent significance. Minor facial anomalies such as protruding eyes were seen in Benin as a sign of majesty and power (Fig 5). On the other hand, a grossly abnormal facial expression, as seen in some storage diseases, was believed to signify criminality. A case in point is shown in a clay sculpture from Nigeria (Fig 6) showing the insignia of death sentence (the head of an ape on a necklace) in an obviously severely ill person. Also from Nigeria stems a terra-cotta of a malformed head, held by a hand at the neck, apparently signifying decapitation for a criminal act (Fig 7).



Fig 4 Mask from Ceylon used to exorcise demons showing median facial cleft involving the lip and nose with a protruding frontal eye and strabismus divergens. (See also Figs 12–14.)

Attitudes in European Antiquity

In Greek and Roman antiquity, there is sparse reliable testimony on this subject. In the state of Athens in the 4th and 3rd centuries B.C., where the ideas of Platon's, as laid down in "The Republic," were, of all Greek town states, most closely implemented, the practice was, in Platon's words, as follows: "The offspring of the citizens who are born defective they will properly dispose of in secret" [a euphemism for exposure] "so that no one will know what has become of them" [6]. The same could be and was frequently done also with normal children unwanted for other reasons.

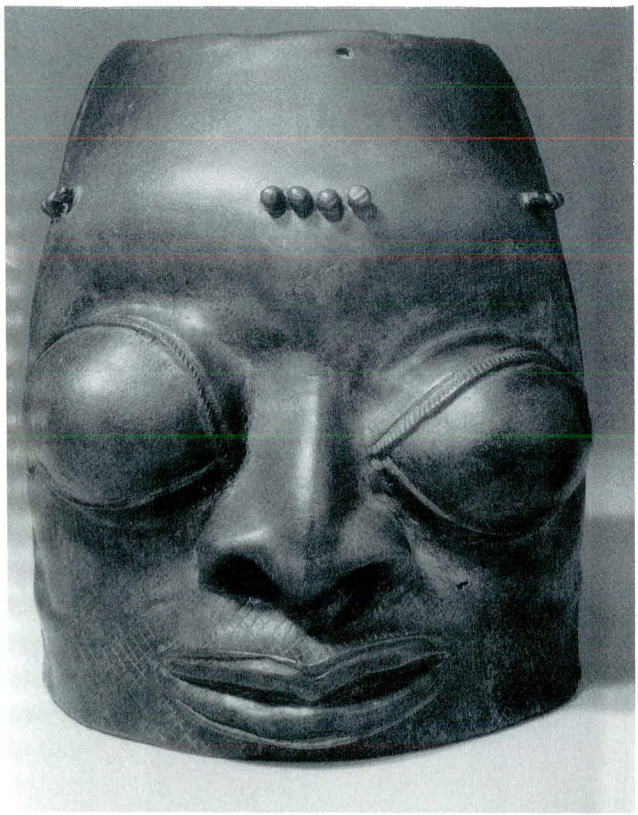


Fig 5 Bronze from Benin (Africa) showing massive protrusion of the eyes (allegedly a sign of majesty and power), possibly patterned from Crouzon's syndrome. (See also Figs 18 and 19.)



Fig 6 Clay sculpture from Nigeria showing a sick, possibly malformed person with the insignia of death sentence (skull of an ape on a necklace). Facial expression suggests storage disease. (See also Fig 20.)

The decision whether to rear or dispose of a newborn was up to the father. Menander, for instance, in the comedy Perikeiromene lets Moschio, himself a former foundling, states: "No father has to raise children he doesn't want; it is his right to expose them" [7]. While the practice of exposure in the wilderness was accepted custom in Athens at Platon's time, Aristoteles strongly advocated that "a law be made that no defective offspring be raised" (Politeia, VII, 8).

On the other hand, in Sparta, according to Plutarch's biography of Lycurgos, this legislator in the 8th century B.C. instituted a law on the subject of defective offspring. The passage in Plutarch reads as follows: "Offspring was not reared at the will of the father, but was taken and carried by him to a place called Lesche where the elders of the tribes officially examined the infant, and if it was well built and sturdy they ordered the father to rear it; but if it was ill-born and deformed they sent it to the so-called Apothetae, a chasm-like place at the foot of Mount Taygetos, in the conviction that the life of that which nature had not well equipped at the very beginning for health and strength, was of no advantage either to itself or the state" [9].

In ancient Greece, a malformed adult, if one survived (or a psychotic or another social outcast) was often selected by the community to be the ritual projection center (ritual impersonation) of all misdeeds having happened in the city during one year. The poor creature was then escorted by citizens in a procession to the city gates and banished from the city, and, with him, all evil [10].

An entirely rational attitude toward the problem of malformations was taken by the Roman philosopher Seneca (1st century A.D.). In *De Ira* he wrote, matter of factly, "The malformed [animals] we extinguish, children too; we drown them if they are born feeble and defective. And it is not out of ire but of reason that we separate the unfit from the healthy" [11].

The expansion of the Roman empire into Germania and the contact with Teutons (some of whom were incorporated into the Roman army) induced Tacitus to write and compare the utterly moral and healthy Germanic



Fig 7 Terra-cotta from Nigeria showing decapitated head of a person with flat forehead caused by midface hypoplasia, low position of the nasal base, possibly bicoronal craniosynostosis, slightly protruding eyes, and possibly mongolism or Binder's syndrome (nasomaxillary hypoplasia). (See also Fig 21).

family life and society with that of the decadent Romans, who considered the upbringing of children a tedious chore for women and men and who readily aborted or disposed of unwanted offspring without scruples. In Germania, Tacitus wrote, in the sense of admonition of his people: "To limit the number of children or to kill one of the late-born ones is a detestable crime in Germania" [12]. However, according to other sources the extinction or exposure of feeble or too numerous offspring often was also practiced by them [1].

New Attitude Through Christian Ethics and Its Practice

A new attitude toward the sick in general and those born defective arose in Germania when the Christian religion was officially admitted by the Emperor Constantine I and after the first Nicean Council convocated by him in 325 A.D. From then on and throughout the high Middle Ages, monasteries were increasingly built in Germania that typically also contained an infirmary where the sick and feeble were looked after by monks or friars. A building plan of the monastery of St. Gall of the 8th century is still preserved [13]. Often there was also a separate building for those with contagious diseases such as leprosy imported from the Orient or, later on, syphilis. Also, patients with gangrenous limbs resulting from ergotism from eating moldy grain were treated there. Unwanted newborns often were deposited at the gates of a convent and brought up by nuns.

Hospices (mainly for sick pilgrims) or hospitals were frequently built or financially supported by the reigning authorities (dukes or knights) as an atonement for sins; they then were granted remission by the church. Thus, according to an existing papal document of 1204 issued by Innocence III, the first major hospital of the city of Zurich was built by the Zähringer Duke Berchtold V "as a remedy for his sins," as the papal epistle states. This hospital was granted papal protection but obliged to yearly pay to the papal administration one gold florin. This obligation was repealed only 250 years later. A drawing from 1576 of the ancient Zurich Hospital "Heiliggeistspital" (Hospital of the Holy Spirit) associated with and tended by the monastery "Predigerkloster" (Monastery of the Preachers) and its staff is shown in Figure 8.

These were the customs for about 1,000 years in medieval central Europe. Philosophically speaking, caring for the sick and feeble was propagated by the church and considered by it the same as caring for Christ himself, whereby one gained spiritual rewards for oneself according to the scriptures (Matthew 25:40). This is aptly expressed by the inscription on the ancient hospital seal (still in use as an emblem by today's University Hospital Zurich), surrounding a double cross reading in Latin "Res sacra miser," meaning "a sacred cause is the miserable" (Fig 9).

A more secular attitude toward tending to the sick, crippled, and needy originated from the Zurich Reformer Zwingli, pastor of the City Church from 1519 to 1531, who urged the worldly administrators to look after its poor, sick, and underprivileged. Zwingli succeeded in instituting the so-called Order of Alms covering hospital expenses for long-term inmates such as severely crippled, imbecile, epileptic, deaf-mute, and insane patients called "house children" [13]. The predominant motive of the nursing staff to do this work now was charity rather than penance. The still entirely Christian attitude toward nursing can be seen by Bullinger's (city pastor, successor of Zwingly) admonition to an almighty hospital administrator: "Don't treat the house children as dogs; Christ himself meets you in them."

Influence of Medical Care and Surgical Skills

Medical care proper (vs. nursing alone practiced before) began in 1683 when the city employed two medical doctors and two surgeons as permanent hospital staff. Medical knowledge and progress subsequently determined patient treatment.

A medical faculty was founded in 1833 soon after the foundation of the University. Since 1804 the hospital was under the administration of the Canton of Zurich, to the relief of the city.

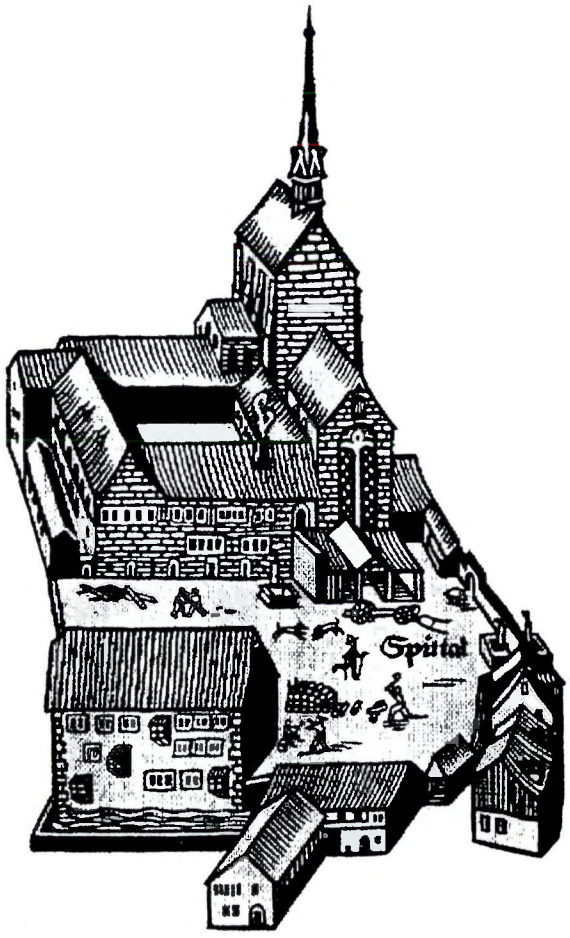


Fig 8 An ancient forerunner of today's Zurich University Hospital depicted on a map from the 16th century. The larger and two smaller houses at the bottom left served patient accommodation. The row of small buildings on the right housed different hospital-related craftsmen. At the top the monasterial complex with the dominating Predigerkirche (church of the preachers) is shown. The hospital, then named Heiliggeistspital (Hospital of the Holy Spirit), was entirely staffed by nuns and friars. The picture shows the close association between the monastery and the hospital complex.

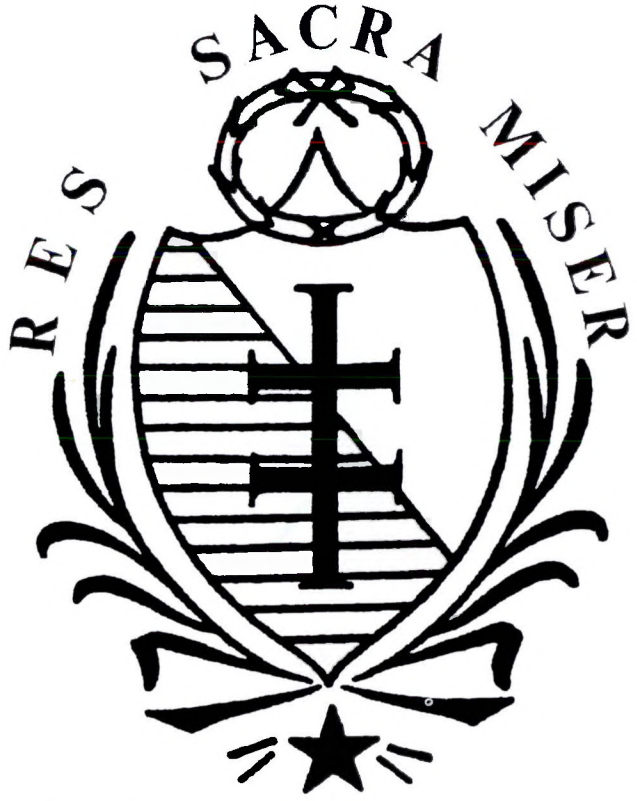


Fig 9 Ancient official hospital seal probably stemming from last century. The Latin words mean "a holy thing [cause] is the miserable." Older seals of similar design exist, a poorly legible one dating back to the 13th century. This picture is still used by the Zurich University Hospital as a decorative emblem.

Operative treatment of children with maxillofacial malformations began in the second half of the last century, around 1860. In Germany, von Langenbeck introduced techniques for the closure of maxillofacial clefts, and around 1890 the first operations for craniosynostoses were done. Pediatric surgery, comprising craniomaxillofacial surgery, started at the University Children's Hospital of Zurich in 1909. Adequate treatment of all congenital malformations was financially helped from 1960 up to now by a special government fund for all of Switzerland covering all medical costs of these patients up to the age of 20 years (Insurance for Invalids).

The smooth transition of nursing care alone to sophisticated surgical treatment of patients with congenital malformations, as outlined previously for Switzerland, developed along similar lines in the whole of central Europe (Germany, France, Great Britain). These surgical measures were often taken over and decisively developed and improved by the departments of craniomaxillofacial surgery, as was the case 25 years ago in Zurich.

Political Aberrations of Our Century and Our Answer to Them

A tragic interruption of surgical and medical care of the congenitally malformed patients occurred in Germany in the early 1940s, when for eugenic (and financial) reasons any malformed children of all ages, namely those with maxillofacial clefts, spina bifida, missing extremities, idiocy, mongolism, different kinds of paralysis, and so on cared for in institutions or at home and physically or mentally infirm adults had to be registered to be

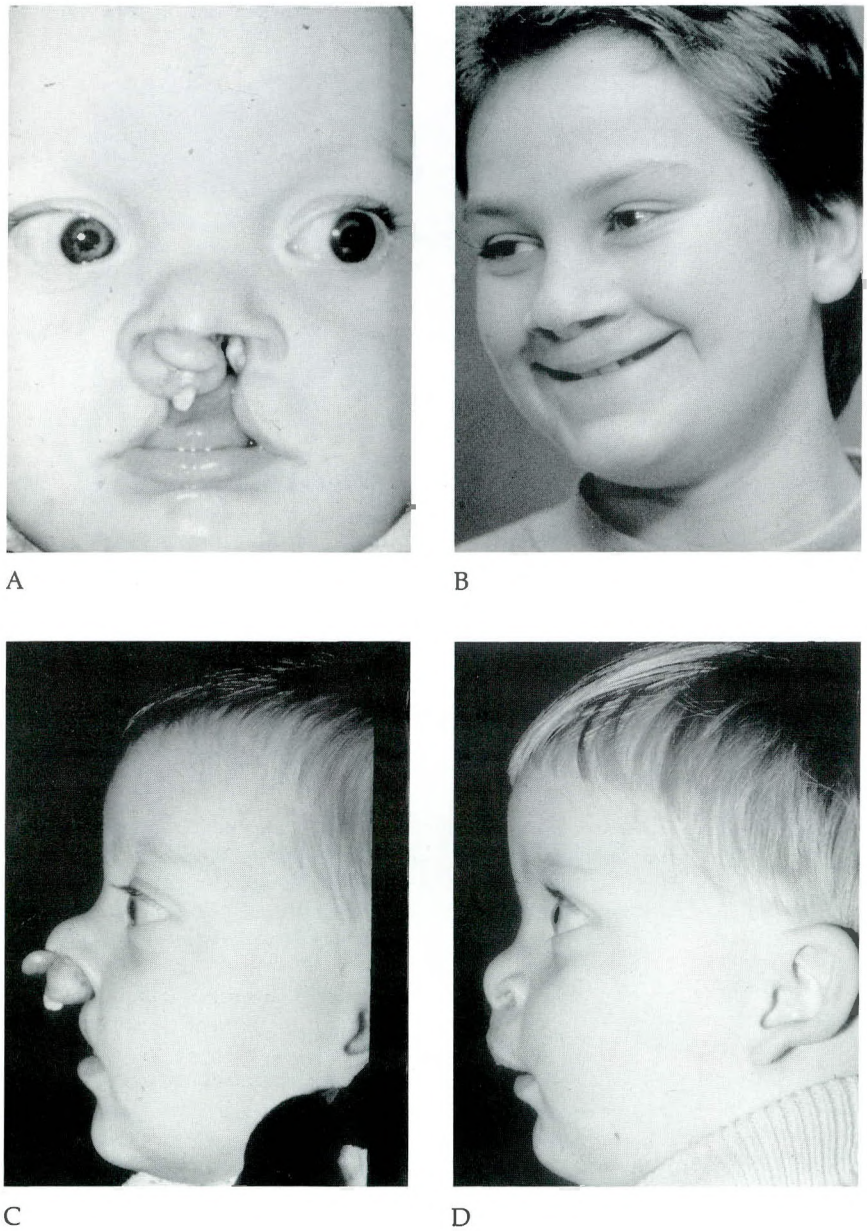
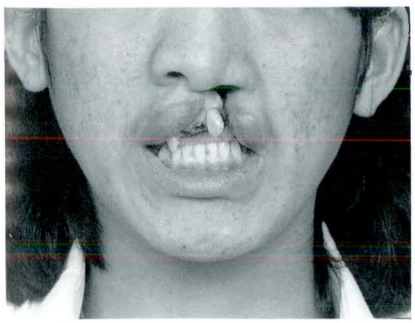


Fig 10 Nine-month-old child with bilateral total cleft lip and palate. (A) Frontal view. (B) Postoperative result showing happy youngster at age 14 years. (C) Lateral view. (D) After primary orthodontic treatment, the lip was closed according to the method of Celesnic I and II (Op. fec. Prof. Perko).

extinguished by government decree (confidential governmental issue of the Ministry of the Interior, Aug. 18, 1939) [14]. However—and this is less well known—the terrain that made these misdeeds possible was prepared significantly by the philosophical movement of social Darwinism (in which many medical doctors participated), which followed Darwin's theories of evolution for all living organisms, including humans, by natural selection and adaptation. (Favorable physical changes are, however, as recognized later, caused by chance mutation of genes, not adaptation.) Two major propagators of the application of the selection theory in human beings were the zoologist and philosopher Ernst Haeckel [15] and the medicolegal team of K. Binding and A. E. Hoche with their treatise [16]: "Die Freigabe der Vernichtung lebensunwerten Lebens" (in literal translation, "The Liberalization of the Annihilation of Human Life Unworthy of Being Lived"). While Haeckel and other social Darwinists succumbed to a perfectionist belief concerning the human race, Binding and Hoche were clearly motivated by political and economic considerations. However—and this was their perfidy—they invoked a "new and higher ethics" as the basis of their philosophy; the ethics of the perfect, self-righteous, and autonomous human possessing



A



B

Fig 11 Adolescent with unilateral total cleft lip and palate. (A) Preoperative view. (B) Postoperative view.



A

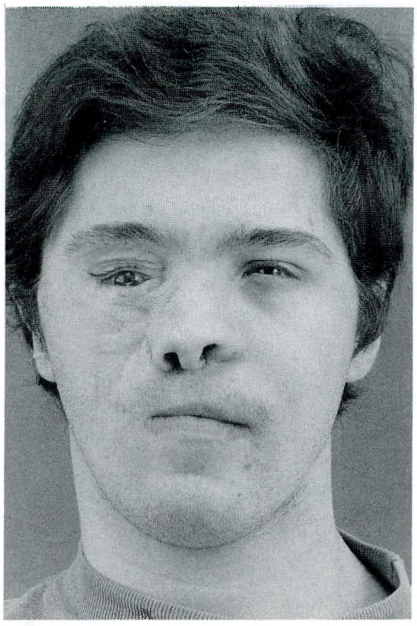


B

Fig 12 (A) Fourteen-year-old boy with median facial cleft (lip already closed) with complete cleft of the nose, widely separated nostrils, and hypertelorism. An encephalocele was protruding through the anterior and medial cranial fossa into the oral cavity. (B) Result at age 23 years after operative correction of hypertelorism and nose.



A

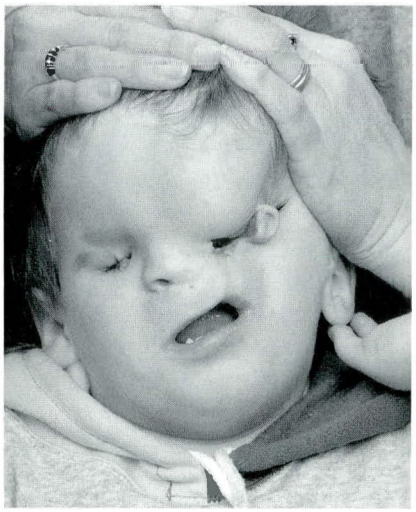


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Fig 13 (A) Newborn with unilateral right paramedian cleft lip and palate, cleft of right half of the nose and eyelid, and displaced orbit. (B) Result at age 20 years after multiple operative procedures.



A

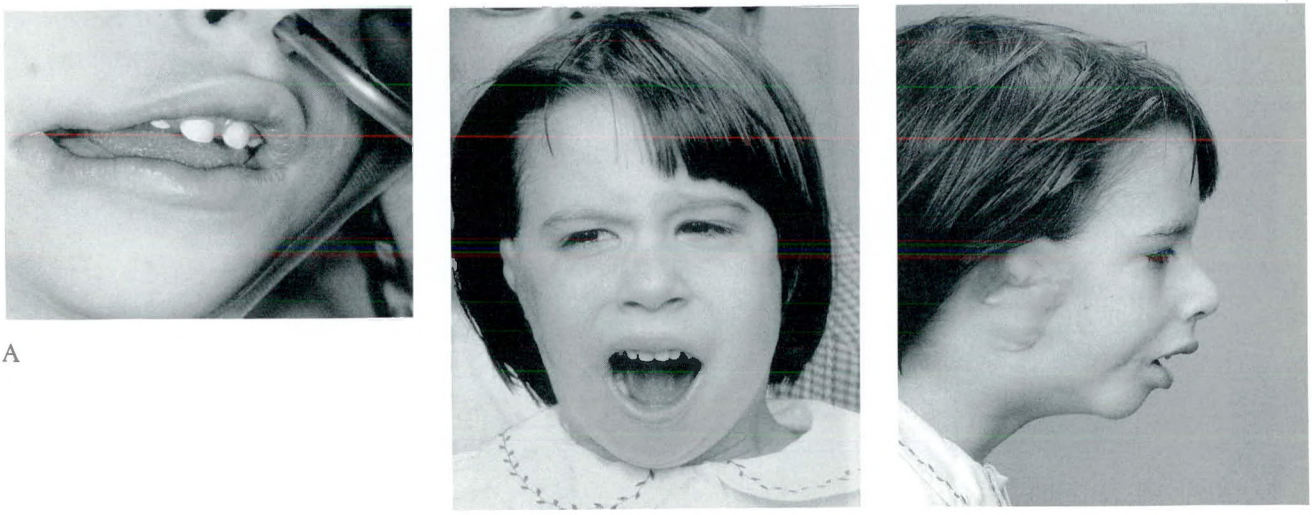


B



C

Fig 14 (A) Multiple total facial clefts (see Tessier classification) with hyperteloric, anophthalmic miniorbits, large median encephalocele, and deformed external ears. (B and C) Frontal and lateral views of result after operative closure of lip and nose.



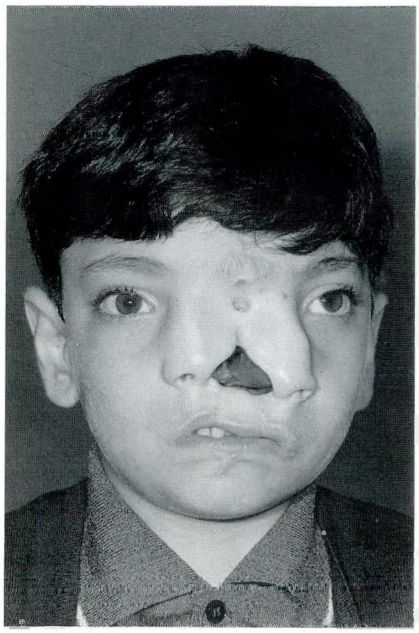
A B C

Fig 15 (A) Preoperative view of partial lateral facial cleft of the mouth and external ear deformity (hemifacial microsomia). (B and C) Postoperative views.



A B C

Fig 16 (A) Frontal and (B) lateral views of deep groove in the left midface dividing all tissues down to the oral mucosa, resulting from a tight amniotic band across the face. (C) Result after closure of soft tissues.

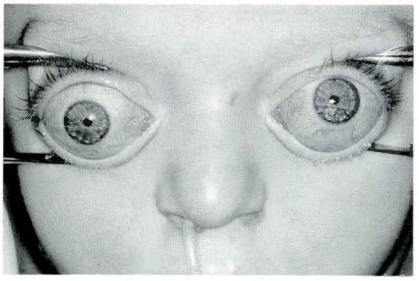


A

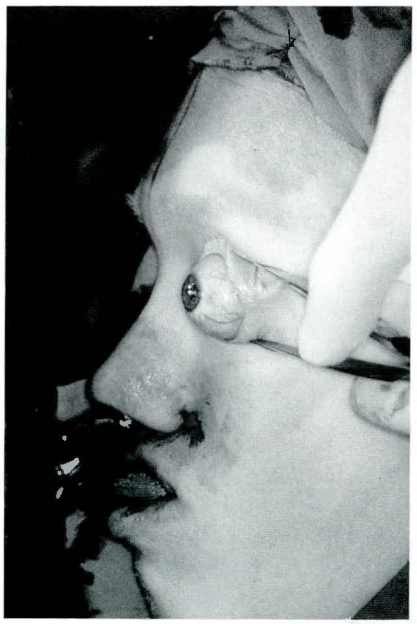


B

Fig 17 (A) Ten-year-old boy, after correction of the lip, with partial duplication of mouth and nose, a rudimentary third eye and eye socket, wide cleft of the palate, and extreme degree of hypertelorism. (B) Result at age 12 years after further operative corrections. (From Obwegeser and colleagues [17]. Used with permission.)



A



B

Fig 18 (A) Frontal and (B) lateral views of patient with Crouzon's syndrome.

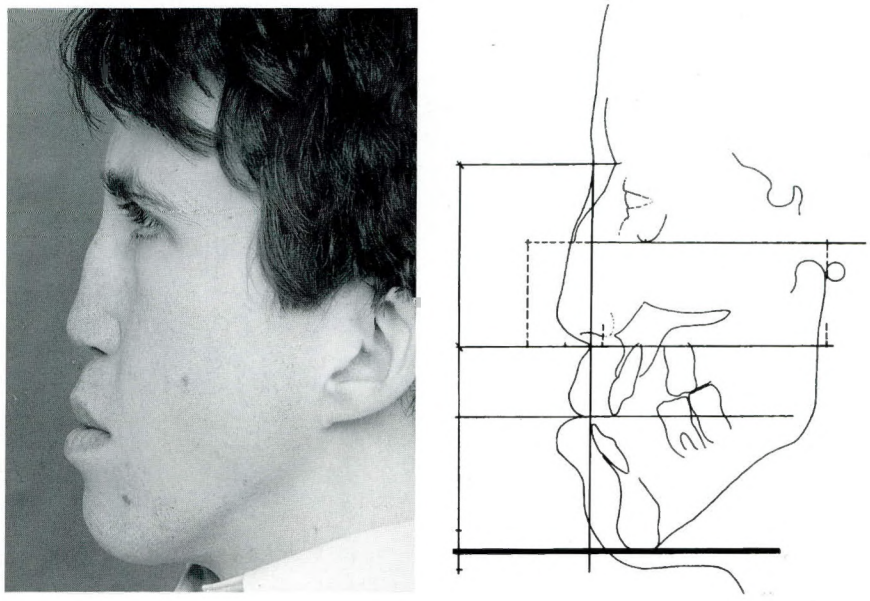


A B

Fig 19 Another patient with Crouzon's syndrome. (A) Preoperative view. Note hypoplasia of midface and protrusion of eyeballs. (B) Result after frontofacial advancement operation.



Fig 20 A 10-day-old infant with polysaccharidosis.



A B

Fig 21 Patient with Binder's syndrome (nasomaxillary hypoplasia). (A) Lateral view. (B) Cephalogram showing skeletal situation.

superior judgment. Today, a revival of this attitude anywhere in the world is not improbable. Indeed, according to one news report (*Neue Zürcher Zeitung*, October 31, 1994), a law has passed parliamentary approval in China regulating the prevention and elimination of defective offspring "in order to improve in the future the quality of the Chinese people."

Silent Cultural Contribution

What is our position and what are our possibilities in the face of such developments? Thanks to modern medical knowledge and refined surgical technology, we are able to rehabilitate and socially reintegrate formerly hidden and excluded humans with the most despicable and detested craniofacial defects (Figs 10–21), making life worth living for them. In this sense and in the general and widespread absence of philosophical or religious ties today, our profession is making a silent cultural contribution, acting as a grain of salt on the earth.

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Influence of Craniofacial Surgery on the Social Attitudes Toward the Malformed and Their Handling in Different Cultures and at Different Times: A Contribution to Social World History

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A historic overview including the European, American, Asian, and African continents is given on attitudes toward and the handling of humans with congenital malformations in ancient cultures and on pertinent customs in some prehistoric peoples. Figures of early works of art showing malformed individuals are presented testifying to this worldwide and timeless problem of humankind. In parallel, analogous patient photographs from our hospital before and after reconstructive surgery are shown. Philosophies of ancient Greece, Rome, and China on the subject of malformed infants essentially did not differ from the known attitudes of the less developed tribes in Europe and pre-Columbian America, although the means of elimination of unwanted offspring were rather passive (exposure) than active (manual killing). A radical change in attitudes and practices occurred with the spread of the Christian religion and its political installment in Europe: The care for the underprivileged including the malformed ones was considered a Christian duty to be performed with compassion and love. In our century, the clocks have been and apparently are turned back again. Atheistic and Darwinian influences, political atheism, and the belief in "higher ethics" issued by "superman" have led to a relapse into barbarism, also within the medical system. We, as craniofacial surgeons, are privileged to have the means to turn the clocks forward again by rehabilitating the physically most underprivileged: those with conspicuous craniofacial malformations. The necessary techniques exist and are applied, as the figures of patients from our hospital demonstrate, but the will and the emotional strength for their consequent application require more than our hands.

Key Words: Congenital malformations, ancient cultures

The significance and the handling of malformed humans from archaic to modern times worldwide reflect the lifestyle and culture of the various populations at any time. According to extensive ethnological studies, mostly done in the second half of the last century, primitive tribes and peoples on all continents disposed of malformed infants immediately after birth, usually by drowning, strangulation, or suffocation or live burial [1]. Our survey is not claiming to be comprehensive but rather to show typical examples of behavior of ancient societies toward a painful and secret problem, and some modern trends in similar directions.

Behavior of Pre-Columbian and Some Contemporary Indigenous American Indians

Among culturally more developed peoples like the Indians of South and Central America (the Incas, Mayas, and Aztecs), ritual homicide or infanticide was frequently practiced, mainly by the Aztecs. Offspring were regularly extinguished when born under bad auspices (of calendar or stars). Congenital malformations were believed to be due to misbehavior of the mothers during pregnancy [2], but what happened to them or their "stigmatized" children is unknown. Excavated terra-cotta figurines of persons with cleft lips (Fig 1) and other facial abnormalities (Figs 2 and 3), mainly found in Mexico but probably stemming from the Inca Land Columbia, famous for ceramics manufacturing, may simply testify to the high frequency, even today, of facial clefts in these regions.

That the attitude of certain indigenous South American Indian societies toward malformed infants apparently has remained unchanged for millennia is

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judicious use of plate and screw fixation in critical areas requiring three-dimensional stability. Longer close follow-up of the patients is of paramount importance. The development of resorbable plates, screws, and bioceramic cements may make these concerns a moot point in the future [16, 17].

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Fig 1 Pre-Columbian vase in glazed terra-cotta showing unilateral cleft lip. (See also Figs 10 and 11.)

documented by the following report in the Neue Zürcher Zeitung of November 3, 1994. A Yanoama mother gave birth in a Brazilian hospital to a son. The midwife had to tell her that the baby had a minor genital malformation (possibly hypospadias). When the midwife left the room, the mother immediately killed the baby, stating that she was, by their customs, obliged to do this. The Brazilian magistrates, being aware of these unwritten laws of their indigenous people, exempted her from legal prosecution.

Customs in Early Asian Cultures

In Far East Indian culture, the handling of malformed children or otherwise handicapped persons was prescribed by laws of the four major castes. A pertinent passage in the Brahman *Laws of Manu* (translated into English in 1886) [3] reads as follows: "Eunuchs and outcasts, persons born blind or deaf, the insane, the idiots and the dumb as well as those deficient in any organ (of action or



Fig 2 Terra-cotta from Mexico probably showing left lateral facial cleft of nose and mouth (or possibly acquired loss of soft tissue). (Photograph by Prof. Perko.) (See also Figs 15 and 16.)

sensation) are disqualified to inherit. But a man who knows the law has to provide evenly to all of them, give food and raiment without stint, according to his ability. He who gives it not will become an outcast." Outcasts and madmen were not allowed to marry. Others (i.e., malformed ones) could do so. In some southern India circles, persons with facial malformations were given demonic attributes as exemplified by a mask from Ceylon used to exorcise demons (Fig 4).

From ancient China there exists a legal text of the Qu'in period (200 B.C.) on the subject of malformed or otherwise unwanted children [4]. The passage reads as follows: "Unauthorizedly to kill a child is punishable by tattooing and being subjected to forced labour (grain pounding)." However, "when a child is newly born and has strange things on its body, as well as when it is deformed, to kill it is not to be considered a crime" and later "letting a child die simply because one has too many children is a case of killing" (and therefore a criminal act).

According to a legal expert on Han law (Han period 206 B.C. to 220 A.D.) (cited in Behnke Kinney [4]), partly in use up to recent times, the method of punishment of those guilty of infanticide and abandonment was left more or less to the discretion of the local official in charge. This could vary from death sentence (rare) to tolerance without any consequences. A public document, probably from the Han period states: "Now under heaven, all families kill girls; there are even some that have killed more than ten" [5].

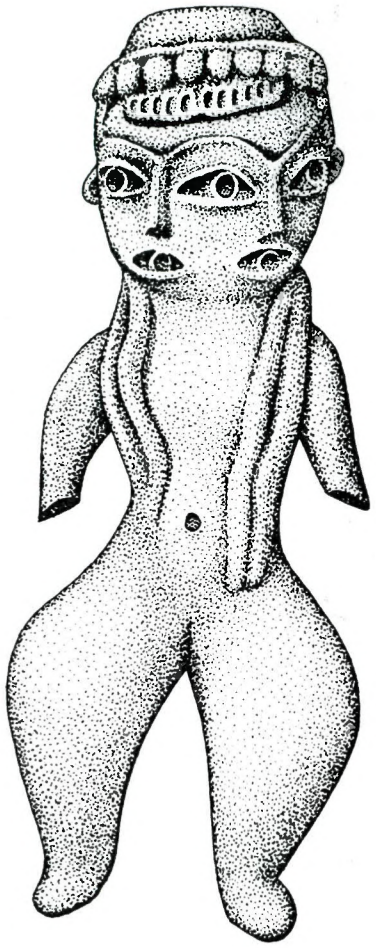


Fig 3 Clay figurine from Mexico, Zacatenco period (about 500 B.C.) with partial facial duplication (mouth and nose) and a third eye. (From Covarrubias M. Indian art of Mexico and Central America. New York: Alfred A. Knopf, 1957. Used with permission.) (See also Fig 17.)

Following religious tradition (as opposed to legal practice), the existence of a child was not officially recognized until the third day of life. During this time, the family (often consisting of five generations) had to decide whether to raise a child. If in doubt, the child was left for 3 days without food and shelter on a bundle of rags. If it survived, the parents were morally obliged to raise it.

Thus, tentatively summing up the attitudes in many ancient non-European cultures toward children with birth defects, the predominant tendencies were in favor of abandonment while delegating responsibility to supernatural authorities.

Attitude in Indigenous African Cultures

In some African cultures, malformations or congenital diseases may have been of ambivalent significance. Minor facial anomalies such as protruding eyes were seen in



Fig 4 Mask from Ceylon used to exorcise demons showing median facial cleft involving the lip and nose with a protruding frontal eye and strabismus divergens. (See also Figs 12–14.)

Benin as a sign of majesty and power (Fig 5). On the other hand, a grossly abnormal facial expression, as seen in some storage diseases, was believed to signify criminality. A case in point is shown in a clay sculpture from Nigeria (Fig 6) showing the insignia of death sentence (the head of an ape on a necklace) in an obviously severely ill person. Also from Nigeria stems a terra-cotta of a malformed head, held by a hand at the neck, apparently signifying decapitation for a criminal act (Fig 7).

Attitudes in European Antiquity

In Greek and Roman antiquity, there is sparse reliable testimony on this subject. In the state of Athens in the 4th and 3rd centuries B.C., where the ideas of Platon's, as laid down in "The Republic," were, of all Greek town states, most closely implemented, the practice was, in Platon's words, as follows: "The offspring of the citizens who are born defective they will properly dispose of in secret" [a euphemism for exposure] "so that no one will know what has become of them" [6]. The same could be and was frequently done also with normal children unwanted for other reasons.

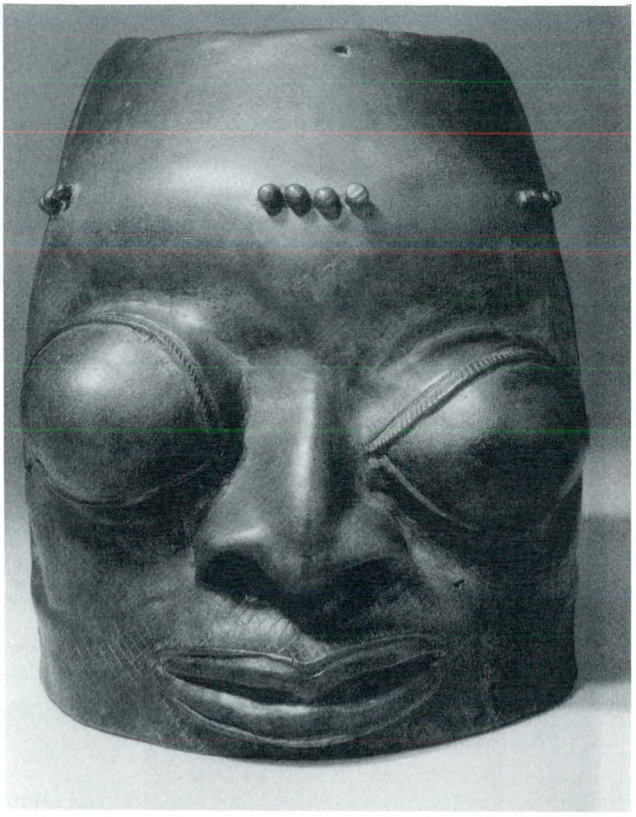


Fig 5 Bronze from Benin (Africa) showing massive protrusion of the eyes (allegedly a sign of majesty and power), possibly patterned from Crouzon's syndrome. (See also Figs 18 and 19.)



Fig 6 Clay sculpture from Nigeria showing a sick, possibly malformed person with the insignia of death sentence (skull of an ape on a necklace). Facial expression suggests storage disease. (See also Fig 20.)

The decision whether to rear or dispose of a newborn was up to the father. Menander, for instance, in the comedy Perikeiromene lets Moschio, himself a former foundling, states: "No father has to raise children he doesn't want; it is his right to expose them" [7]. While the practice of exposure in the wilderness was accepted custom in Athens at Platon's time, Aristoteles strongly advocated that "a law be made that no defective offspring be raised" (Politeia, VII, 8).

On the other hand, in Sparta, according to Plutarch's biography of Lycurgos, this legislator in the 8th century B.C. instituted a law on the subject of defective offspring. The passage in Plutarch reads as follows: "Offspring was not reared at the will of the father, but was taken and carried by him to a place called Lesche where the elders of the tribes officially examined the infant, and if it was well built and sturdy they ordered the father to rear it; but if it was ill-born and deformed they sent it to the so-called Apothetae, a chasm-like place at the foot of Mount Taygetos, in the conviction that the life of that which nature had not well equipped at the very beginning for health and strength, was of no advantage either to itself or the state" [9].

In ancient Greece, a malformed adult, if one survived (or a psychotic or another social outcast) was often selected by the community to be the ritual projection center (ritual impersonation) of all misdeeds having happened in the city during one year. The poor creature was then escorted by citizens in a procession to the city gates and banished from the city, and, with him, all evil [10].

An entirely rational attitude toward the problem of malformations was taken by the Roman philosopher Seneca (1st century A.D.). In *De Ira* he wrote, matter of factly, "The malformed [animals] we extinguish, children too; we drown them if they are born feeble and defective. And it is not out of ire but of reason that we separate the unfit from the healthy" [11].

The expansion of the Roman empire into Germania and the contact with Teutons (some of whom were incorporated into the Roman army) induced Tacitus to write and compare the utterly moral and healthy Germanic



Fig 7 Terra-cotta from Nigeria showing decapitated head of a person with flat forehead caused by midface hypoplasia, low position of the nasal base, possibly bicoronal craniosynostosis, slightly protruding eyes, and possibly mongolism or Binder's syndrome (nasomaxillary hypoplasia). (See also Fig 21).

family life and society with that of the decadent Romans, who considered the upbringing of children a tedious chore for women and men and who readily aborted or disposed of unwanted offspring without scruples. In Germania, Tacitus wrote, in the sense of admonition of his people: "To limit the number of children or to kill one of the late-born ones is a detestable crime in Germania" [12]. However, according to other sources the extinction or exposure of feeble or too numerous offspring often was also practiced by them [1].

New Attitude Through Christian Ethics and Its Practice

A new attitude toward the sick in general and those born defective arose in Germania when the Christian religion was officially admitted by the Emperor Constantine I and after the first Nicean Council convocated by him in 325 A.D. From then on and throughout the high Middle Ages, monasteries were increasingly built in Germania that typically also contained an infirmary where the sick and feeble were looked after by monks or friars. A building plan of the monastery of St. Gall of the 8th century is still preserved [13]. Often there was also a separate building for those with contagious diseases such as leprosy imported from the Orient or, later on, syphilis. Also, patients with gangrenous limbs resulting from ergotism from eating moldy grain were treated there. Unwanted newborns often were deposited at the gates of a convent and brought up by nuns.

Hospices (mainly for sick pilgrims) or hospitals were frequently built or financially supported by the reigning authorities (dukes or knights) as an atonement for sins; they then were granted remission by the church. Thus, according to an existing papal document of 1204 issued by Innocence III, the first major hospital of the city of Zurich was built by the Zähringer Duke Berchtold V "as a remedy for his sins," as the papal epistle states. This hospital was granted papal protection but obliged to yearly pay to the papal administration one gold florin. This obligation was repealed only 250 years later. A drawing from 1576 of the ancient Zurich Hospital "Heiliggeistspital" (Hospital of the Holy Spirit) associated with and tended by the monastery "Predigerkloster" (Monastery of the Preachers) and its staff is shown in Figure 8.

These were the customs for about 1,000 years in medieval central Europe. Philosophically speaking, caring for the sick and feeble was propagated by the church and considered by it the same as caring for Christ himself, whereby one gained spiritual rewards for oneself according to the scriptures (Matthew 25:40). This is aptly expressed by the inscription on the ancient hospital seal (still in use as an emblem by today's University Hospital Zurich), surrounding a double cross reading in Latin "Res sacra miser," meaning "a sacred cause is the miserable" (Fig 9).

A more secular attitude toward tending to the sick, crippled, and needy originated from the Zurich Reformer Zwingli, pastor of the City Church from 1519 to 1531, who urged the worldly administrators to look after its poor, sick, and underprivileged. Zwingli succeeded in instituting the so-called Order of Alms covering hospital expenses for long-term inmates such as severely crippled, imbecile, epileptic, deaf-mute, and insane patients called "house children" [13]. The predominant motive of the nursing staff to do this work now was charity rather than penance. The still entirely Christian attitude toward nursing can be seen by Bullinger's (city pastor, successor of Zwingly) admonition to an almighty hospital administrator: "Don't treat the house children as dogs; Christ himself meets you in them."

Influence of Medical Care and Surgical Skills

Medical care proper (vs. nursing alone practiced before) began in 1683 when the city employed two medical doctors and two surgeons as permanent hospital staff. Medical knowledge and progress subsequently determined patient treatment.

A medical faculty was founded in 1833 soon after the foundation of the University. Since 1804 the hospital was under the administration of the Canton of Zurich, to the relief of the city.

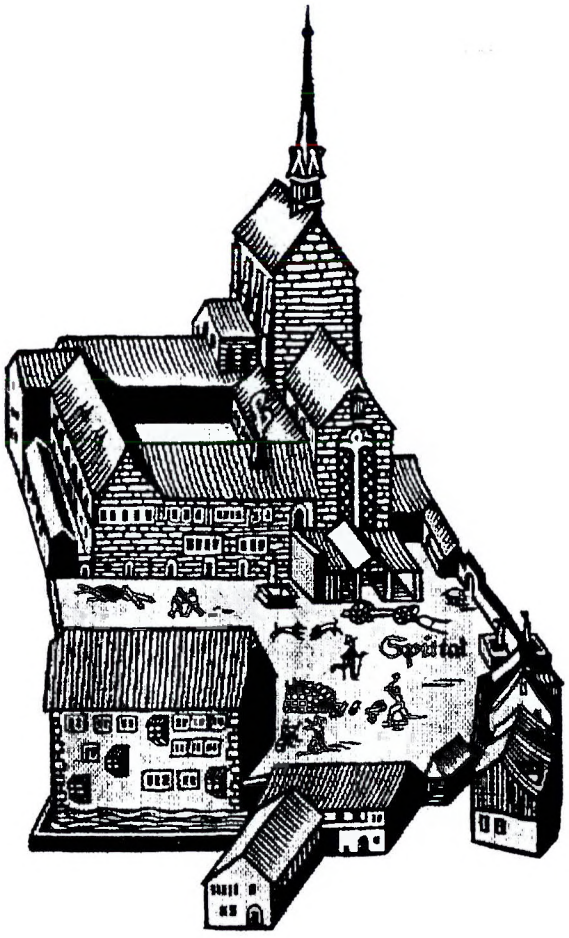


Fig 8 An ancient forerunner of today's Zurich University Hospital depicted on a map from the 16th century. The larger and two smaller houses at the bottom left served patient accommodation. The row of small buildings on the right housed different hospital-related craftsmen. At the top the monasterial complex with the dominating Predigerkirche (church of the preachers) is shown. The hospital, then named Heiliggeistspital (Hospital of the Holy Spirit), was entirely staffed by nuns and friars. The picture shows the close association between the monastery and the hospital complex.

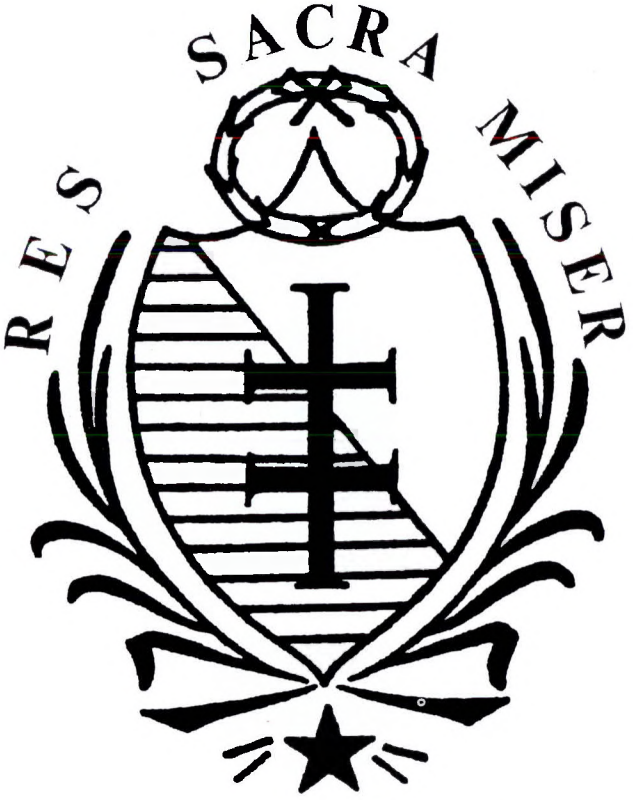


Fig 9 Ancient official hospital seal probably stemming from last century. The Latin words mean "a holy thing [cause] is the miserable." Older seals of similar design exist, a poorly legible one dating back to the 13th century. This picture is still used by the Zurich University Hospital as a decorative emblem.

Operative treatment of children with maxillofacial malformations began in the second half of the last century, around 1860. In Germany, von Langenbeck introduced techniques for the closure of maxillofacial clefts, and around 1890 the first operations for craniosynostoses were done. Pediatric surgery, comprising craniomaxillofacial surgery, started at the University Children's Hospital of Zurich in 1909. Adequate treatment of all congenital malformations was financially helped from 1960 up to now by a special government fund for all of Switzerland covering all medical costs of these patients up to the age of 20 years (Insurance for Invalids).

The smooth transition of nursing care alone to sophisticated surgical treatment of patients with congenital malformations, as outlined previously for Switzerland, developed along similar lines in the whole of central Europe (Germany, France, Great Britain). These surgical measures were often taken over and decisively developed and improved by the departments of craniomaxillofacial surgery, as was the case 25 years ago in Zurich.

Political Aberrations of Our Century and Our Answer to Them

A tragic interruption of surgical and medical care of the congenitally malformed patients occurred in Germany in the early 1940s, when for eugenic (and financial) reasons any malformed children of all ages, namely those with maxillofacial clefts, spina bifida, missing extremities, idiocy, mongolism, different kinds of paralysis, and so on cared for in institutions or at home and physically or mentally infirm adults had to be registered to be

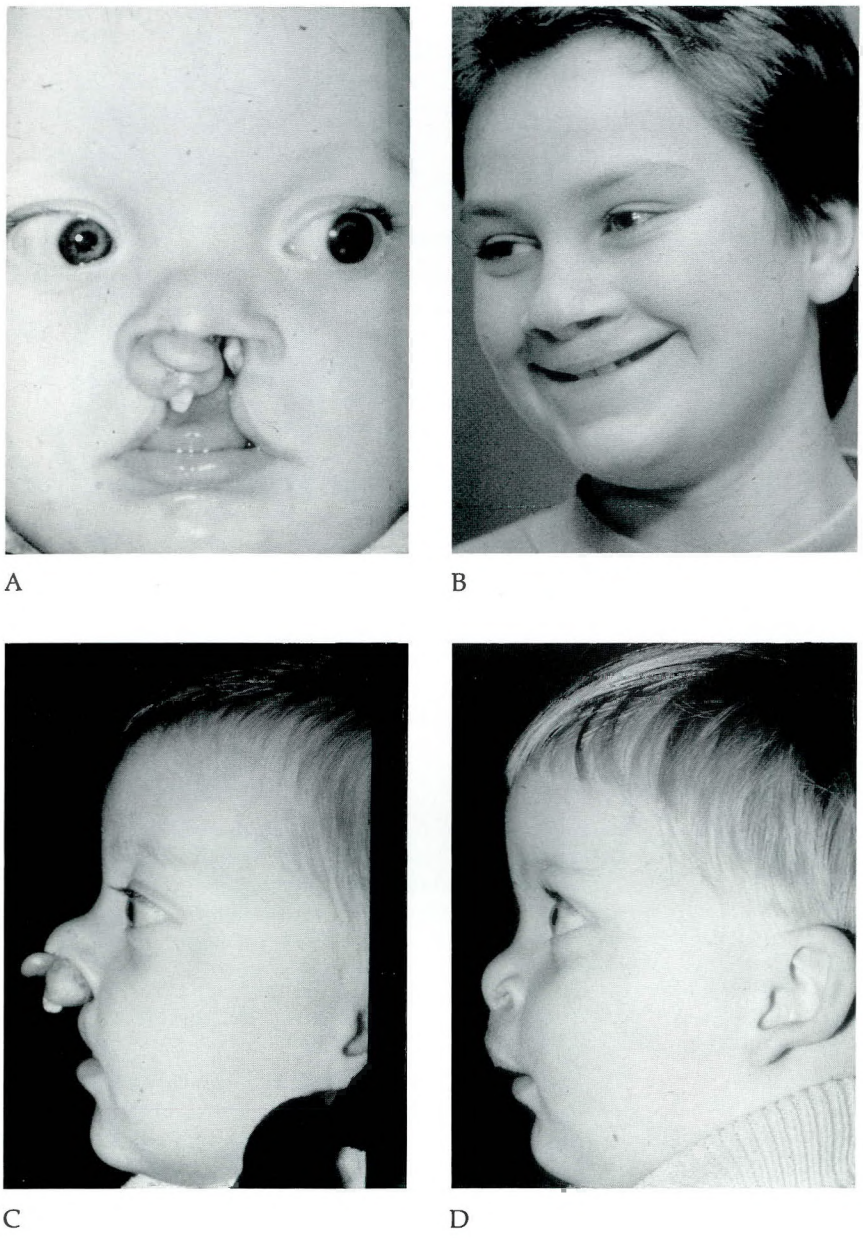
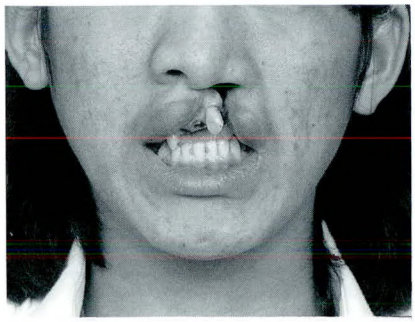


Fig 10 Nine-month-old child with bilateral total cleft lip and palate. (A) Frontal view. (B) Postoperative result showing happy youngster at age 14 years. (C) Lateral view. (D) After primary orthodontic treatment, the lip was closed according to the method of Celesnic I and II (Op. fec. Prof. Perko).

extinguished by government decree (confidential governmental issue of the Ministry of the Interior, Aug. 18, 1939) [14]. However—and this is less well known—the terrain that made these misdeeds possible was prepared significantly by the philosophical movement of social Darwinism (in which many medical doctors participated), which followed Darwin's theories of evolution for all living organisms, including humans, by natural selection and adaptation. (Favorable physical changes are, however, as recognized later, caused by chance mutation of genes, not adaptation.) Two major propagators of the application of the selection theory in human beings were the zoologist and philosopher Ernst Haeckel [15] and the medicolegal team of K. Binding and A. E. Hoche with their treatise [16]: "Die Freigabe der Vernichtung lebensunwerten Lebens" (in literal translation, "The Liberalization of the Annihilation of Human Life Unworthy of Being Lived"). While Haeckel and other social Darwinists succumbed to a perfectionist belief concerning the human race, Binding and Hoche were clearly motivated by political and economic considerations. However—and this was their perfidy—they invoked a "new and higher ethics" as the basis of their philosophy; the ethics of the perfect, self-righteous, and autonomous human possessing

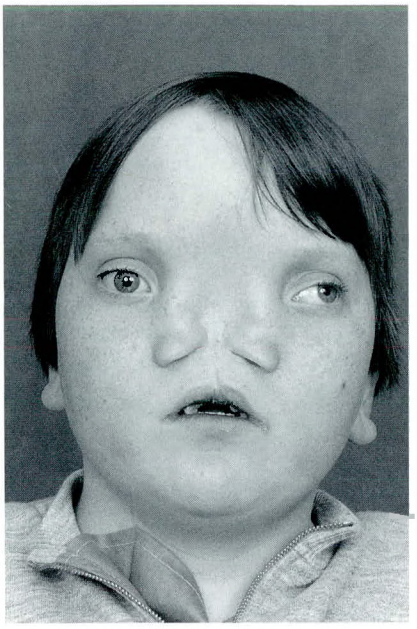


A



B

Fig 11 Adolescent with unilateral total cleft lip and palate. (A) Preoperative view. (B) Postoperative view.



A

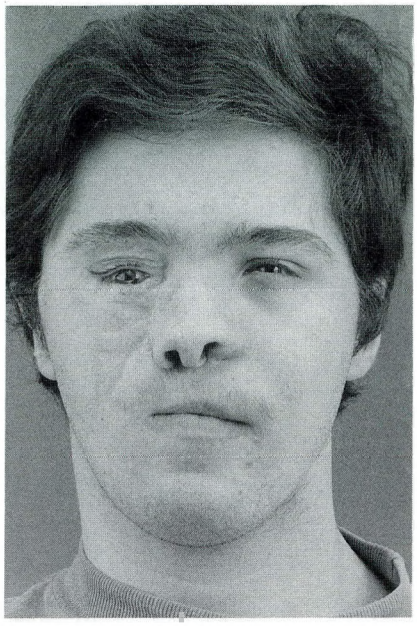


B

Fig 12 (A) Fourteen-year-old boy with median facial cleft (lip already closed) with complete cleft of the nose, widely separated nostrils, and hypertelorism. An encephalocele was protruding through the anterior and medial cranial fossa into the oral cavity. (B) Result at age 23 years after operative correction of hypertelorism and nose.



A

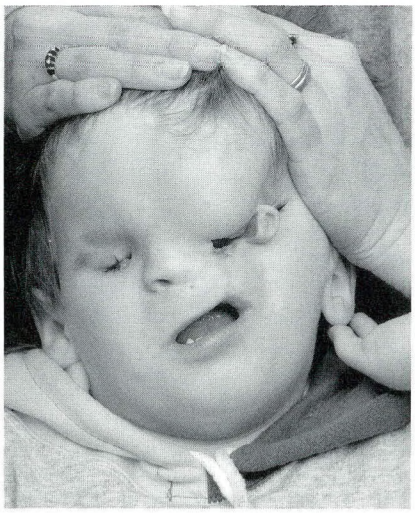


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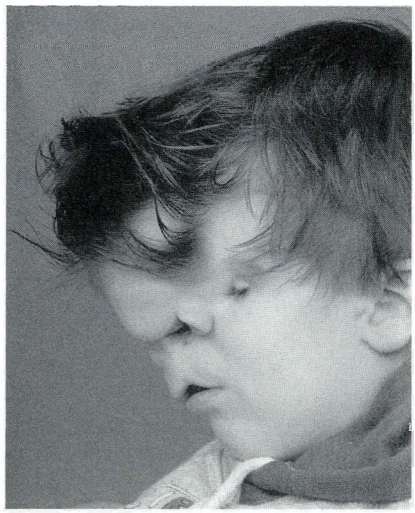
Fig 13 (A) Newborn with unilateral right paramedian cleft lip and palate, cleft of right half of the nose and eyelid, and displaced orbit. (B) Result at age 20 years after multiple operative procedures.



A

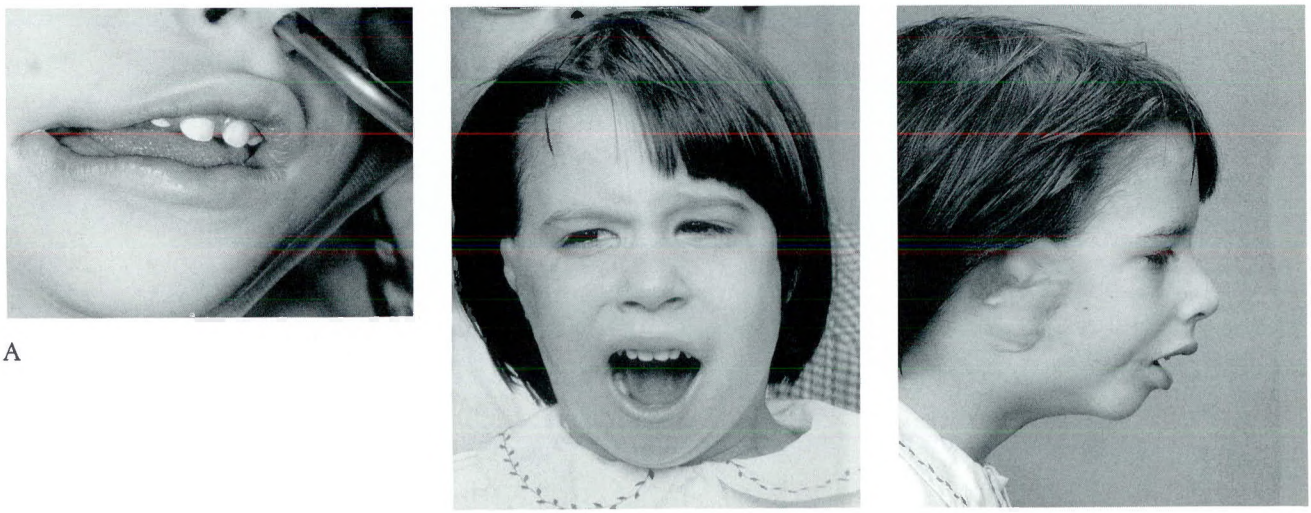


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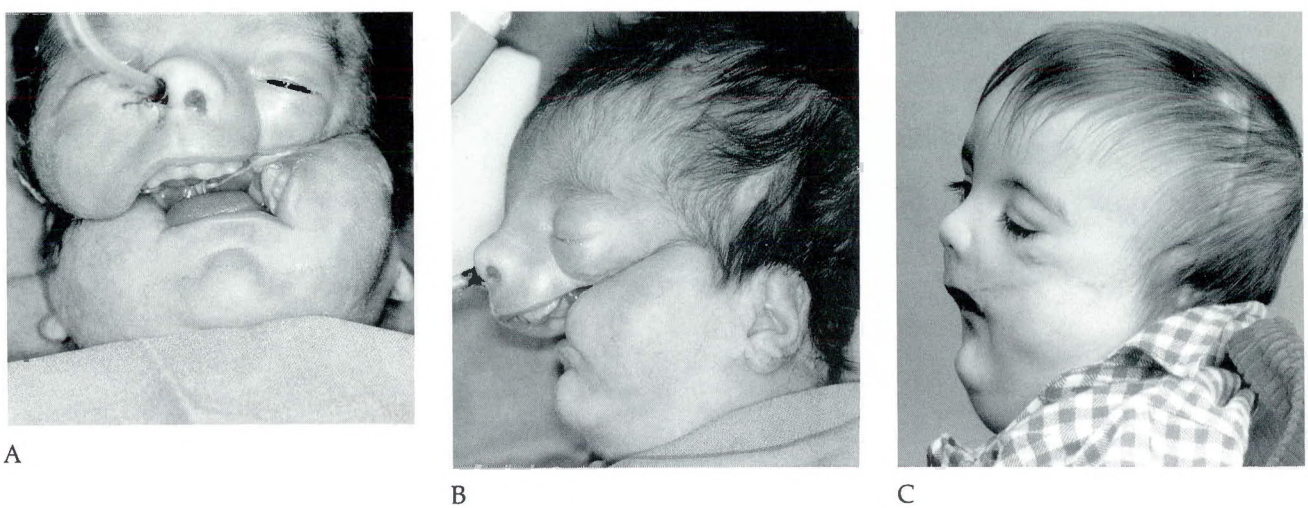
C

Fig 14 (A) Multiple total facial clefts (see Tessier classification) with hyperteloric, anophthalmic miniorbits, large median encephalocele, and deformed external ears. (B and C) Frontal and lateral views of result after operative closure of lip and nose.



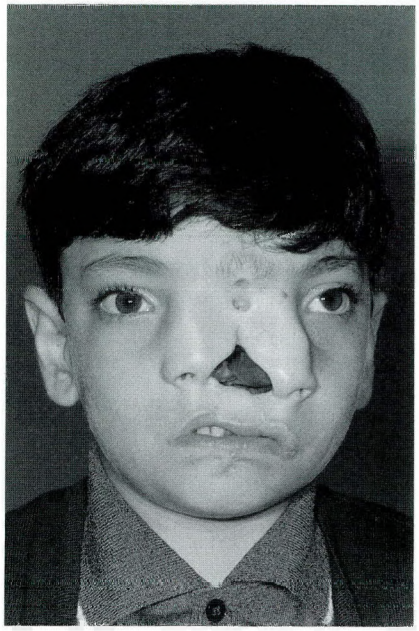
A B C

Fig 15 (A) Preoperative view of partial lateral facial cleft of the mouth and external ear deformity (hemifacial microsomia). (B and C) Postoperative views.



A B C

Fig 16 (A) Frontal and (B) lateral views of deep groove in the left midface dividing all tissues down to the oral mucosa, resulting from a tight amniotic band across the face. (C) Result after closure of soft tissues.

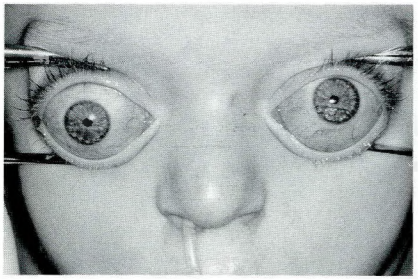


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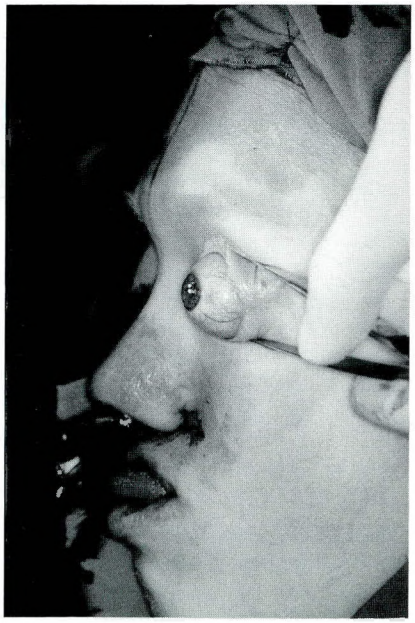


B

Fig 17 (A) Ten-year-old boy, after correction of the lip, with partial duplication of mouth and nose, a rudimentary third eye and eye socket, wide cleft of the palate, and extreme degree of hypertelorism. (B) Result at age 12 years after further operative corrections. (From Obwegeser and colleagues [17]. Used with permission.)



A



B

Fig 18 (A) Frontal and (B) lateral views of patient with Crouzon's syndrome.



A B

Fig 19 Another patient with Crouzon's syndrome. (A) Preoperative view. Note hypoplasia of midface and protrusion of eyeballs. (B) Result after frontofacial advancement operation.

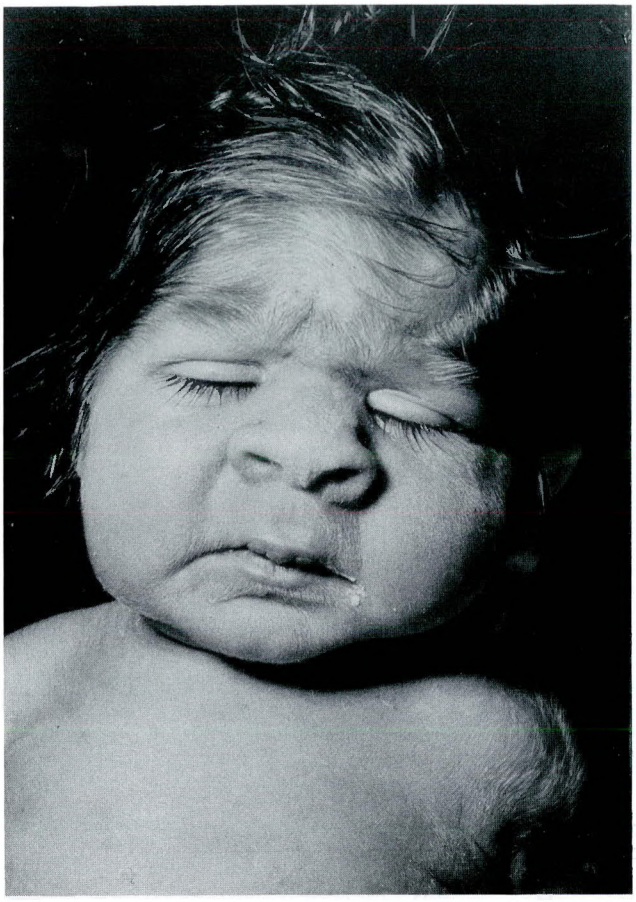
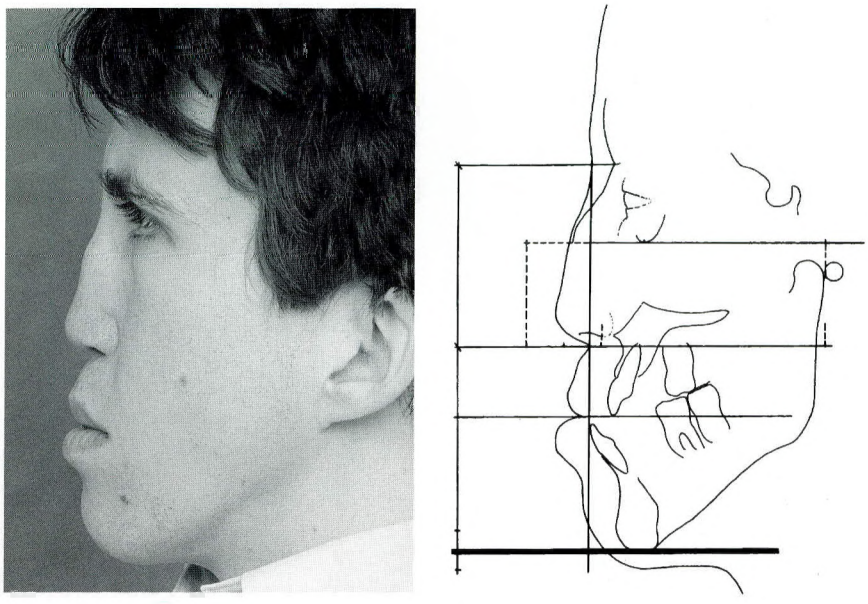


Fig 20 A 10-day-old infant with polysaccharidosis.



A B

Fig 21 Patient with Binder's syndrome (nasomaxillary hypoplasia). (A) Lateral view. (B) Cephalogram showing skeletal situation.

superior judgment. Today, a revival of this attitude anywhere in the world is not improbable. Indeed, according to one news report (*Neue Zürcher Zeitung,* October 31, 1994), a law has passed parliamentary approval in China regulating the prevention and elimination of defective offspring "in order to improve in the future the quality of the Chinese people."

Silent Cultural Contribution

What is our position and what are our possibilities in the face of such developments? Thanks to modern medical knowledge and refined surgical technology, we are able to rehabilitate and socially reintegrate formerly hidden and excluded humans with the most despicable and detested craniofacial defects (Figs 10–21), making life worth living for them. In this sense and in the general and widespread absence of philosophical or religious ties today, our profession is making a silent cultural contribution, acting as a grain of salt on the earth.

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Influence of Craniofacial Surgery on the Social Attitudes Toward the Malformed and Their Handling in Different Cultures and at Different Times: A Contribution to Social World History

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A historic overview including the European, American, Asian, and African continents is given on attitudes toward and the handling of humans with congenital malformations in ancient cultures and on pertinent customs in some prehistoric peoples. Figures of early works of art showing malformed individuals are presented testifying to this worldwide and timeless problem of humankind. In parallel, analogous patient photographs from our hospital before and after reconstructive surgery are shown. Philosophies of ancient Greece, Rome, and China on the subject of malformed infants essentially did not differ from the known attitudes of the less developed tribes in Europe and pre-Columbian America, although the means of elimination of unwanted offspring were rather passive (exposure) than active (manual killing). A radical change in attitudes and practices occurred with the spread of the Christian religion and its political installment in Europe: The care for the underprivileged including the malformed ones was considered a Christian duty to be performed with compassion and love. In our century, the clocks have been and apparently are turned back again. Atheistic and Darwinian influences, political atheism, and the belief in "higher ethics" issued by "superman" have led to a relapse into barbarism, also within the medical system. We, as craniofacial surgeons, are privileged to have the means to turn the clocks forward again by rehabilitating the physically most underprivileged: those with conspicuous craniofacial malformations. The necessary techniques exist and are applied, as the figures of patients from our hospital demonstrate, but the will and the emotional strength for their consequent application require more than our hands.

Key Words: Congenital malformations, ancient cultures

The significance and the handling of malformed humans from archaic to modern times worldwide reflect the lifestyle and culture of the various populations at any time. According to extensive ethnological studies, mostly done in the second half of the last century, primitive tribes and peoples on all continents disposed of malformed infants immediately after birth, usually by drowning, strangulation, or suffocation or live burial [1]. Our survey is not claiming to be comprehensive but rather to show typical examples of behavior of ancient societies toward a painful and secret problem, and some modern trends in similar directions.

Behavior of Pre-Columbian and Some Contemporary Indigenous American Indians

Among culturally more developed peoples like the Indians of South and Central America (the Incas, Mayas, and Aztecs), ritual homicide or infanticide was frequently practiced, mainly by the Aztecs. Offspring were regularly extinguished when born under bad auspices (of calendar or stars). Congenital malformations were believed to be due to misbehavior of the mothers during pregnancy [2], but what happened to them or their "stigmatized" children is unknown. Excavated terra-cotta figurines of persons with cleft lips (Fig 1) and other facial abnormalities (Figs 2 and 3), mainly found in Mexico but probably stemming from the Inca Land Columbia, famous for ceramics manufacturing, may simply testify to the high frequency, even today, of facial clefts in these regions.

That the attitude of certain indigenous South American Indian societies toward malformed infants apparently has remained unchanged for millennia is

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judicious use of plate and screw fixation in critical areas requiring three-dimensional stability. Longer close follow-up of the patients is of paramount importance. The development of resorbable plates, screws, and bioceramic cements may make these concerns a moot point in the future [16, 17].

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Fig 1 Pre-Columbian vase in glazed terra-cotta showing unilateral cleft lip. (See also Figs 10 and 11.)

documented by the following report in the Neue Zürcher Zeitung of November 3, 1994. A Yanoama mother gave birth in a Brazilian hospital to a son. The midwife had to tell her that the baby had a miňor genital malformation (possibly hypospadias). When the midwife left the room, the mother immediately killed the baby, stating that she was, by their customs, obliged to do this. The Brazilian magistrates, being aware of these unwritten laws of their indigenous people, exempted her from legal prosecution.

Customs in Early Asian Cultures

In Far East Indian culture, the handling of malformed children or otherwise handicapped persons was prescribed by laws of the four major castes. A pertinent passage in the Brahman *Laws of Manu* (translated into English in 1886) [3] reads as follows: "Eunuchs and outcasts, persons born blind or deaf, the insane, the idiots and the dumb as well as those deficient in any organ (of action or



Fig 2 Terra-cotta from Mexico probably showing left lateral facial cleft of nose and mouth (or possibly acquired loss of soft tissue). (Photograph by Prof. Perko.) (See also Figs 15 and 16.)

sensation) are disqualified to inherit. But a man who knows the law has to provide evenly to all of them, give food and raiment without stint, according to his ability. He who gives it not will become an outcast." Outcasts and madmen were not allowed to marry. Others (i.e., malformed ones) could do so. In some southern India circles, persons with facial malformations were given demonic attributes as exemplified by a mask from Ceylon used to exorcise demons (Fig 4).

From ancient China there exists a legal text of the Qu'in period (200 B.C.) on the subject of malformed or otherwise unwanted children [4]. The passage reads as follows: "Unauthorizedly to kill a child is punishable by tattooing and being subjected to forced labour (grain pounding)." However, "when a child is newly born and has strange things on its body, as well as when it is deformed, to kill it is not to be considered a crime" and later "letting a child die simply because one has too many children is a case of killing" (and therefore a criminal act).

According to a legal expert on Han law (Han period 206 B.C. to 220 A.D.) (cited in Behnke Kinney [4]), partly in use up to recent times, the method of punishment of those guilty of infanticide and abandonment was left more or less to the discretion of the local official in charge. This could vary from death sentence (rare) to tolerance without any consequences. A public document, probably from the Han period states: "Now under heaven, all families kill girls; there are even some that have killed more than ten" [5].

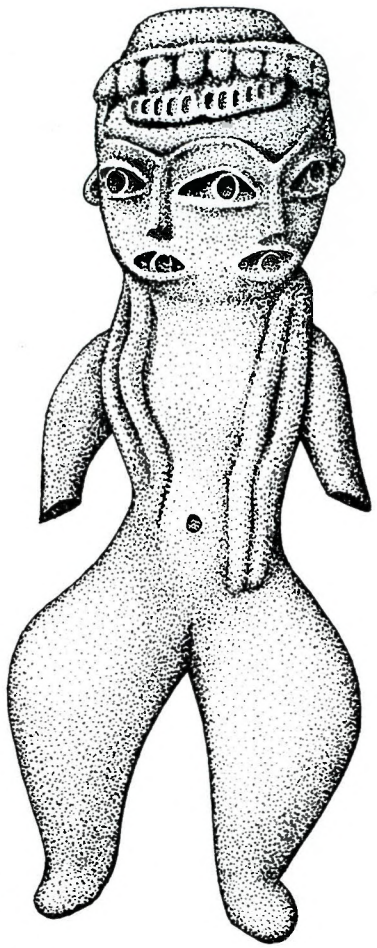


Fig 3 Clay figurine from Mexico, Zacatenco period (about 500 B.C.) with partial facial duplication (mouth and nose) and a third eye. (From Covarrubias M. Indian art of Mexico and Central America. New York: Alfred A. Knopf, 1957. Used with permission.) (See also Fig 17.)

Following religious tradition (as opposed to legal practice), the existence of a child was not officially recognized until the third day of life. During this time, the family (often consisting of five generations) had to decide whether to raise a child. If in doubt, the child was left for 3 days without food and shelter on a bundle of rags. If it survived, the parents were morally obliged to raise it.

Thus, tentatively summing up the attitudes in many ancient non-European cultures toward children with birth defects, the predominant tendencies were in favor of abandonment while delegating responsibility to supernatural authorities.

Attitude in Indigenous African Cultures

In some African cultures, malformations or congenital diseases may have been of ambivalent significance. Minor facial anomalies such as protruding eyes were seen in Benin as a sign of majesty and power (Fig 5). On the other hand, a grossly abnormal facial expression, as seen in some storage diseases, was believed to signify criminality. A case in point is shown in a clay sculpture from Nigeria (Fig 6) showing the insignia of death sentence (the head of an ape on a necklace) in an obviously severely ill person. Also from Nigeria stems a terra-cotta of a malformed head, held by a hand at the neck, apparently signifying decapitation for a criminal act (Fig 7).



Fig 4 Mask from Ceylon used to exorcise demons showing median facial cleft involving the lip and nose with a protruding frontal eye and strabismus divergens. (See also Figs 12–14.)

Attitudes in European Antiquity

In Greek and Roman antiquity, there is sparse reliable testimony on this subject. In the state of Athens in the 4th and 3rd centuries B.C., where the ideas of Platon's, as laid down in "The Republic," were, of all Greek town states, most closely implemented, the practice was, in Platon's words, as follows: "The offspring of the citizens who are born defective they will properly dispose of in secret" [a euphemism for exposure] "so that no one will know what has become of them" [6]. The same could be and was frequently done also with normal children unwanted for other reasons.

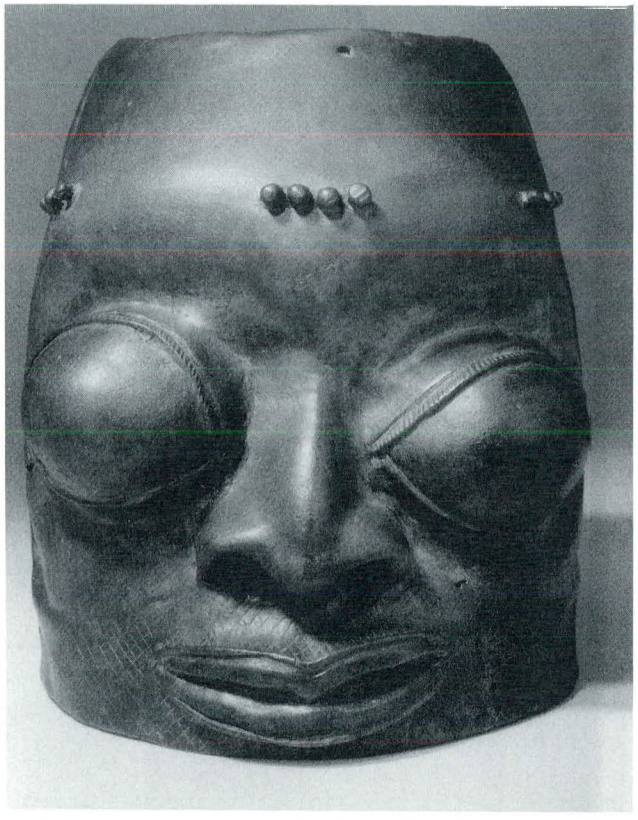


Fig 5 Bronze from Benin (Africa) showing massive protrusion of the eyes (allegedly a sign of majesty and power), possibly patterned from Crouzon's syndrome. (See also Figs 18 and 19.)



Fig 6 Clay sculpture from Nigeria showing a sick, possibly malformed person with the insignia of death sentence (skull of an ape on a necklace). Facial expression suggests storage disease. (See also Fig 20.)

The decision whether to rear or dispose of a newborn was up to the father. Menander, for instance, in the comedy Perikeiromene lets Moschio, himself a former foundling, states: "No father has to raise children he doesn't want; it is his right to expose them" [7]. While the practice of exposure in the wilderness was accepted custom in Athens at Platon's time, Aristoteles strongly advocated that "a law be made that no defective offspring be raised" (Politeia, VII, 8).

On the other hand, in Sparta, according to Plutarch's biography of Lycurgos, this legislator in the 8th century B.C. instituted a law on the subject of defective offspring. The passage in Plutarch reads as follows: "Offspring was not reared at the will of the father, but was taken and carried by him to a place called Lesche where the elders of the tribes officially examined the infant, and if it was well built and sturdy they ordered the father to rear it; but if it was ill-born and deformed they sent it to the so-called Apothetae, a chasm-like place at the foot of Mount Taygetos, in the conviction that the life of that which nature had not well equipped at the very beginning for health and strength, was of no advantage either to itself or the state" [9].

In ancient Greece, a malformed adult, if one survived (or a psychotic or another social outcast) was often selected by the community to be the ritual projection center (ritual impersonation) of all misdeeds having happened in the city during one year. The poor creature was then escorted by citizens in a procession to the city gates and banished from the city, and, with him, all evil [10].

An entirely rational attitude toward the problem of malformations was taken by the Roman philosopher Seneca (1st century A.D.). In *De Ira* he wrote, matter of factly, "The malformed [animals] we extinguish, children too; we drown them if they are born feeble and defective. And it is not out of ire but of reason that we separate the unfit from the healthy" [11].

The expansion of the Roman empire into Germania and the contact with Teutons (some of whom were incorporated into the Roman army) induced Tacitus to write and compare the utterly moral and healthy Germanic



Fig 7 Terra-cotta from Nigeria showing decapitated head of a person with flat forehead caused by midface hypoplasia, low position of the nasal base, possibly bicoronal craniosynostosis, slightly protruding eyes, and possibly mongolism or Binder's syndrome (nasomaxillary hypoplasia). (See also Fig 21).

family life and society with that of the decadent Romans, who considered the upbringing of children a tedious chore for women and men and who readily aborted or disposed of unwanted offspring without scruples. In Germania, Tacitus wrote, in the sense of admonition of his people: "To limit the number of children or to kill one of the late-born ones is a detestable crime in Germania" [12]. However, according to other sources the extinction or exposure of feeble or too numerous offspring often was also practiced by them [1].

New Attitude Through Christian Ethics and Its Practice

A new attitude toward the sick in general and those born defective arose in Germania when the Christian religion was officially admitted by the Emperor Constantine I and after the first Nicean Council convocated by him in 325 A.D. From then on and throughout the high Middle Ages, monasteries were increasingly built in Germania that typically also contained an infirmary where the sick and feeble were looked after by monks or friars. A building plan of the monastery of St. Gall of the 8th century is still preserved [13]. Often there was also a separate building for those with contagious diseases such as leprosy imported from the Orient or, later on, syphilis. Also, patients with gangrenous limbs resulting from ergotism from eating moldy grain were treated there. Unwanted newborns often were deposited at the gates of a convent and brought up by nuns.

Hospices (mainly for sick pilgrims) or hospitals were frequently built or financially supported by the reigning authorities (dukes or knights) as an atonement for sins; they then were granted remission by the church. Thus, according to an existing papal document of 1204 issued by Innocence III, the first major hospital of the city of Zurich was built by the Zähringer Duke Berchtold V "as a remedy for his sins," as the papal epistle states. This hospital was granted papal protection but obliged to yearly pay to the papal administration one gold florin. This obligation was repealed only 250 years later. A drawing from 1576 of the ancient Zurich Hospital "Heiliggeistspital" (Hospital of the Holy Spirit) associated with and tended by the monastery "Predigerkloster" (Monastery of the Preachers) and its staff is shown in Figure 8.

These were the customs for about 1,000 years in medieval central Europe. Philosophically speaking, caring for the sick and feeble was propagated by the church and considered by it the same as caring for Christ himself, whereby one gained spiritual rewards for oneself according to the scriptures (Matthew 25:40). This is aptly expressed by the inscription on the ancient hospital seal (still in use as an emblem by today's University Hospital Zurich), surrounding a double cross reading in Latin "Res sacra miser," meaning "a sacred cause is the miserable" (Fig 9).

A more secular attitude toward tending to the sick, crippled, and needy originated from the Zurich Reformer Zwingli, pastor of the City Church from 1519 to 1531, who urged the worldly administrators to look after its poor, sick, and underprivileged. Zwingli succeeded in instituting the so-called Order of Alms covering hospital expenses for long-term inmates such as severely crippled, imbecile, epileptic, deaf-mute, and insane patients called "house children" [13]. The predominant motive of the nursing staff to do this work now was charity rather than penance. The still entirely Christian attitude toward nursing can be seen by Bullinger's (city pastor, successor of Zwingly) admonition to an almighty hospital administrator: "Don't treat the house children as dogs; Christ himself meets you in them."

Influence of Medical Care and Surgical Skills

Medical care proper (vs. nursing alone practiced before) began in 1683 when the city employed two medical doctors and two surgeons as permanent hospital staff. Medical knowledge and progress subsequently determined patient treatment.

A medical faculty was founded in 1833 soon after the foundation of the University. Since 1804 the hospital was under the administration of the Canton of Zurich, to the relief of the city.

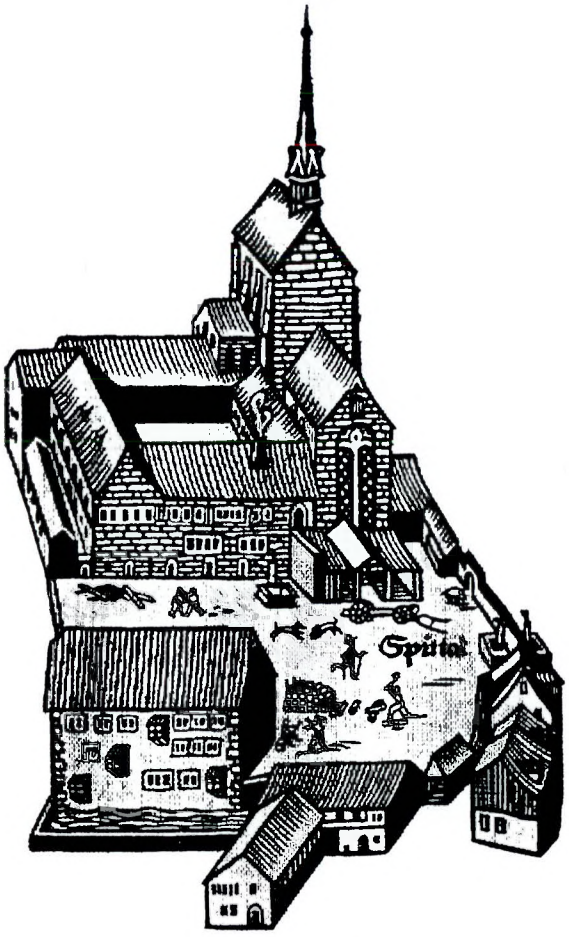


Fig 8 An ancient forerunner of today's Zurich University Hospital depicted on a map from the 16th century. The larger and two smaller houses at the bottom left served patient accommodation. The row of small buildings on the right housed different hospital-related craftsmen. At the top the monasterial complex with the dominating Predigerkirche (church of the preachers) is shown. The hospital, then named Heiliggeistspital (Hospital of the Holy Spirit), was entirely staffed by nuns and friars. The picture shows the close association between the monastery and the hospital complex.

Operative treatment of children with maxillofacial malformations began in the second half of the last century, around 1860. In Germany, von Langenbeck introduced techniques for the closure of maxillofacial clefts, and around 1890 the first operations for craniosynostoses were done. Pediatric surgery, comprising craniomaxillofacial surgery, started at the University Children's Hospital of Zurich in 1909. Adequate treatment of all congenital malformations was financially helped from 1960 up to now by a special government fund for all of Switzerland covering all medical costs of these patients up to the age of 20 years (Insurance for Invalids).

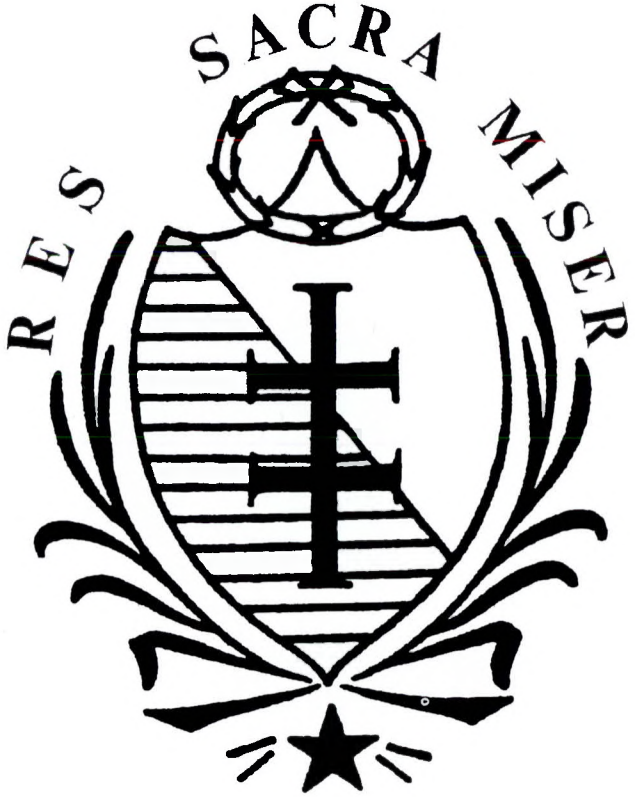


Fig 9 Ancient official hospital seal probably stemming from last century. The Latin words mean "a holy thing [cause] is the miserable." Older seals of similar design exist, a poorly legible one dating back to the 13th century. This picture is still used by the Zurich University Hospital as a decorative emblem.

The smooth transition of nursing care alone to sophisticated surgical treatment of patients with congenital malformations, as outlined previously for Switzerland, developed along similar lines in the whole of central Europe (Germany, France, Great Britain). These surgical measures were often taken over and decisively developed and improved by the departments of craniomaxillofacial surgery, as was the case 25 years ago in Zurich.

Political Aberrations of Our Century and Our Answer to Them

A tragic interruption of surgical and medical care of the congenitally malformed patients occurred in Germany in the early 1940s, when for eugenic (and financial) reasons any malformed children of all ages, namely those with maxillofacial clefts, spina bifida, missing extremities, idiocy, mongolism, different kinds of paralysis, and so on cared for in institutions or at home and physically or mentally infirm adults had to be registered to be

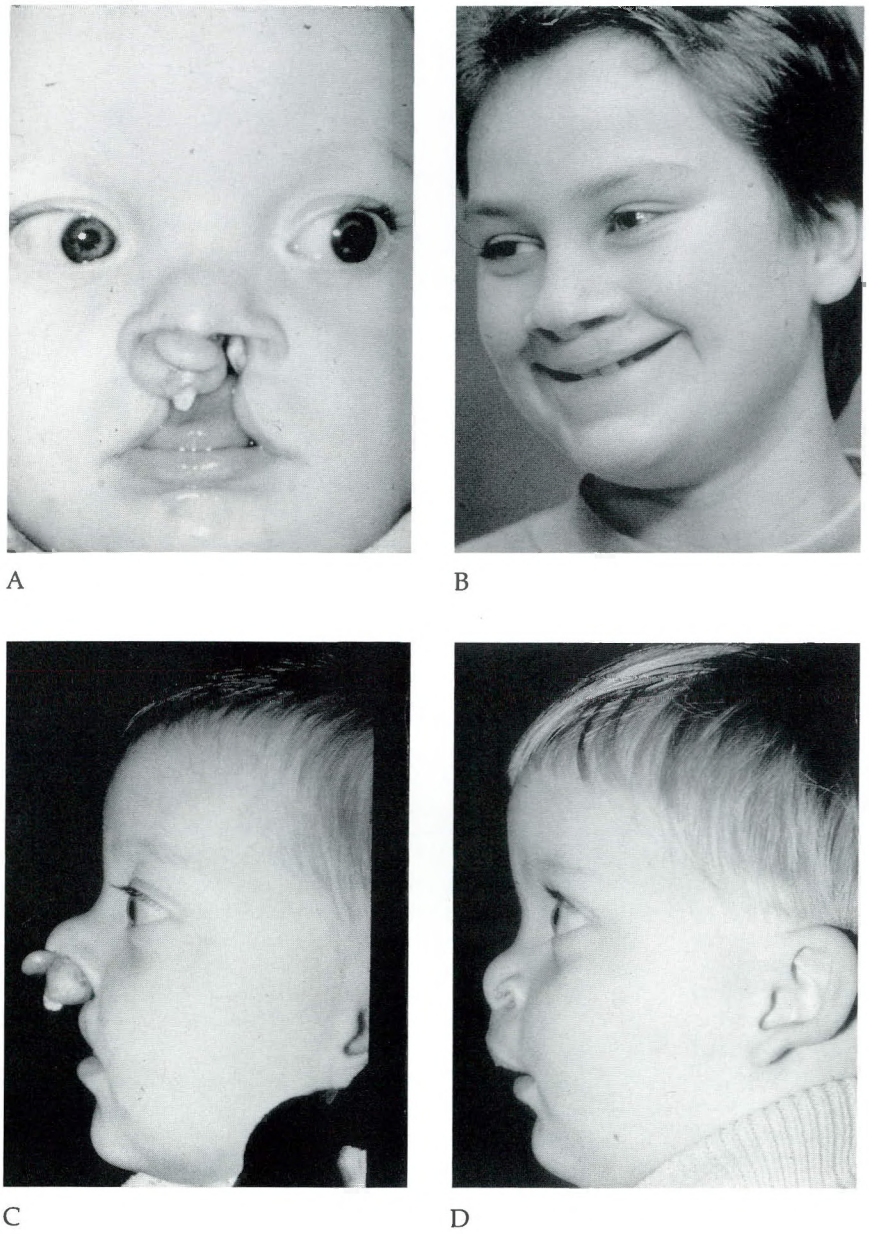
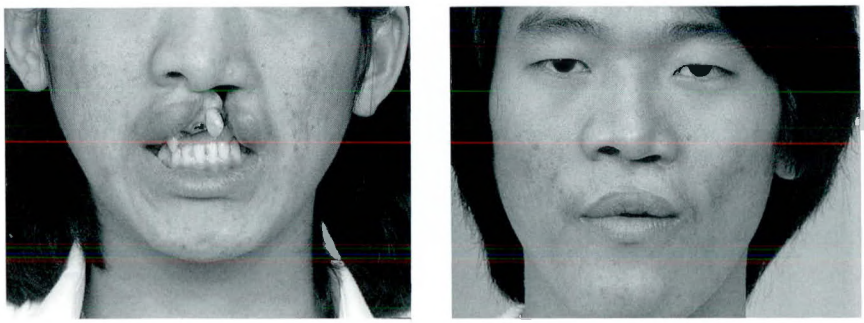


Fig 10 Nine-month-old child with bilateral total cleft lip and palate. (A) Frontal view. (B) Postoperative result showing happy youngster at age 14 years. (C) Lateral view. (D) After primary orthodontic treatment, the lip was closed according to the method of Celesnic I and II (Op. fec. Prof. Perko).

extinguished by government decree (confidential governmental issue of the Ministry of the Interior, Aug. 18, 1939) [14]. However—and this is less well known—the terrain that made these misdeeds possible was prepared significantly by the philosophical movement of social Darwinism (in which many medical doctors participated), which followed Darwin's theories of evolution for all living organisms, including humans, by natural selection and adaptation. (Favorable physical changes are, however, as recognized later, caused by chance mutation of genes, not adaptation.) Two major propagators of the application of the selection theory in human beings were the zoologist and philosopher Ernst Haeckel [15] and the medicolegal team of K. Binding and A. E. Hoche with their treatise [16]: "Die Freigabe der Vernichtung lebensunwerten Lebens" (in literal translation, "The Liberalization of the Annihilation of Human Life Unworthy of Being Lived"). While Haeckel and other social Darwinists succumbed to a perfectionist belief concerning the human race, Binding and Hoche were clearly motivated by political and economic considerations. However—and this was their perfidy—they invoked a "new and higher ethics" as the basis of their philosophy; the ethics of the perfect, self-righteous, and autonomous human possessing



A B

Fig 11 Adolescent with unilateral total cleft lip and palate. (A) Preoperative view. (B) Postoperative view.

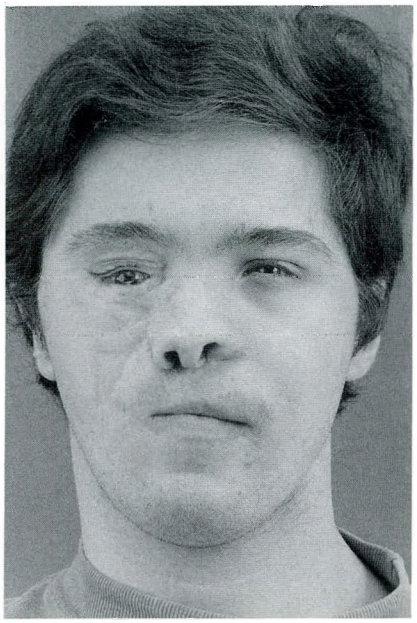


A B

Fig 12 (A) Fourteen-year-old boy with median facial cleft (lip already closed) with complete cleft of the nose, widely separated nostrils, and hypertelorism. An encephalocele was protruding through the anterior and medial cranial fossa into the oral cavity. (B) Result at age 23 years after operative correction of hypertelorism and nose.



A

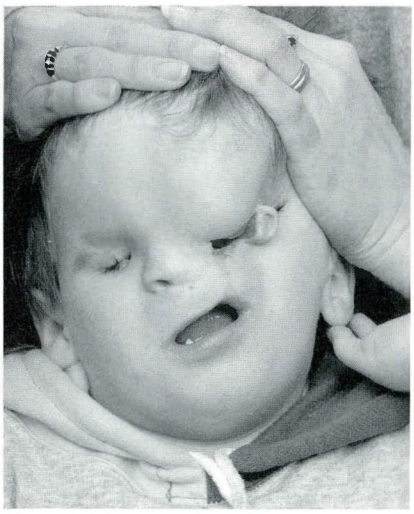


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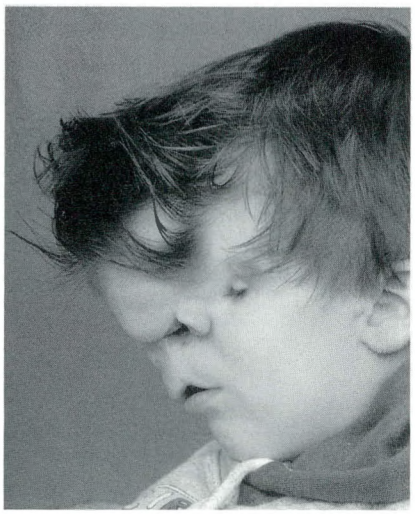
Fig 13 (A) Newborn with unilateral right paramedian cleft lip and palate, cleft of right half of the nose and eyelid, and displaced orbit. (B) Result at age 20 years after multiple operative procedures.



A



B



C

Fig 14 (A) Multiple total facial clefts (see Tessier classification) with hyperteloric, anophthalmic miniorbits, large median encephalocele, and deformed external ears. (B and C) Frontal and lateral views of result after operative closure of lip and nose.



A B C

Fig 15 (A) Preoperative view of partial lateral facial cleft of the mouth and external ear deformity (hemifacial microsomia). (B and C) Postoperative views.



A B C

Fig 16 (A) Frontal and (B) lateral views of deep groove in the left midface dividing all tissues down to the oral mucosa, resulting from a tight amniotic band across the face. (C) Result after closure of soft tissues.

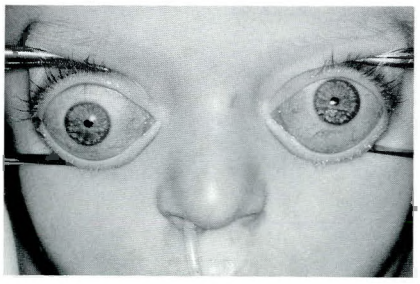


A

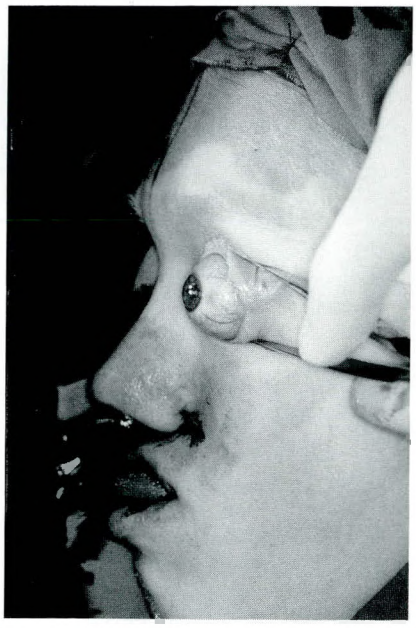


B

Fig 17 (A) Ten-year-old boy, after correction of the lip, with partial duplication of mouth and nose, a rudimentary third eye and eye socket, wide cleft of the palate, and extreme degree of hypertelorism. (B) Result at age 12 years after further operative corrections. (From Obwegeser and colleagues [17]. Used with permission.)



A



B

Fig 18 (A) Frontal and (B) lateral views of patient with Crouzon's syndrome.



A B

Fig 19 Another patient with Crouzon's syndrome. (A) Preoperative view. Note hypoplasia of midface and protrusion of eyeballs. (B) Result after frontofacial advancement operation.

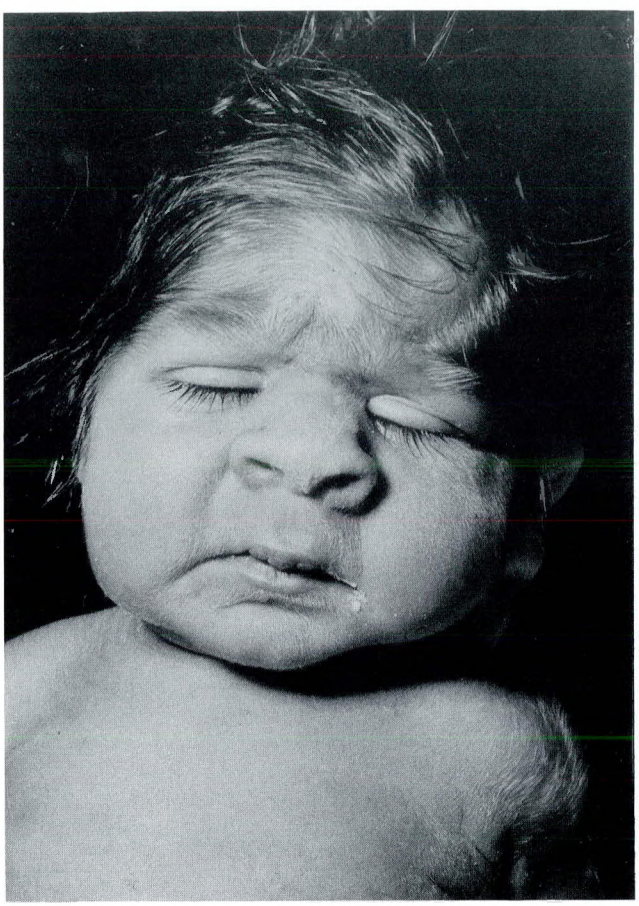
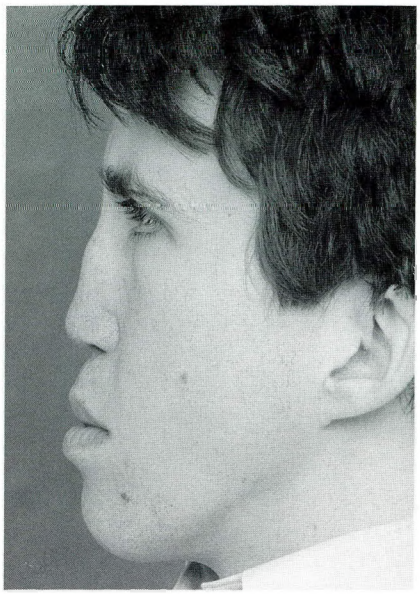
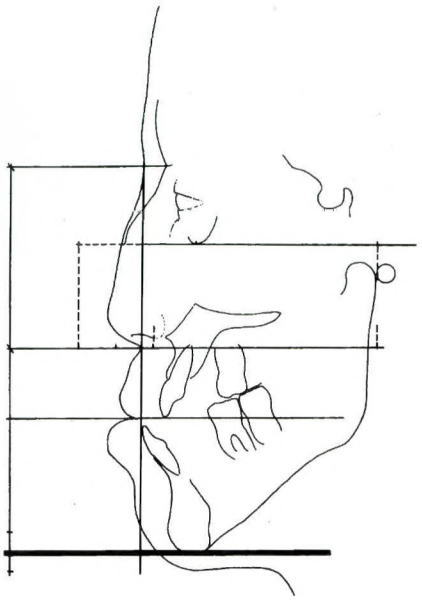


Fig 20 A 10-day-old infant with polysaccharidosis.



A



B

Fig 21 Patient with Binder's syndrome (nasomaxillary hypoplasia). (A) Lateral view. (B) Cephalogram showing skeletal situation.

superior judgment. Today, a revival of this attitude anywhere in the world is not improbable. Indeed, according to one news report (*Neue Zürcher Zeitung*, October 31, 1994), a law has passed parliamentary approval in China regulating the prevention and elimination of defective offspring "in order to improve in the future the quality of the Chinese people."

Silent Cultural Contribution

What is our position and what are our possibilities in the face of such developments? Thanks to modern medical knowledge and refined surgical technology, we are able to rehabilitate and socially reintegrate formerly hidden and excluded humans with the most despicable and detested craniofacial defects (Figs 10–21), making life worth living for them. In this sense and in the general and widespread absence of philosophical or religious ties today, our profession is making a silent cultural contribution, acting as a grain of salt on the earth.

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Influence of Craniofacial Surgery on the Social Attitudes Toward the Malformed and Their Handling in Different Cultures and at Different Times: A Contribution to Social World History

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A historic overview including the European, American, Asian, and African continents is given on attitudes toward and the handling of humans with congenital malformations in ancient cultures and on pertinent customs in some prehistoric peoples. Figures of early works of art showing malformed individuals are presented testifying to this worldwide and timeless problem of humankind. In parallel, analogous patient photographs from our hospital before and after reconstructive surgery are shown. Philosophies of ancient Greece, Rome, and China on the subject of malformed infants essentially did not differ from the known attitudes of the less developed tribes in Europe and pre-Columbian America, although the means of elimination of unwanted offspring were rather passive (exposure) than active (manual killing). A radical change in attitudes and practices occurred with the spread of the Christian religion and its political installment in Europe: The care for the underprivileged including the malformed ones was considered a Christian duty to be performed with compassion and love. In our century, the clocks have been and apparently are turned back again. Atheistic and Darwinian influences, political atheism, and the belief in "higher ethics" issued by "superman" have led to a relapse into barbarism, also within the medical system. We, as craniofacial surgeons, are privileged to have the means to turn the clocks forward again by rehabilitating the physically most underprivileged: those with conspicuous craniofacial malformations. The necessary techniques exist and are applied, as the figures of patients from our hospital demonstrate, but the will and the emotional strength for their consequent application require more than our hands.

Key Words: Congenital malformations, ancient cultures

The significance and the handling of malformed humans from archaic to modern times worldwide reflect the lifestyle and culture of the various populations at any time. According to extensive ethnological studies, mostly done in the second half of the last century, primitive tribes and peoples on all continents disposed of malformed infants immediately after birth, usually by drowning, strangulation, or suffocation or live burial [1]. Our survey is not claiming to be comprehensive but rather to show typical examples of behavior of ancient societies toward a painful and secret problem, and some modern trends in similar directions.

Behavior of Pre-Columbian and Some Contemporary Indigenous American Indians

Among culturally more developed peoples like the Indians of South and Central America (the Incas, Mayas, and Aztecs), ritual homicide or infanticide was frequently practiced, mainly by the Aztecs. Offspring were regularly extinguished when born under bad auspices (of calendar or stars). Congenital malformations were believed to be due to misbehavior of the mothers during pregnancy [2], but what happened to them or their "stigmatized" children is unknown. Excavated terra-cotta figurines of persons with cleft lips (Fig 1) and other facial abnormalities (Figs 2 and 3), mainly found in Mexico but probably stemming from the Inca Land Columbia, famous for ceramics manufacturing, may simply testify to the high frequency, even today, of facial clefts in these regions.

That the attitude of certain indigenous South American Indian societies toward malformed infants apparently has remained unchanged for millennia is

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judicious use of plate and screw fixation in critical areas requiring three-dimensional stability. Longer close follow-up of the patients is of paramount importance. The development of resorbable plates, screws, and bioceramic cements may make these concerns a moot point in the future [16, 17].

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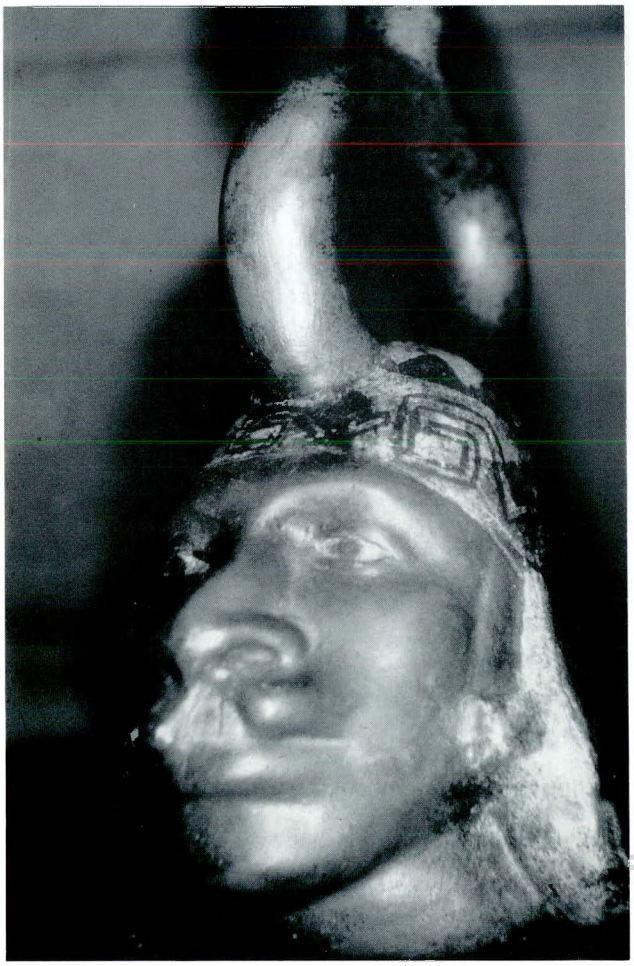


Fig 1 Pre-Columbian vase in glazed terra-cotta showing unilateral cleft lip. (See also Figs 10 and 11.)

documented by the following report in the Neue Zürcher Zeitung of November 3, 1994. A Yanoama mother gave birth in a Brazilian hospital to a son. The midwife had to tell her that the baby had a minor genital malformation (possibly hypospadias). When the midwife left the room, the mother immediately killed the baby, stating that she was, by their customs, obliged to do this. The Brazilian magistrates, being aware of these unwritten laws of their indigenous people, exempted her from legal prosecution.

Customs in Early Asian Cultures

In Far East Indian culture, the handling of malformed children or otherwise handicapped persons was prescribed by laws of the four major castes. A pertinent passage in the Brahman *Laws of Manu* (translated into English in 1886) [3] reads as follows: "Eunuchs and outcasts, persons born blind or deaf, the insane, the idiots and the dumb as well as those deficient in any organ (of action or



Fig 2 Terra-cotta from Mexico probably showing left lateral facial cleft of nose and mouth (or possibly acquired loss of soft tissue). (Photograph by Prof. Perko.) (See also Figs 15 and 16.)

sensation) are disqualified to inherit. But a man who knows the law has to provide evenly to all of them, give food and raiment without stint, according to his ability. He who gives it not will become an outcast." Outcasts and madmen were not allowed to marry. Others (i.e., malformed ones) could do so. In some southern India circles, persons with facial malformations were given demonic attributes as exemplified by a mask from Ceylon used to exorcise demons (Fig 4).

From ancient China there exists a legal text of the Qu'in period (200 B.C.) on the subject of malformed or otherwise unwanted children [4]. The passage reads as follows: "Unauthorizedly to kill a child is punishable by tattooing and being subjected to forced labour (grain pounding)." However, "when a child is newly born and has strange things on its body, as well as when it is deformed, to kill it is not to be considered a crime" and later "letting a child die simply because one has too many children is a case of killing" (and therefore a criminal act).

According to a legal expert on Han law (Han period 206 B.C. to 220 A.D.) (cited in Behnke Kinney [4]), partly in use up to recent times, the method of punishment of those guilty of infanticide and abandonment was left more or less to the discretion of the local official in charge. This could vary from death sentence (rare) to tolerance without any consequences. A public document, probably from the Han period states: "Now under heaven, all families kill girls; there are even some that have killed more than ten" [5].

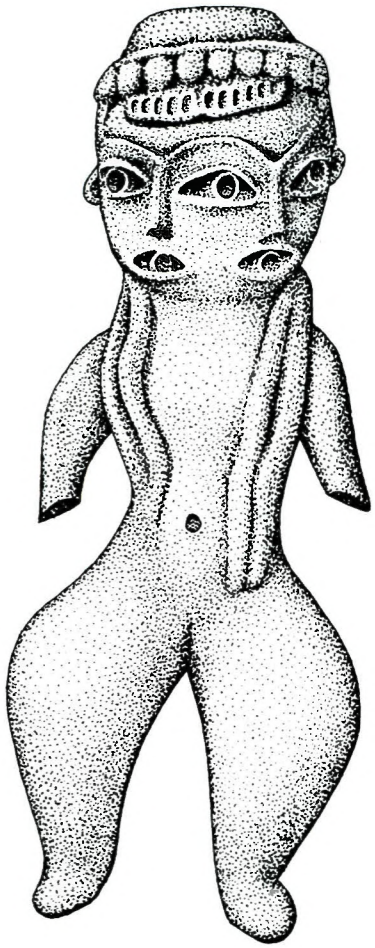


Fig 3 Clay figurine from Mexico, Zacatenco period (about 500 B.C.) with partial facial duplication (mouth and nose) and a third eye. (From Covarrubias M. Indian art of Mexico and Central America. New York: Alfred A. Knopf, 1957. Used with permission.) (See also Fig 17.)

Following religious tradition (as opposed to legal practice), the existence of a child was not officially recognized until the third day of life. During this time, the family (often consisting of five generations) had to decide whether to raise a child. If in doubt, the child was left for 3 days without food and shelter on a bundle of rags. If it survived, the parents were morally obliged to raise it.

Thus, tentatively summing up the attitudes in many ancient non-European cultures toward children with birth defects, the predominant tendencies were in favor of abandonment while delegating responsibility to supernatural authorities.

Attitude in Indigenous African Cultures

In some African cultures, malformations or congenital diseases may have been of ambivalent significance. Minor facial anomalies such as protruding eyes were seen in Benin as a sign of majesty and power (Fig 5). On the other hand, a grossly abnormal facial expression, as seen in some storage diseases, was believed to signify criminality. A case in point is shown in a clay sculpture from Nigeria (Fig 6) showing the insignia of death sentence (the head of an ape on a necklace) in an obviously severely ill person. Also from Nigeria stems a terra-cotta of a malformed head, held by a hand at the neck, apparently signifying decapitation for a criminal act (Fig 7).



Fig 4 Mask from Ceylon used to exorcise demons showing median facial cleft involving the lip and nose with a protruding frontal eye and strabismus divergens. (See also Figs 12–14.)

Attitudes in European Antiquity

In Greek and Roman antiquity, there is sparse reliable testimony on this subject. In the state of Athens in the 4th and 3rd centuries B.C., where the ideas of Platon's, as laid down in "The Republic," were, of all Greek town states, most closely implemented, the practice was, in Platon's words, as follows: "The offspring of the citizens who are born defective they will properly dispose of in secret" [a euphemism for exposure] "so that no one will know what has become of them" [6]. The same could be and was frequently done also with normal children unwanted for other reasons.

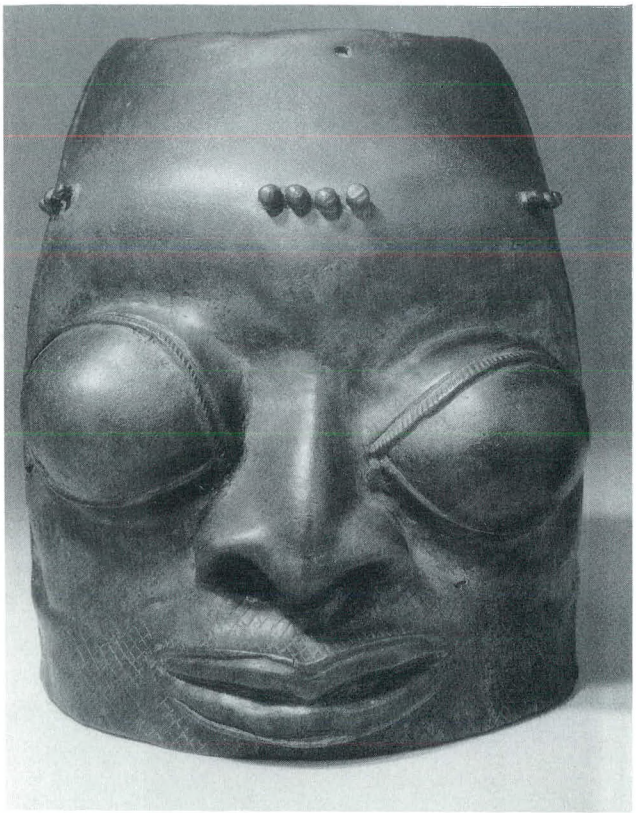


Fig 5 Bronze from Benin (Africa) showing massive protrusion of the eyes (allegedly a sign of majesty and power), possibly patterned from Crouzon's syndrome. (See also Figs 18 and 19.)



Fig 6 Clay sculpture from Nigeria showing a sick, possibly malformed person with the insignia of death sentence (skull of an ape on a necklace). Facial expression suggests storage disease. (See also Fig 20.)

The decision whether to rear or dispose of a newborn was up to the father. Menander, for instance, in the comedy Perikeiromene lets Moschio, himself a former foundling, states: "No father has to raise children he doesn't want; it is his right to expose them" [7]. While the practice of exposure in the wilderness was accepted custom in Athens at Platon's time, Aristoteles strongly advocated that "a law be made that no defective offspring be raised" (Politeia, VII, 8).

On the other hand, in Sparta, according to Plutarch's biography of Lycurgos, this legislator in the 8th century B.C. instituted a law on the subject of defective offspring. The passage in Plutarch reads as follows: "Offspring was not reared at the will of the father, but was taken and carried by him to a place called Lesche where the elders of the tribes officially examined the infant, and if it was well built and sturdy they ordered the father to rear it; but if it was ill-born and deformed they sent it to the so-called Apothetae, a chasm-like place at the foot of Mount Taygetos, in the conviction that the life of that which nature had not well equipped at the very beginning for health and strength, was of no advantage either to itself or the state" [9].

In ancient Greece, a malformed adult, if one survived (or a psychotic or another social outcast) was often selected by the community to be the ritual projection center (ritual impersonation) of all misdeeds having happened in the city during one year. The poor creature was then escorted by citizens in a procession to the city gates and banished from the city, and, with him, all evil [10].

An entirely rational attitude toward the problem of malformations was taken by the Roman philosopher Seneca (1st century A.D.). In *De Ira* he wrote, matter of factly, "The malformed [animals] we extinguish, children too; we drown them if they are born feeble and defective. And it is not out of ire but of reason that we separate the unfit from the healthy" [11].

The expansion of the Roman empire into Germania and the contact with Teutons (some of whom were incorporated into the Roman army) induced Tacitus to write and compare the utterly moral and healthy Germanic



Fig 7 Terra-cotta from Nigeria showing decapitated head of a person with flat forehead caused by midface hypoplasia, low position of the nasal base, possibly bicoronal craniosynostosis, slightly protruding eyes, and possibly mongolism or Binder's syndrome (nasomaxillary hypoplasia). (See also Fig 21).

family life and society with that of the decadent Romans, who considered the upbringing of children a tedious chore for women and men and who readily aborted or disposed of unwanted offspring without scruples. In Germania, Tacitus wrote, in the sense of admonition of his people: "To limit the number of children or to kill one of the late-born ones is a detestable crime in Germania" [12]. However, according to other sources the extinction or exposure of feeble or too numerous offspring often was also practiced by them [1].

New Attitude Through Christian Ethics and Its Practice

A new attitude toward the sick in general and those born defective arose in Germania when the Christian religion was officially admitted by the Emperor Constantine I and after the first Nicean Council convocated by him in 325 A.D. From then on and throughout the high Middle Ages, monasteries were increasingly built in Germania that typically also contained an infirmary where the sick and feeble were looked after by monks or friars. A building plan of the monastery of St. Gall of the 8th century is still preserved [13]. Often there was also a separate building for those with contagious diseases such as leprosy imported from the Orient or, later on, syphilis. Also, patients with gangrenous limbs resulting from ergotism from eating moldy grain were treated there. Unwanted newborns often were deposited at the gates of a convent and brought up by nuns.

Hospices (mainly for sick pilgrims) or hospitals were frequently built or financially supported by the reigning authorities (dukes or knights) as an atonement for sins; they then were granted remission by the church. Thus, according to an existing papal document of 1204 issued by Innocence III, the first major hospital of the city of Zurich was built by the Zähringer Duke Berchtold V "as a remedy for his sins," as the papal epistle states. This hospital was granted papal protection but obliged to yearly pay to the papal administration one gold florin. This obligation was repealed only 250 years later. A drawing from 1576 of the ancient Zurich Hospital "Heiliggeistspital" (Hospital of the Holy Spirit) associated with and tended by the monastery "Predigerkloster" (Monastery of the Preachers) and its staff is shown in Figure 8.

These were the customs for about 1,000 years in medieval central Europe. Philosophically speaking, caring for the sick and feeble was propagated by the church and considered by it the same as caring for Christ himself, whereby one gained spiritual rewards for oneself according to the scriptures (Matthew 25:40). This is aptly expressed by the inscription on the ancient hospital seal (still in use as an emblem by today's University Hospital Zurich), surrounding a double cross reading in Latin "Res sacra miser," meaning "a sacred cause is the miserable" (Fig 9).

A more secular attitude toward tending to the sick, crippled, and needy originated from the Zurich Reformer Zwingli, pastor of the City Church from 1519 to 1531, who urged the worldly administrators to look after its poor, sick, and underprivileged. Zwingli succeeded in instituting the so-called Order of Alms covering hospital expenses for long-term inmates such as severely crippled, imbecile, epileptic, deaf-mute, and insane patients called "house children" [13]. The predominant motive of the nursing staff to do this work now was charity rather than penance. The still entirely Christian attitude toward nursing can be seen by Bullinger's (city pastor, successor of Zwingly) admonition to an almighty hospital administrator: "Don't treat the house children as dogs; Christ himself meets you in them."

Influence of Medical Care and Surgical Skills

Medical care proper (vs. nursing alone practiced before) began in 1683 when the city employed two medical doctors and two surgeons as permanent hospital staff. Medical knowledge and progress subsequently determined patient treatment.

A medical faculty was founded in 1833 soon after the foundation of the University. Since 1804 the hospital was under the administration of the Canton of Zurich, to the relief of the city.

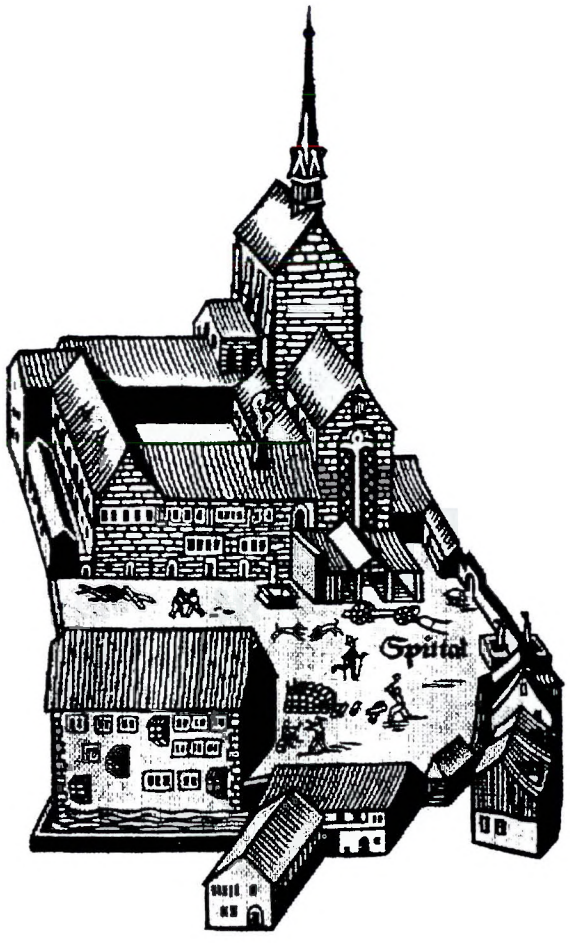


Fig 8 An ancient forerunner of today's Zurich University Hospital depicted on a map from the 16th century. The larger and two smaller houses at the bottom left served patient accommodation. The row of small buildings on the right housed different hospital-related craftsmen. At the top the monasterial complex with the dominating Predigerkirche (church of the preachers) is shown. The hospital, then named Heiliggeistspital (Hospital of the Holy Spirit), was entirely staffed by nuns and friars. The picture shows the close association between the monastery and the hospital complex.

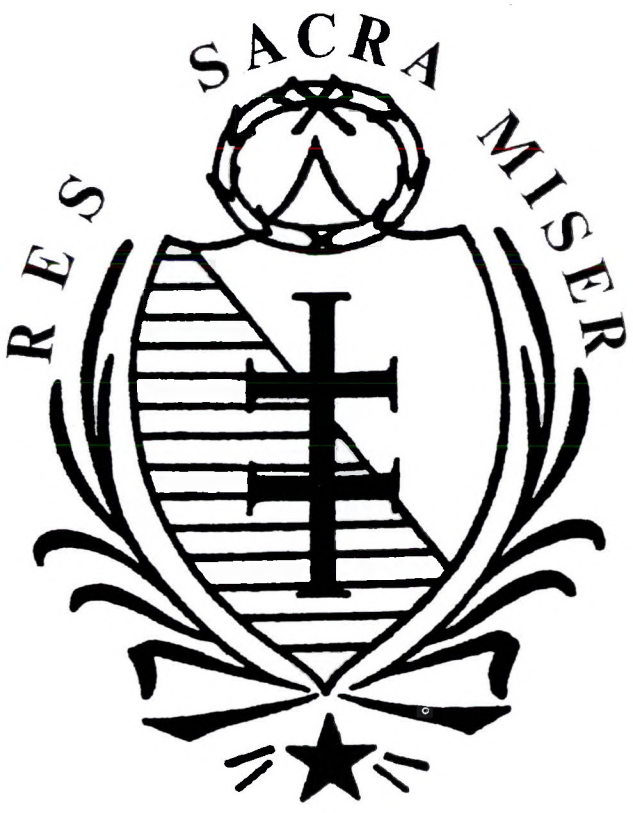


Fig 9 Ancient official hospital seal probably stemming from last century. The Latin words mean "a holy thing [cause] is the miserable." Older seals of similar design exist, a poorly legible one dating back to the 13th century. This picture is still used by the Zurich University Hospital as a decorative emblem.

Operative treatment of children with maxillofacial malformations began in the second half of the last century, around 1860. In Germany, von Langenbeck introduced techniques for the closure of maxillofacial clefts, and around 1890 the first operations for craniosynostoses were done. Pediatric surgery, comprising craniomaxillofacial surgery, started at the University Children's Hospital of Zurich in 1909. Adequate treatment of all congenital malformations was financially helped from 1960 up to now by a special government fund for all of Switzerland covering all medical costs of these patients up to the age of 20 years (Insurance for Invalids).

The smooth transition of nursing care alone to sophisticated surgical treatment of patients with congenital malformations, as outlined previously for Switzerland, developed along similar lines in the whole of central Europe (Germany, France, Great Britain). These surgical measures were often taken over and decisively developed and improved by the departments of craniomaxillofacial surgery, as was the case 25 years ago in Zurich.

Political Aberrations of Our Century and Our Answer to Them

A tragic interruption of surgical and medical care of the congenitally malformed patients occurred in Germany in the early 1940s, when for eugenic (and financial) reasons any malformed children of all ages, namely those with maxillofacial clefts, spina bifida, missing extremities, idiocy, mongolism, different kinds of paralysis, and so on cared for in institutions or at home and physically or mentally infirm adults had to be registered to be

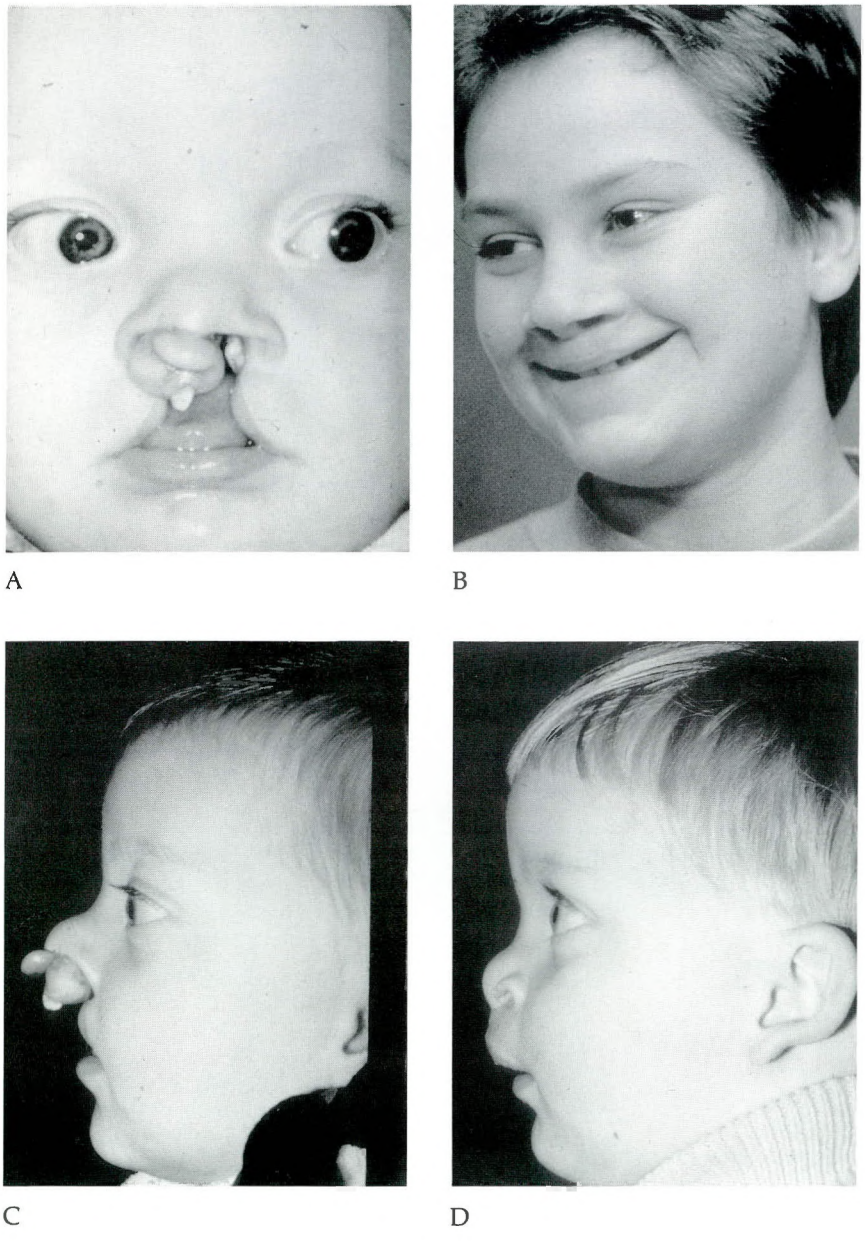
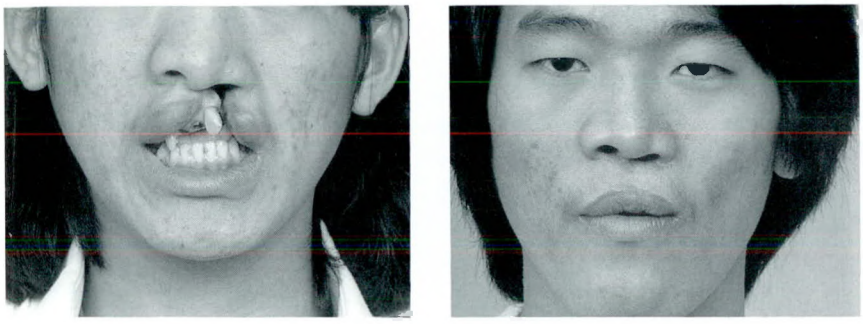


Fig 10 Nine-month-old child with bilateral total cleft lip and palate. (A) Frontal view. (B) Postoperative result showing happy youngster at age 14 years. (C) Lateral view. (D) After primary orthodontic treatment, the lip was closed according to the method of Celesnic I and II (Op. fec. Prof. Perko).

extinguished by government decree (confidential governmental issue of the Ministry of the Interior, Aug. 18, 1939) [14]. However—and this is less well known—the terrain that made these misdeeds possible was prepared significantly by the philosophical movement of social Darwinism (in which many medical doctors participated), which followed Darwin's theories of evolution for all living organisms, including humans, by natural selection and adaptation. (Favorable physical changes are, however, as recognized later, caused by chance mutation of genes, not adaptation.) Two major propagators of the application of the selection theory in human beings were the zoologist and philosopher Ernst Haeckel [15] and the medicolegal team of K. Binding and A. E. Hoche with their treatise [16]: "Die Freigabe der Vernichtung lebensunwerten Lebens" (in literal translation, "The Liberalization of the Annihilation of Human Life Unworthy of Being Lived"). While Haeckel and other social Darwinists succumbed to a perfectionist belief concerning the human race, Binding and Hoche were clearly motivated by political and economic considerations. However—and this was their perfidy—they invoked a "new and higher ethics" as the basis of their philosophy; the ethics of the perfect, self-righteous, and autonomous human possessing



A B

Fig 11 Adolescent with unilateral total cleft lip and palate. (A) Preoperative view. (B) Postoperative view.

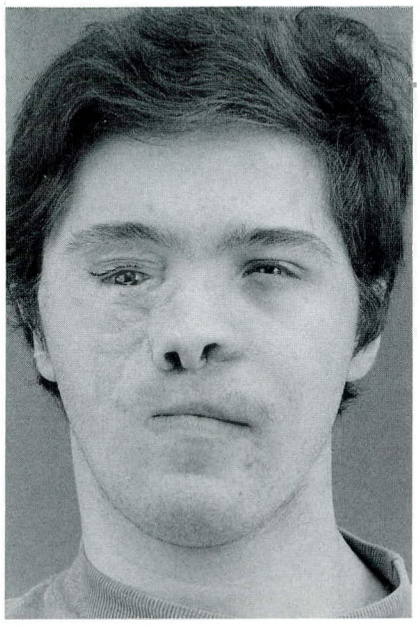


A B

Fig 12 (A) Fourteen-year-old boy with median facial cleft (lip already closed) with complete cleft of the nose, widely separated nostrils, and hypertelorism. An encephalocele was protruding through the anterior and medial cranial fossa into the oral cavity. (B) Result at age 23 years after operative correction of hypertelorism and nose.



A

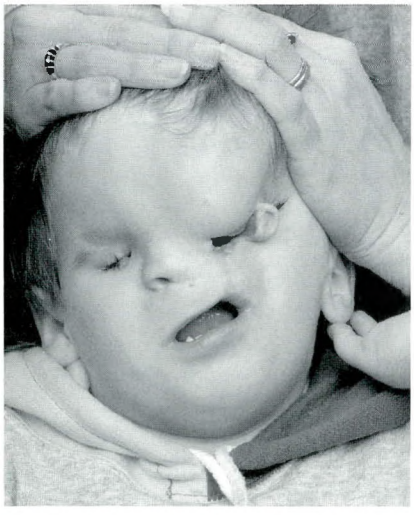


B

Fig 13 (A) Newborn with unilateral right paramedian cleft lip and palate, cleft of right half of the nose and eyelid, and displaced orbit. (B) Result at age 20 years after multiple operative procedures.



A

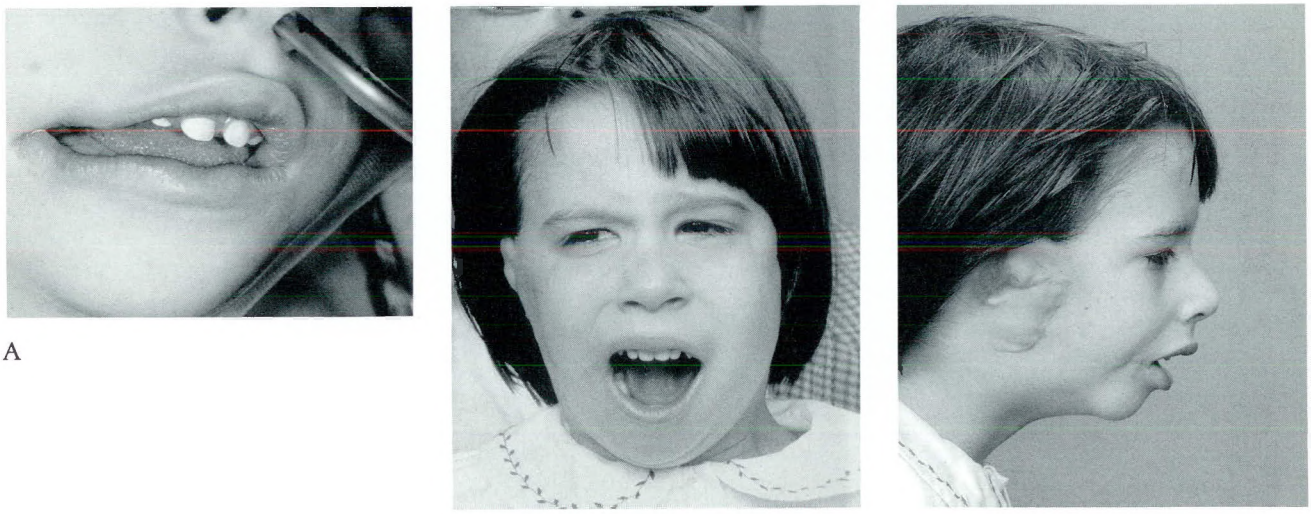


B



C

Fig 14 (A) Multiple total facial clefts (see Tessier classification) with hyperteloric, anophthalmic miniorbits, large median encephalocele, and deformed external ears. (B and C) Frontal and lateral views of result after operative closure of lip and nose.



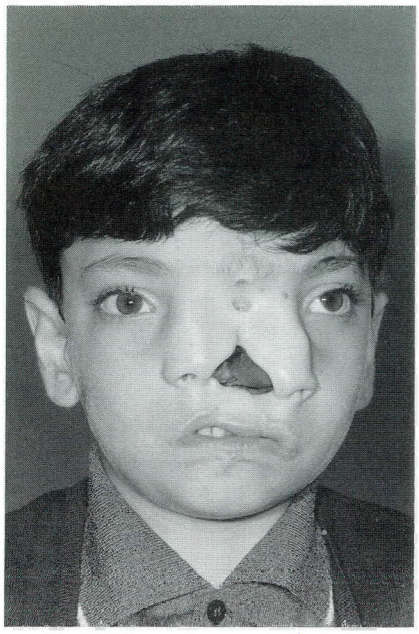
A B C

Fig 15 (A) Preoperative view of partial lateral facial cleft of the mouth and external ear deformity (hemifacial microsomia). (B and C) Postoperative views.



A B C

Fig 16 (A) Frontal and (B) lateral views of deep groove in the left midface dividing all tissues down to the oral mucosa, resulting from a tight amniotic band across the face. (C) Result after closure of soft tissues.

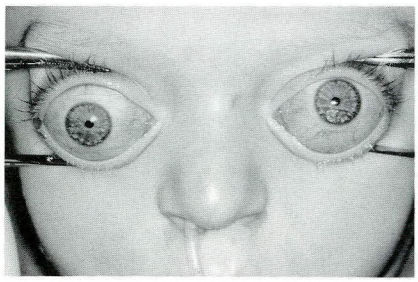


A

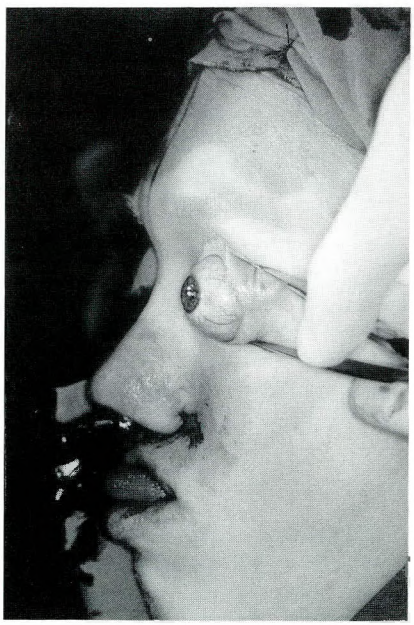


B

Fig 17 (A) Ten-year-old boy, after correction of the lip, with partial duplication of mouth and nose, a rudimentary third eye and eye socket, wide cleft of the palate, and extreme degree of hypertelorism. (B) Result at age 12 years after further operative corrections. (From Obwegeser and colleagues [17]. Used with permission.)



A



B

Fig 18 (A) Frontal and (B) lateral views of patient with Crouzon's syndrome.



A B

Fig 19 Another patient with Crouzon's syndrome. (A) Preoperative view. Note hypoplasia of midface and protrusion of eyeballs. (B) Result after frontofacial advancement operation.

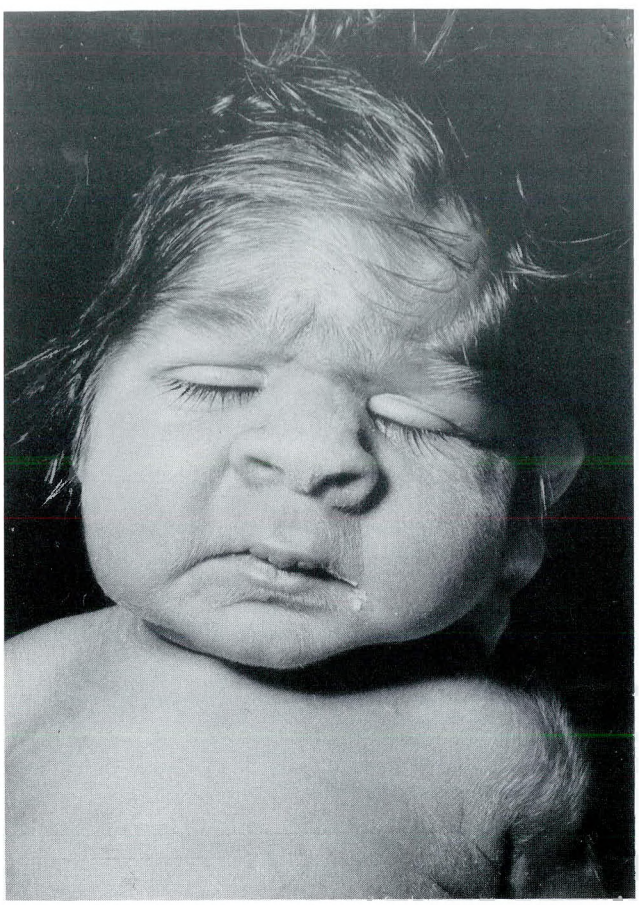
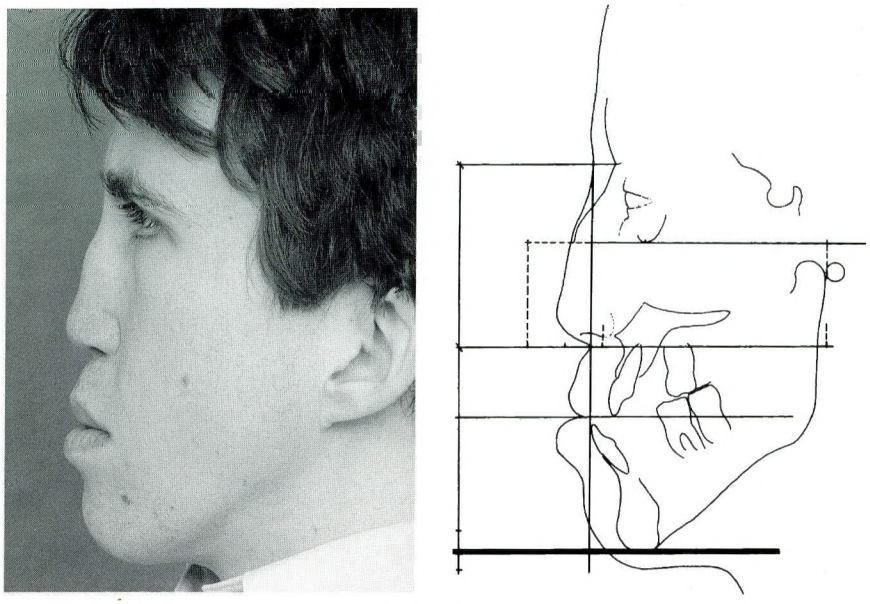


Fig 20 A 10-day-old infant with polysaccharidosis.



A B

Fig 21 Patient with Binder's syndrome (nasomaxillary hypoplasia). (A) Lateral view. (B) Cephalogram showing skeletal situation.

superior judgment. Today, a revival of this attitude anywhere in the world is not improbable. Indeed, according to one news report (*Neue Zürcher Zeitung*, October 31, 1994), a law has passed parliamentary approval in China regulating the prevention and elimination of defective offspring "in order to improve in the future the quality of the Chinese people."

Silent Cultural Contribution

What is our position and what are our possibilities in the face of such developments? Thanks to modern medical knowledge and refined surgical technology, we are able to rehabilitate and socially reintegrate formerly hidden and excluded humans with the most despicable and detested craniofacial defects (Figs 10–21), making life worth living for them. In this sense and in the general and widespread absence of philosophical or religious ties today, our profession is making a silent cultural contribution, acting as a grain of salt on the earth.

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Influence of Craniofacial Surgery on the Social Attitudes Toward the Malformed and Their Handling in Different Cultures and at Different Times: A Contribution to Social World History

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A historic overview including the European, American, Asian, and African continents is given on attitudes toward and the handling of humans with congenital malformations in ancient cultures and on pertinent customs in some prehistoric peoples. Figures of early works of art showing malformed individuals are presented testifying to this worldwide and timeless problem of humankind. In parallel, analogous patient photographs from our hospital before and after reconstructive surgery are shown. Philosophies of ancient Greece, Rome, and China on the subject of malformed infants essentially did not differ from the known attitudes of the less developed tribes in Europe and pre-Columbian America, although the means of elimination of unwanted offspring were rather passive (exposure) than active (manual killing). A radical change in attitudes and practices occurred with the spread of the Christian religion and its political installment in Europe: The care for the underprivileged including the malformed ones was considered a Christian duty to be performed with compassion and love. In our century, the clocks have been and apparently are turned back again. Atheistic and Darwinian influences, political atheism, and the belief in "higher ethics" issued by "superman" have led to a relapse into barbarism, also within the medical system. We, as craniofacial surgeons, are privileged to have the means to turn the clocks forward again by rehabilitating the physically most underprivileged: those with conspicuous craniofacial malformations. The necessary techniques exist and are applied, as the figures of patients from our hospital demonstrate, but the will and the emotional strength for their consequent application require more than our hands.

Key Words: Congenital malformations, ancient cultures

The significance and the handling of malformed humans from archaic to modern times worldwide reflect the lifestyle and culture of the various populations at any time. According to extensive ethnological studies, mostly done in the second half of the last century, primitive tribes and peoples on all continents disposed of malformed infants immediately after birth, usually by drowning, strangulation, or suffocation or live burial [1]. Our survey is not claiming to be comprehensive but rather to show typical examples of behavior of ancient societies toward a painful and secret problem, and some modern trends in similar directions.

Behavior of Pre-Columbian and Some Contemporary Indigenous American Indians

Among culturally more developed peoples like the Indians of South and Central America (the Incas, Mayas, and Aztecs), ritual homicide or infanticide was frequently practiced, mainly by the Aztecs. Offspring were regularly extinguished when born under bad auspices (of calendar or stars). Congenital malformations were believed to be due to misbehavior of the mothers during pregnancy [2], but what happened to them or their "stigmatized" children is unknown. Excavated terra-cotta figurines of persons with cleft lips (Fig 1) and other facial abnormalities (Figs 2 and 3), mainly found in Mexico but probably stemming from the Inca Land Columbia, famous for ceramics manufacturing, may simply testify to the high frequency, even today, of facial clefts in these regions.

That the attitude of certain indigenous South American Indian societies toward malformed infants apparently has remained unchanged for millennia is

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judicious use of plate and screw fixation in critical areas requiring three-dimensional stability. Longer close follow-up of the patients is of paramount importance. The development of resorbable plates, screws, and bioceramic cements may make these concerns a moot point in the future [16, 17].

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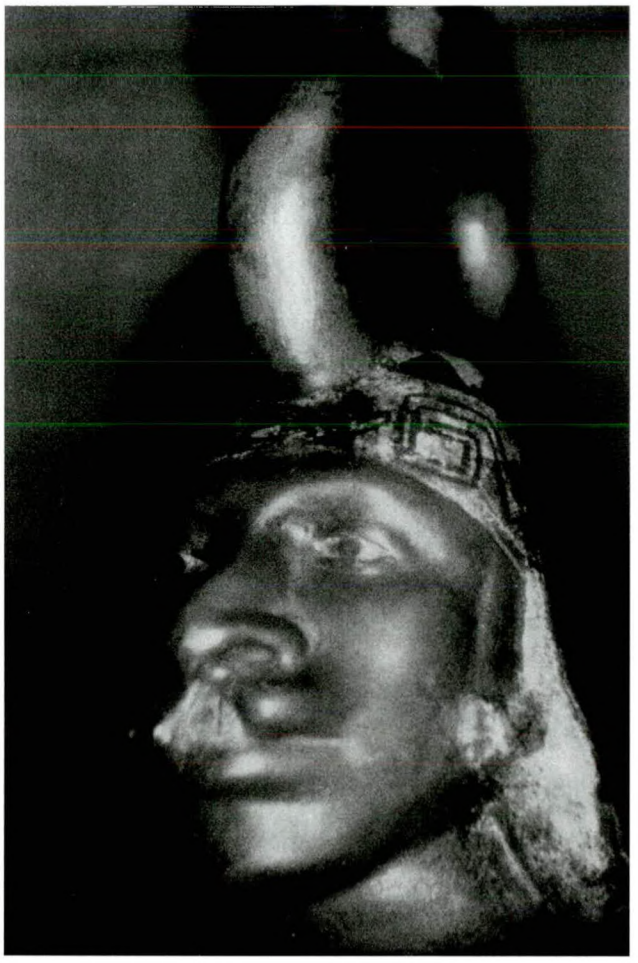


Fig 1 Pre-Columbian vase in glazed terra-cotta showing unilateral cleft lip. (See also Figs 10 and 11.)

documented by the following report in the Neue Zürcher Zeitung of November 3, 1994. A Yanoama mother gave birth in a Brazilian hospital to a son. The midwife had to tell her that the baby had a minor genital malformation (possibly hypospadias). When the midwife left the room, the mother immediately killed the baby, stating that she was, by their customs, obliged to do this. The Brazilian magistrates, being aware of these unwritten laws of their indigenous people, exempted her from legal prosecution.

Customs in Early Asian Cultures

In Far East Indian culture, the handling of malformed children or otherwise handicapped persons was prescribed by laws of the four major castes. A pertinent passage in the Brahman *Laws of Manu* (translated into English in 1886) [3] reads as follows: "Eunuchs and outcasts, persons born blind or deaf, the insane, the idiots and the dumb as well as those deficient in any organ (of action or



Fig 2 Terra-cotta from Mexico probably showing left lateral facial cleft of nose and mouth (or possibly acquired loss of soft tissue). (Photograph by Prof. Perko.) (See also Figs 15 and 16.)

sensation) are disqualified to inherit. But a man who knows the law has to provide evenly to all of them, give food and raiment without stint, according to his ability. He who gives it not will become an outcast." Outcasts and madmen were not allowed to marry. Others (i.e., malformed ones) could do so. In some southern India circles, persons with facial malformations were given demonic attributes as exemplified by a mask from Ceylon used to exorcise demons (Fig 4).

From ancient China there exists a legal text of the Qu'in period (200 B.C.) on the subject of malformed or otherwise unwanted children [4]. The passage reads as follows: "Unauthorizedly to kill a child is punishable by tattooing and being subjected to forced labour (grain pounding)." However, "when a child is newly born and has strange things on its body, as well as when it is deformed, to kill it is not to be considered a crime" and later "letting a child die simply because one has too many children is a case of killing" (and therefore a criminal act).

According to a legal expert on Han law (Han period 206 B.C. to 220 A.D.) (cited in Behnke Kinney [4]), partly in use up to recent times, the method of punishment of those guilty of infanticide and abandonment was left more or less to the discretion of the local official in charge. This could vary from death sentence (rare) to tolerance without any consequences. A public document, probably from the Han period states: "Now under heaven, all families kill girls; there are even some that have killed more than ten" [5].

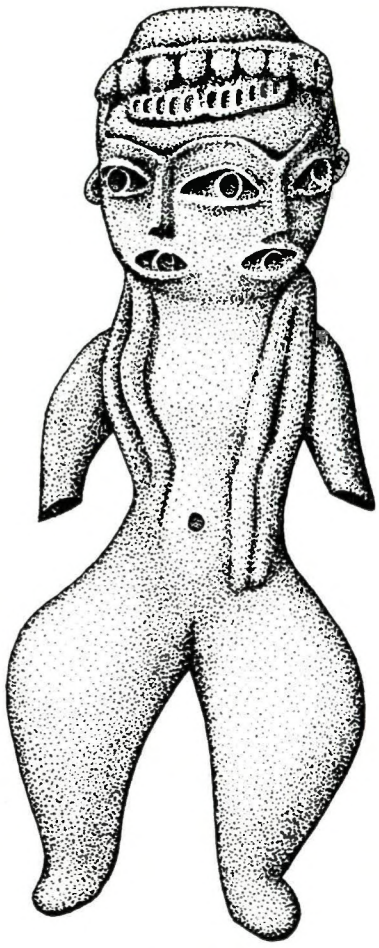


Fig 3 Clay figurine from Mexico, Zacatenco period (about 500 B.C.) with partial facial duplication (mouth and nose) and a third eye. (From Covarrubias M. Indian art of Mexico and Central America. New York: Alfred A. Knopf, 1957. Used with permission.) (See also Fig 17.)

Following religious tradition (as opposed to legal practice), the existence of a child was not officially recognized until the third day of life. During this time, the family (often consisting of five generations) had to decide whether to raise a child. If in doubt, the child was left for 3 days without food and shelter on a bundle of rags. If it survived, the parents were morally obliged to raise it.

Thus, tentatively summing up the attitudes in many ancient non-European cultures toward children with birth defects, the predominant tendencies were in favor of abandonment while delegating responsibility to supernatural authorities.

Attitude in Indigenous African Cultures

In some African cultures, malformations or congenital diseases may have been of ambivalent significance. Minor facial anomalies such as protruding eyes were seen in Benin as a sign of majesty and power (Fig 5). On the other hand, a grossly abnormal facial expression, as seen in some storage diseases, was believed to signify criminality. A case in point is shown in a clay sculpture from Nigeria (Fig 6) showing the insignia of death sentence (the head of an ape on a necklace) in an obviously severely ill person. Also from Nigeria stems a terra-cotta of a malformed head, held by a hand at the neck, apparently signifying decapitation for a criminal act (Fig 7).



Fig 4 Mask from Ceylon used to exorcise demons showing median facial cleft involving the lip and nose with a protruding frontal eye and strabismus divergens. (See also Figs 12–14.)

Attitudes in European Antiquity

In Greek and Roman antiquity, there is sparse reliable testimony on this subject. In the state of Athens in the 4th and 3rd centuries B.C., where the ideas of Platon's, as laid down in "The Republic," were, of all Greek town states, most closely implemented, the practice was, in Platon's words, as follows: "The offspring of the citizens who are born defective they will properly dispose of in secret" [a euphemism for exposure] "so that no one will know what has become of them" [6]. The same could be and was frequently done also with normal children unwanted for other reasons.

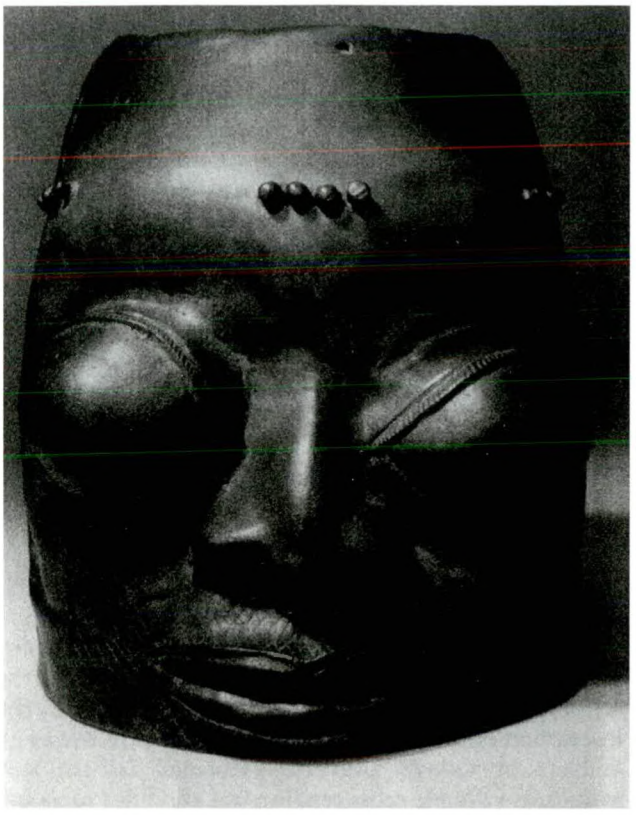


Fig 5 Bronze from Benin (Africa) showing massive protrusion of the eyes (allegedly a sign of majesty and power), possibly patterned from Crouzon's syndrome. (See also Figs 18 and 19.)

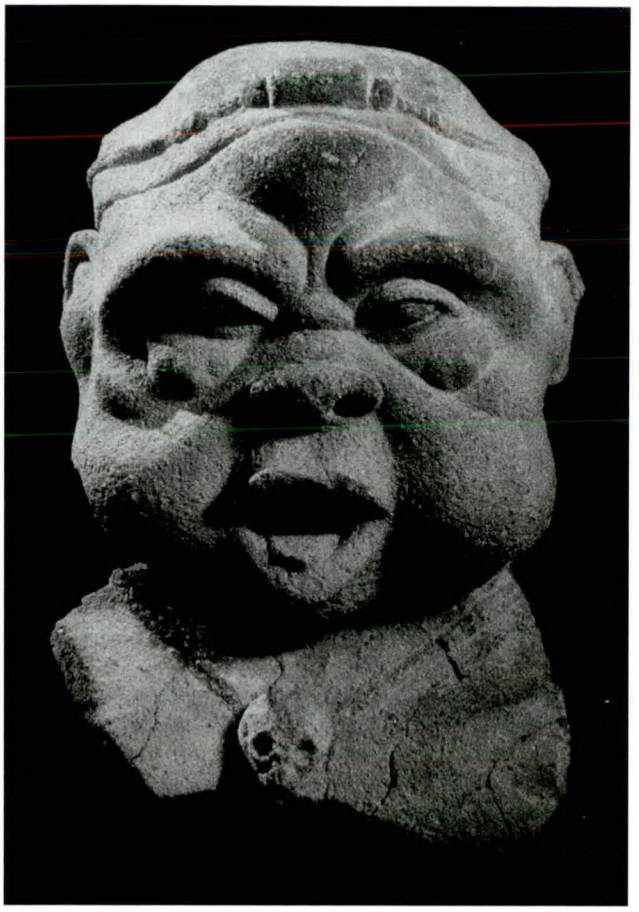


Fig 6 Clay sculpture from Nigeria showing a sick, possibly malformed person with the insignia of death sentence (skull of an ape on a necklace). Facial expression suggests storage disease. (See also Fig 20.)

The decision whether to rear or dispose of a newborn was up to the father. Menander, for instance, in the comedy Perikeiromene lets Moschio, himself a former foundling, states: "No father has to raise children he doesn't want; it is his right to expose them" [7]. While the practice of exposure in the wilderness was accepted custom in Athens at Platon's time, Aristoteles strongly advocated that "a law be made that no defective offspring be raised" (Politeia, VII, 8).

On the other hand, in Sparta, according to Plutarch's biography of Lycurgos, this legislator in the 8th century B.C. instituted a law on the subject of defective offspring. The passage in Plutarch reads as follows: "Offspring was not reared at the will of the father, but was taken and carried by him to a place called Lesche where the elders of the tribes officially examined the infant, and if it was well built and sturdy they ordered the father to rear it; but if it was ill-born and deformed they sent it to the so-called Apothetae, a chasm-like place at the foot of Mount Taygetos, in the conviction that the life of that which nature had not well equipped at the very beginning for health and strength, was of no advantage either to itself or the state" [9].

In ancient Greece, a malformed adult, if one survived (or a psychotic or another social outcast) was often selected by the community to be the ritual projection center (ritual impersonation) of all misdeeds having happened in the city during one year. The poor creature was then escorted by citizens in a procession to the city gates and banished from the city, and, with him, all evil [10].

An entirely rational attitude toward the problem of malformations was taken by the Roman philosopher Seneca (1st century A.D.). In *De Ira* he wrote, matter of factly, "The malformed [animals] we extinguish, children too; we drown them if they are born feeble and defective. And it is not out of ire but of reason that we separate the unfit from the healthy" [11].

The expansion of the Roman empire into Germania and the contact with Teutons (some of whom were incorporated into the Roman army) induced Tacitus to write and compare the utterly moral and healthy Germanic



Fig 7 Terra-cotta from Nigeria showing decapitated head of a person with flat forehead caused by midface hypoplasia, low position of the nasal base, possibly bicoronal craniosynostosis, slightly protruding eyes, and possibly mongolism or Binder's syndrome (nasomaxillary hypoplasia). (See also Fig 21).

family life and society with that of the decadent Romans, who considered the upbringing of children a tedious chore for women and men and who readily aborted or disposed of unwanted offspring without scruples. In Germania, Tacitus wrote, in the sense of admonition of his people: "To limit the number of children or to kill one of the late-born ones is a detestable crime in Germania" [12]. However, according to other sources the extinction or exposure of feeble or too numerous offspring often was also practiced by them [1].

New Attitude Through Christian Ethics and Its Practice

A new attitude toward the sick in general and those born defective arose in Germania when the Christian religion was officially admitted by the Emperor Constantine I and after the first Nicean Council convocated by him in 325 A.D. From then on and throughout the high Middle Ages, monasteries were increasingly built in Germania that typically also contained an infirmary where the sick and feeble were looked after by monks or friars. A building plan of the monastery of St. Gall of the 8th century is still preserved [13]. Often there was also a separate building for those with contagious diseases such as leprosy imported from the Orient or, later on, syphilis. Also, patients with gangrenous limbs resulting from ergotism from eating moldy grain were treated there. Unwanted newborns often were deposited at the gates of a convent and brought up by nuns.

Hospices (mainly for sick pilgrims) or hospitals were frequently built or financially supported by the reigning authorities (dukes or knights) as an atonement for sins; they then were granted remission by the church. Thus, according to an existing papal document of 1204 issued by Innocence III, the first major hospital of the city of Zurich was built by the Zähringer Duke Berchtold V "as a remedy for his sins," as the papal epistle states. This hospital was granted papal protection but obliged to yearly pay to the papal administration one gold florin. This obligation was repealed only 250 years later. A drawing from 1576 of the ancient Zurich Hospital "Heiliggeistspital" (Hospital of the Holy Spirit) associated with and tended by the monastery "Predigerkloster" (Monastery of the Preachers) and its staff is shown in Figure 8.

These were the customs for about 1,000 years in medieval central Europe. Philosophically speaking, caring for the sick and feeble was propagated by the church and considered by it the same as caring for Christ himself, whereby one gained spiritual rewards for oneself according to the scriptures (Matthew 25:40). This is aptly expressed by the inscription on the ancient hospital seal (still in use as an emblem by today's University Hospital Zurich), surrounding a double cross reading in Latin "Res sacra miser," meaning "a sacred cause is the miserable" (Fig 9).

A more secular attitude toward tending to the sick, crippled, and needy originated from the Zurich Reformer Zwingli, pastor of the City Church from 1519 to 1531, who urged the worldly administrators to look after its poor, sick, and underprivileged. Zwingli succeeded in instituting the so-called Order of Alms covering hospital expenses for long-term inmates such as severely crippled, imbecile, epileptic, deaf-mute, and insane patients called "house children" [13]. The predominant motive of the nursing staff to do this work now was charity rather than penance. The still entirely Christian attitude toward nursing can be seen by Bullinger's (city pastor, successor of Zwingly) admonition to an almighty hospital administrator: "Don't treat the house children as dogs; Christ himself meets you in them."

Influence of Medical Care and Surgical Skills

Medical care proper (vs. nursing alone practiced before) began in 1683 when the city employed two medical doctors and two surgeons as permanent hospital staff. Medical knowledge and progress subsequently determined patient treatment.

A medical faculty was founded in 1833 soon after the foundation of the University. Since 1804 the hospital was under the administration of the Canton of Zurich, to the relief of the city.

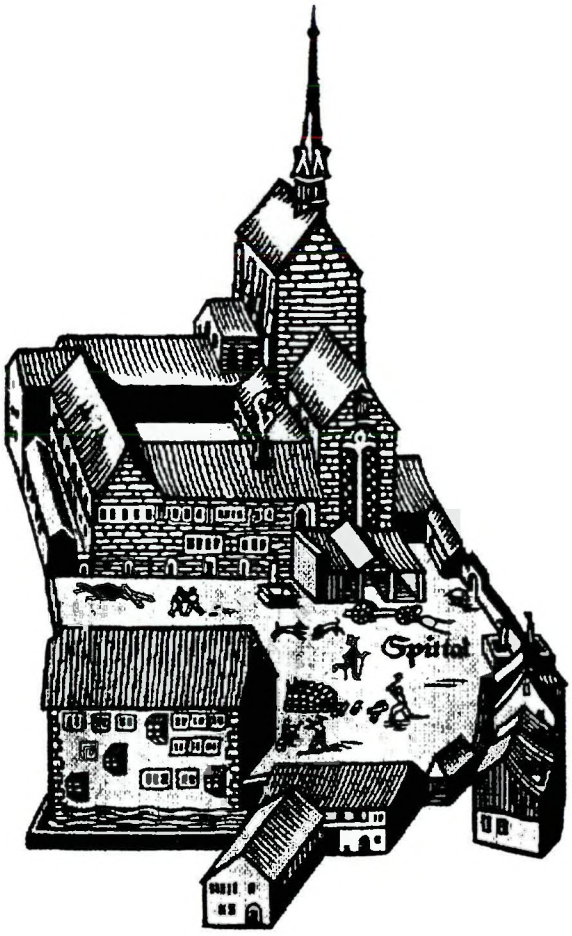


Fig 8 An ancient forerunner of today's Zurich University Hospital depicted on a map from the 16th century. The larger and two smaller houses at the bottom left served patient accommodation. The row of small buildings on the right housed different hospital-related craftsmen. At the top the monasterial complex with the dominating Predigerkirche (church of the preachers) is shown. The hospital, then named Heiliggeistspital (Hospital of the Holy Spirit), was entirely staffed by nuns and friars. The picture shows the close association between the monastery and the hospital complex.

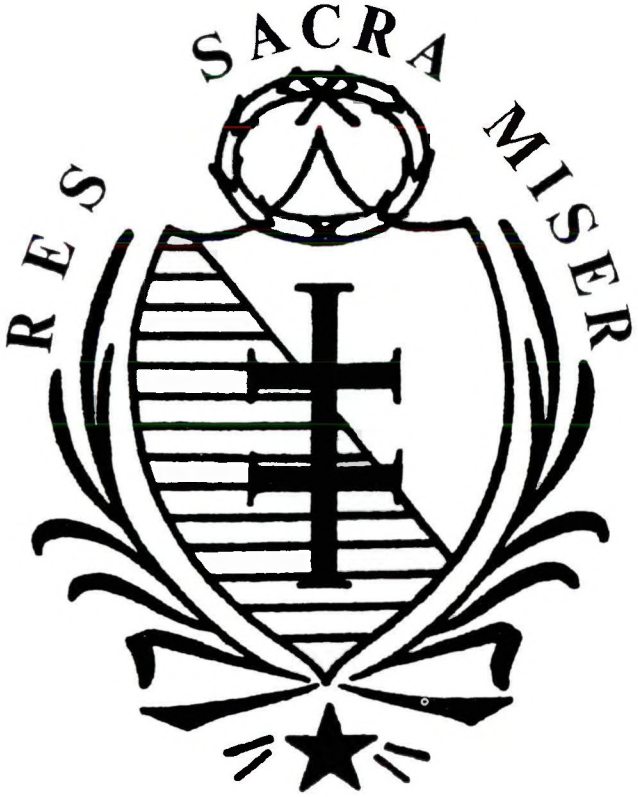


Fig 9 Ancient official hospital seal probably stemming from last century. The Latin words mean "a holy thing [cause] is the miserable." Older seals of similar design exist, a poorly legible one dating back to the 13th century. This picture is still used by the Zurich University Hospital as a decorative emblem.

Operative treatment of children with maxillofacial malformations began in the second half of the last century, around 1860. In Germany, von Langenbeck introduced techniques for the closure of maxillofacial clefts, and around 1890 the first operations for craniosynostoses were done. Pediatric surgery, comprising craniomaxillofacial surgery, started at the University Children's Hospital of Zurich in 1909. Adequate treatment of all congenital malformations was financially helped from 1960 up to now by a special government fund for all of Switzerland covering all medical costs of these patients up to the age of 20 years (Insurance for Invalids).

The smooth transition of nursing care alone to sophisticated surgical treatment of patients with congenital malformations, as outlined previously for Switzerland, developed along similar lines in the whole of central Europe (Germany, France, Great Britain). These surgical measures were often taken over and decisively developed and improved by the departments of craniomaxillofacial surgery, as was the case 25 years ago in Zurich.

Political Aberrations of Our Century and Our Answer to Them

A tragic interruption of surgical and medical care of the congenitally malformed patients occurred in Germany in the early 1940s, when for eugenic (and financial) reasons any malformed children of all ages, namely those with maxillofacial clefts, spina bifida, missing extremities, idiocy, mongolism, different kinds of paralysis, and so on cared for in institutions or at home and physically or mentally infirm adults had to be registered to be

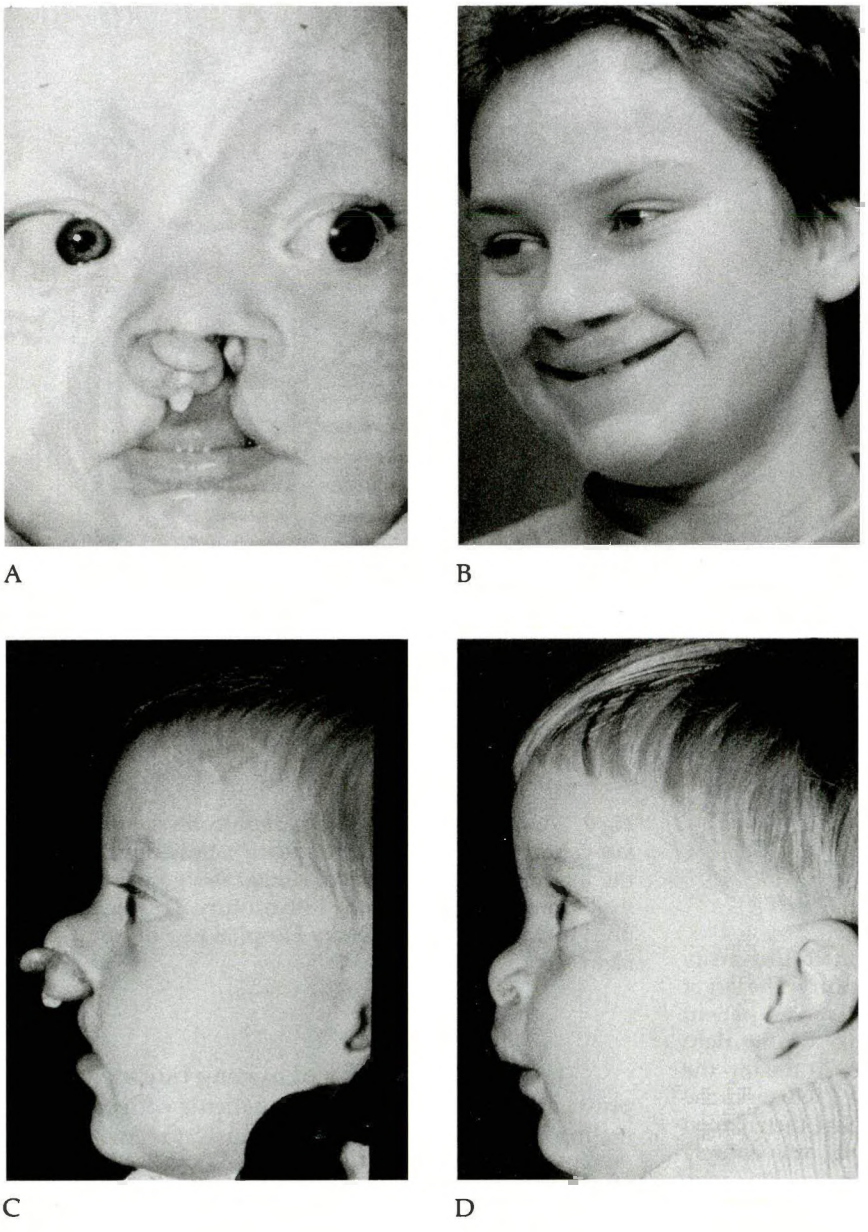
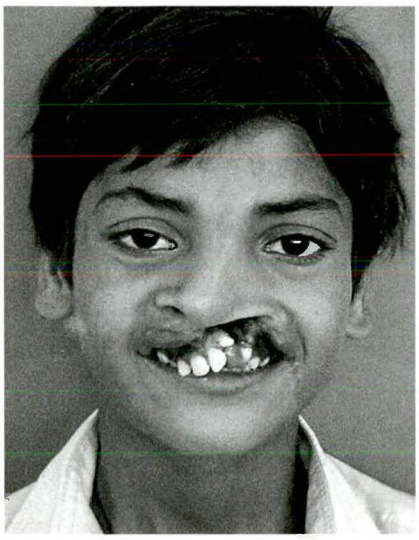
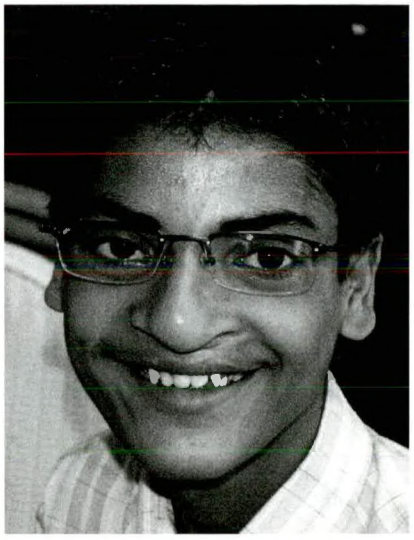


Fig 10 Nine-month-old child with bilateral total cleft lip and palate. (A) Frontal view. (B) Postoperative result showing happy youngster at age 14 years. (C) Lateral view. (D) After primary orthodontic treatment, the lip was closed according to the method of Celesnic I and II (Op. fec. Prof. Perko).

extinguished by government decree (confidential governmental issue of the Ministry of the Interior, Aug. 18, 1939) [14]. However—and this is less well known—the terrain that made these misdeeds possible was prepared significantly by the philosophical movement of social Darwinism (in which many medical doctors participated), which followed Darwin's theories of evolution for all living organisms, including humans, by natural selection and adaptation. (Favorable physical changes are, however, as recognized later, caused by chance mutation of genes, not adaptation.) Two major propagators of the application of the selection theory in human beings were the zoologist and philosopher Ernst Haeckel [15] and the medicolegal team of K. Binding and A. E. Hoche with their treatise [16]: "Die Freigabe der Vernichtung lebensunwerten Lebens" (in literal translation, "The Liberalization of the Annihilation of Human Life Unworthy of Being Lived"). While Haeckel and other social Darwinists succumbed to a perfectionist belief concerning the human race, Binding and Hoche were clearly motivated by political and economic considerations. However—and this was their perfidy—they invoked a "new and higher ethics" as the basis of their philosophy; the ethics of the perfect, self-righteous, and autonomous human possessing



A



B

Fig 11 Adolescent with unilateral total cleft lip and palate. (A) Preoperative view. (B) Postoperative view.

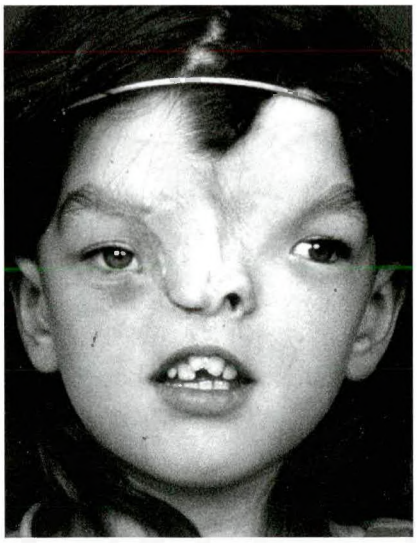


A



B

Fig 12 Varieties of hypertelorism: (A) Fourteen-year-old boy with median facial cleft (lip already closed) with complete cleft of the nose, widely separated nostrils, and hypertelorism. An encephalocele was protruding through the anterior and medial cranial fossa into the oral cavity. (B) Result at age 23 years after operative correction of hypertelorism and nose. Another case of extreme hypertelorism with additional nasal cleft before (C) and after several operations (D) demonstraiting that even attractivity can be achieved in humans with monstruous malformations.



C

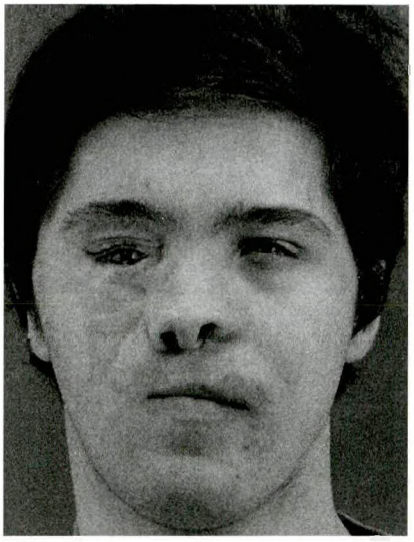


D

Another case of extreme hypertelorism with additional nasal cleft before (C) and after several operations (D) demonstraiting that even attractivity can be achieved in humans with monstruous malformations.



A

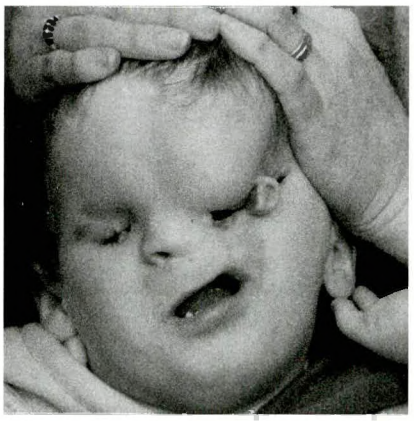


B

Fig 13 (A) Newborn with unilateral right paramedian cleft lip and palate, cleft of right half of the nose and eyelid, and displaced orbit. (B) Result at age 20 years after multiple operative procedures.

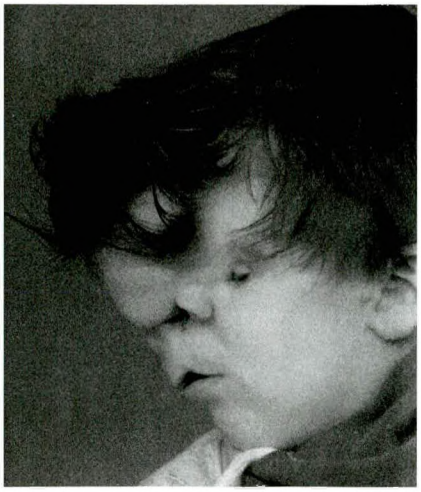


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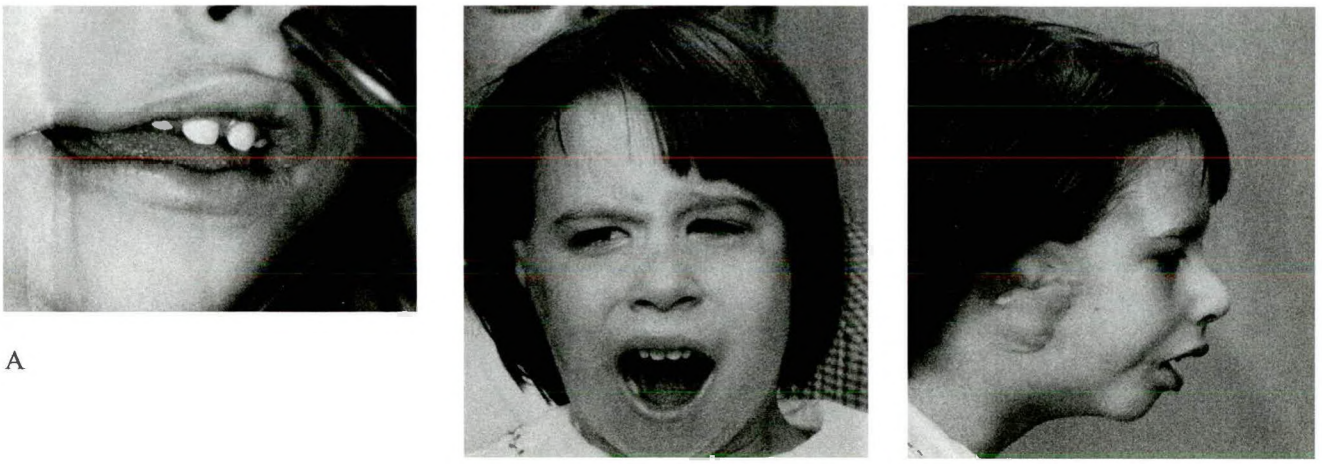
B

Fig 14 (A) Multiple total facial clefts (see Tessier classification) with hyperteloric, anophthalmic miniorbits, large median encephalocele, and deformed external ears. (B) Frontal views of result after operative closure of lip and nose.



C

(C) Lateral views of result after operative closure of lip and nose.



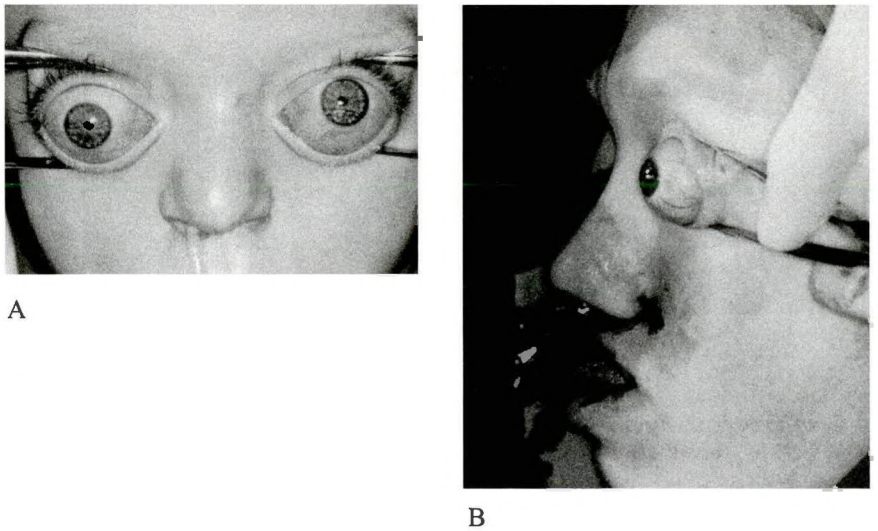
A B C

Fig 15 (A) Preoperative view of partial lateral facial cleft of the mouth and external ear deformity (hemifacial microsomia). (B and C) Postoperative views.



A B

Fig 17 (A) Ten-year-old boy, after correction of the lip, with partial duplication of mouth and nose, a rudimentary third eye and eye socket, wide cleft of the palate, and extreme degree of hypertelorism. (B) Result at age 12 years after further operative corrections. (From Obwegeser and colleagues [17]. Used with permission.)



A B

Fig 18 (A) Frontal and (B) lateral views of patient with Crouzon's syndrome.

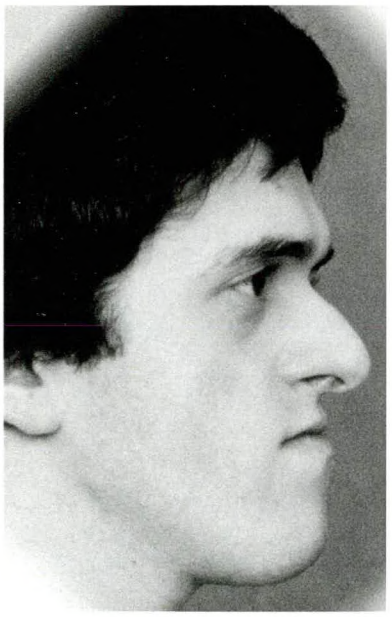


A

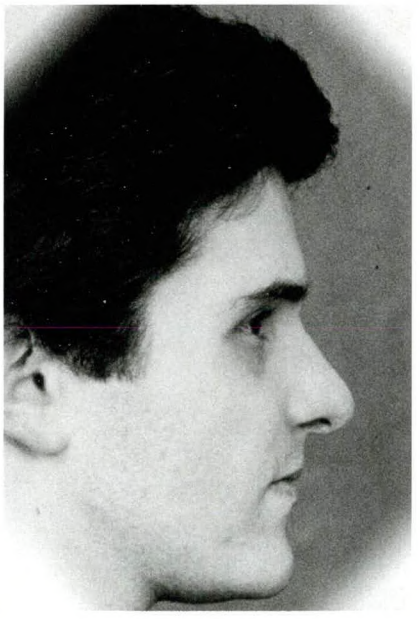


B

Fig 19. Varieties of Crouzon's syndrome: another patient with Crouzon's syndrome. (A) Preoperative view. Note hypoplasia of midface and protrusion of eyeballs. (B) Result after frontofacial advancement operation.

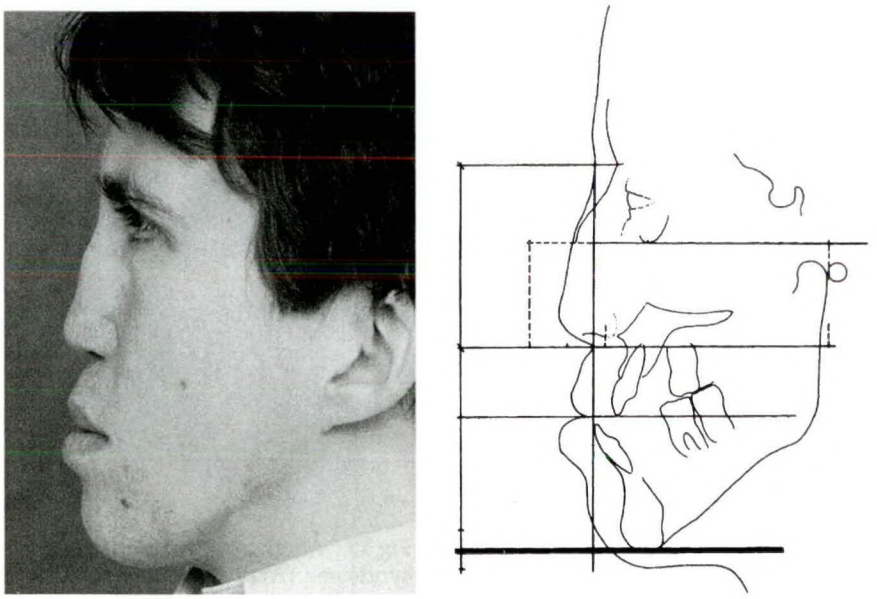


C



D

(C) Another Crouzon's patient where a simultaneous Le Fort III - and Le Fort I - osteotomy lead to an attractive outer appearance (D).



A B

Fig 21 Patient with Binder's syndrome (nasomaxillary hypoplasia). (A) Lateral view. (B) Cephalogram showing skeletal situation.

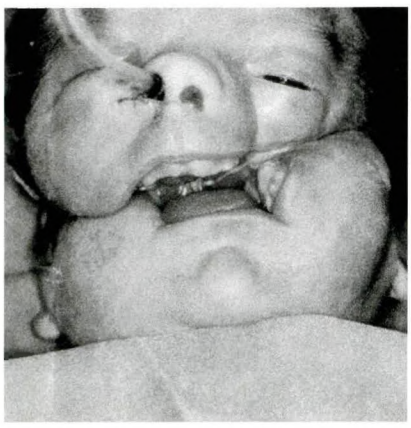
superior judgment. Today, a revival of this attitude anywhere in the world is not improbable. Indeed, according to one news report (*Neue Zürcher Zeitung*, October 31, 1994), a law has passed parliamentary approval in China regulating the prevention and elimination of defective offspring "in order to improve in the future the quality of the Chinese people."

Silent Cultural Contribution

What is our position and what are our possibilities in the face of such developments? Thanks to modern medical knowledge and refined surgical technology, we are able to rehabilitate and socially reintegrate formerly hidden and excluded humans with the most despicable and detested craniofacial defects (Figs 10–21), making life worth living for them. In this sense and in the general and widespread absence of philosophical or religious ties today, our profession is making a silent cultural contribution, acting as a grain of salt on the earth.

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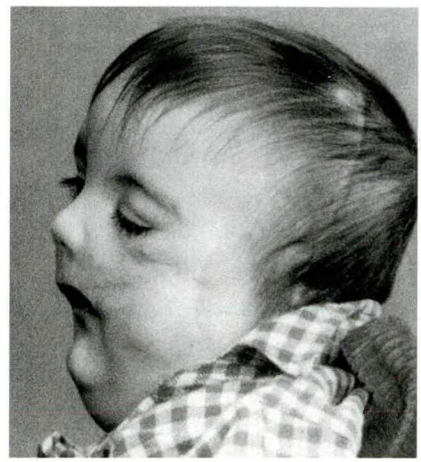
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A

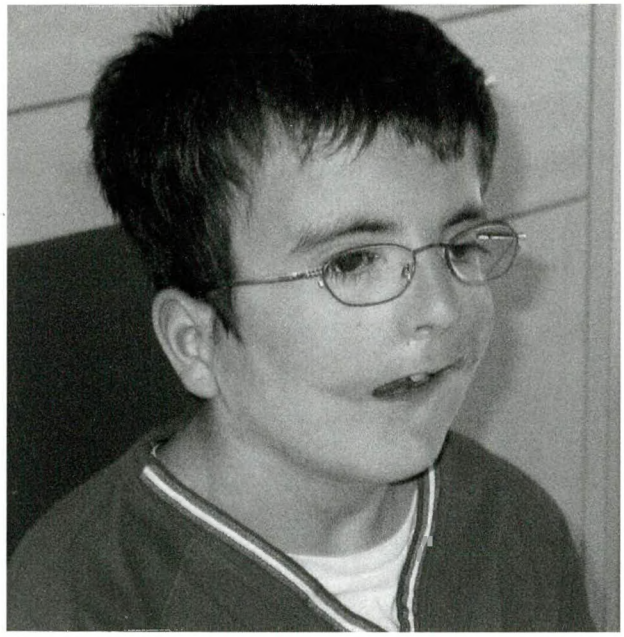


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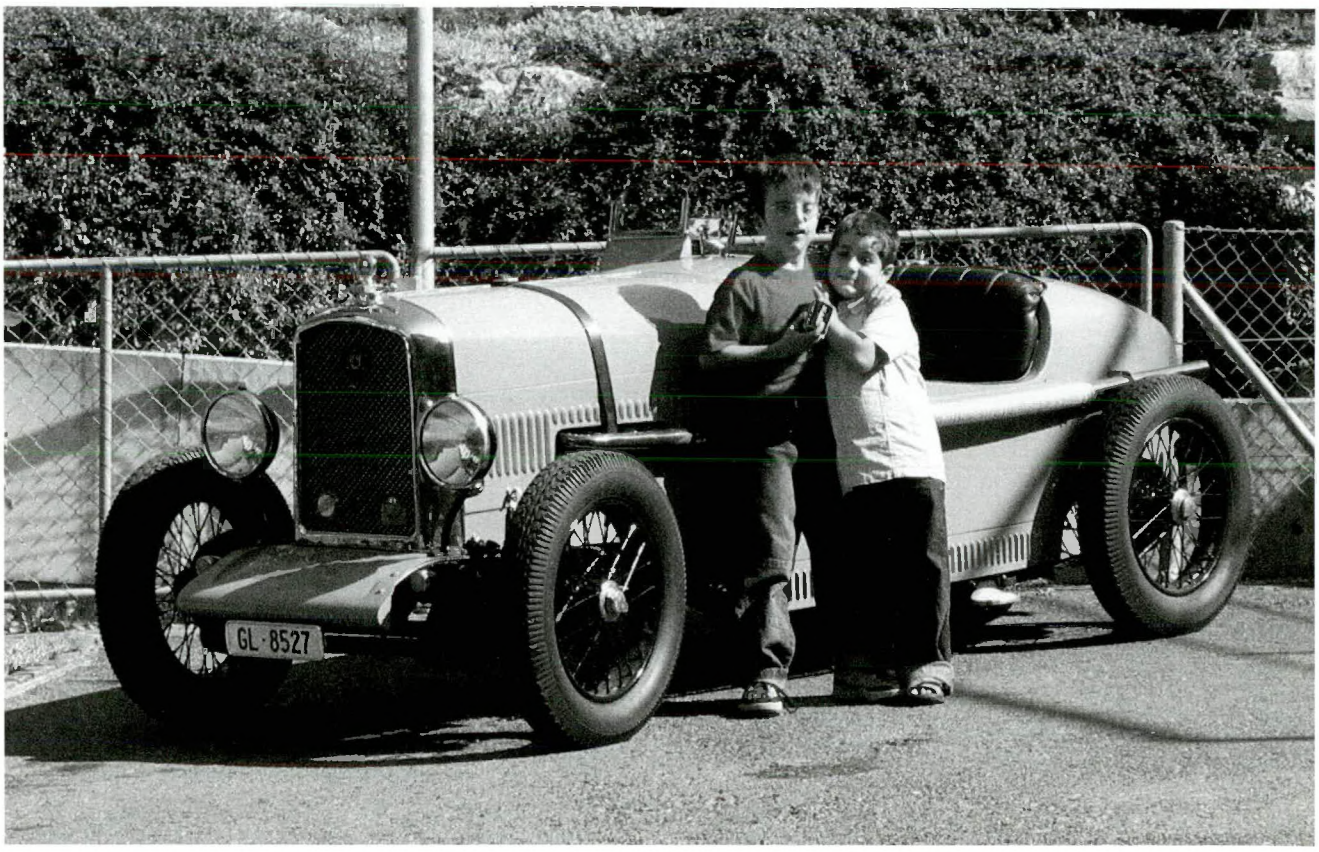
Making life worth living: (A) Frontal and (B) lateral views of deep groove in the left midface dividing all tissues down to the oral mucosa, resulting from a tight amniotic band across the face. (C) Result after first operation. In spite of his extreme deformities the boy developed well during the next 12 years (D,E) is enjoying life (G), plays skillfully his musical instrument (H) and is able to eat normal food (F).



D



E



G



H



F