

The demographic revolution and our common future: quo vadimus?

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Abstract

Professor Egon Diczfalusy reflects on a lifetime of experience, drawing insights from not only the great masters of the arts, philosophy and the sciences but also from a time in history in which he has witnessed some of the greatest triumphs in science as well as some of the greatest tragedies against humanity. This paper highlights some of the most pressing public health issues facing the world today, such as population growth and the changing global population structure, examining factors such as longevity and the progressive imbalance between the number of elderly persons in our communities and the number of persons who are able to support them. Finally he discusses the falling rates in fertility, stressing its multifactorial aetiology. In his closing remarks he poses three major problems that face the scientific community today.

The use and misuse of science

The growing discrepancy between scientific development and our moral/ethical development.

The need to convince today's and future generations that fanatic faith, fundamentalism and obscurantism will not improve the quality of life of their children and grandchildren.

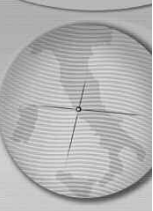
His final reflections remind us that we belong to a humanistic science one in which we should not only strive to achieve the wisdom of humility but also the wisdom of hope.

Key words: demography, use of science, ethic

Shakespeare said that "there is a divinity that shapes our ends" (*Hamlet*, V.II.10). Almost exactly 70 years ago, in June, 1936, the Italian Government invited 200 Hungarian students, who had studied Italian in school, to spend a month in Italy. I was extremely fortunate to be one of them, and that visit marked for me the beginning of a lifelong love-affair with Italy. I moved from Hungary to Sweden in 1946 and I was - again - very fortunate, since I was able to become a Swedish citizen in 1950, an event most unusual at that time. I was even more fortunate in my professional life, to have some 150 research students from 36 countries, among them 12 from Italy. I have always considered them as my Italian children, and I would like to use this opportunity to thank them from the bottom of my heart, for enriching my life so much with their life-long loyalty and devoted friendship.

The great Swedish statesman, Count Oxenstierna (1583-1654) wrote that: "At fifty you begin to be tired of the world and at sixty the world is tired of you". If so, what happens at 75? You discover, like Trotsky, that "old age is the most unexpected of all the things that happen to a man" [1], and you understand better than others what Sophokles meant when he said that "No man loves life like him that's growing old" (*Acrisius*,

fragment 64). Well, what happens then at the age of 85? According to the optimistic view: "Growing old is like climbing mountains: the difficulty is increasing with every step, but so does the perspective". According to the pessimistic view of an oriental proverb: "When a man is young, he writes songs; grown up, he speaks in proverbs; in old age, he preaches pessimism". Let me therefore state with emphasis that I am not a pessimist - I am not an optimist either; I am simply confused. Why am I confused? Because I encounter reality every day at three different levels, the scientific, economic and the political. If those converge, progress can be incredibly rapid. If not, then always the political reality prevails, even if it is completely irrational. So, I am confused. However, nowadays it is very fashionable to be confused and I have read somewhere that "if you are not confused by the realities of these modern times, you are not well informed". Our problem with the realities of today is that the changes around us are increasing in magnitude and speed, but our perception of these changes and of their likely consequences is lagging more and more behind. Therefore, in the final analysis, all of us are prisoners of our perceptions, watching the shadows of new realities on the walls of Platon's cave. The Indonesian scientist, Prof. Soedjatmoko,



the first Rector of the United Nations University in Tokyo, identified masterfully the fundamental challenge of the new realities: "How to deal with problems for which we can't find analogies in older, often petrified systems of wisdom?" [2]. I see an even more fundamental challenge confronting humankind: in a world in which the amount of new scientific and technical information is said to double every seventh year, the classical value systems of our markedly different societies - that are based on historical tradition, parochial identities and religious dogma - can no longer accommodate some of the new realities. Hence, our contemporary history imparts the impression of a stormy sea, where the fragile vessel of rationalism is constantly threatened by the high waves of passion, fanatic faith and emotion. In the year 14 A.D., when Emperor Augustus died, the population of the known world was definitely less than 300 million people and during the next 1000 years it remained at the same low level. Then global population started to increase, first slowly, then more and more rapidly. When I was born, in 1920, the world population was still less than 2 billion; today it is 6.5 billion. Hence, in my lifetime, I have seen the birth of another two worlds - equal in numbers, needs, aspirations, hopes and dreams. I have seen in action the two powerful determinants of human destiny, the arrogance of power and the arrogance of ignorance. And I was reminded of the classical statement of Giordano Bruno, that "ignorance and arrogance are two distinct sisters in one body and one soul". I have also observed the activities of three generations of politicians and reached the same conclusion as Schopenhauer, that "the man who sees the politicians of three generations in action is like someone who sees the tricks of a magician three times in a row" [3]. They are meant to be seen only once. I have witnessed a century, in which some 200 million human beings were killed by other human (?) beings, on the orders of political magicians, and I was greatly influenced by the philosophy of my academic teacher, in Szeged, the Nobel laureate Albert Szent-Györgyi, who wrote that "it is said that man is not intelligent enough to solve problems without killing" [4]. In my lifetime, I have also seen the devastating consequences of two world wars and of many so-called "limited conflicts" and the dangerous flirtation with apocalypse by many governments in the shadow of the atomic bomb; events that are part of our daily life even today. On the other hand, I have been part of the first age since the dawn of our civilization, which made the benefits of progress available to the entire human

race and - through the United Nations Specialized Agencies - provided large-scale assistance in any corner of the world to those stricken by famine, epidemics or other natural catastrophes. Furthermore, in my lifetime, I have seen more progress in science, than all scientists of all preceding periods together since the dawn of history and I profoundly believe that without medical science life would be a mistake. I have also noticed, that most drugs used today by millions and millions of fellow-men and women have been developed in our lifetime and that many more are in the coming. Hence, as Shakespeare wrote, "what is past is prologue" (*The Tempest*, II.I.261). In this way, during a long life, I have reached the conclusion that Rembrandt's *chiaroscuro* - shown in his famous painting of *Claudius Civilis* from 1661 - doesn't signal only a major development in the art of painting, but also characterises human nature and even the human condition in general.

I have indicated before, that in this year, the global population reached 6.5 billion people. In 1950, it was only 2.5 billion, and the United Nations project that by the year 2050, it will exceed 9 billion. In 1950, more than twice as many people lived in Europe than in Africa. Today, a great deal more people live in Africa than in Europe, and it is projected that by the year 2050, three times more people will live in Africa than in Europe, where the population - just like in Italy - is projected to significantly decline (Table 1). Those who are interested in "geopolitics" may perhaps draw interesting conclusions from the demographic data shown in the Tables [5]. The United Nations also project that between now, and the year 2050, the world population of persons aged 60 years or more will treble and in Africa there will be a 5-fold increase (Table 2). Since "human kind cannot bear very much reality" [6], people prefer to neglect these projections and try to cast doubt on their validity. How can you say what will happen in 2050, when we don't even know what will happen tomorrow? It stands to reason, that all projections are uncertain; however, some of them are less uncertain than others. Indeed, the projected two billion elderly people (60 years and over) of the year 2050 represent a

Table 1. Growth of populations (Millions)

Region	Year		
	1950	2005	2050
World	2.520	6.465	9.076
Asia	1.396	3.905	5.217
Africa	224	906	1.937
Europe	547	728	653

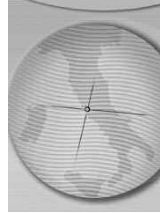


Table 2. Population aged 60 years or older (Millions)

Region	Year	
	2002	2050
World	629	1964
Asia	338	1227
Europe	148	221
Africa	42	205

Table 3. Population aged 65 years and over (Percentage of total. Selected countries)

Country	Year		
	1950	2005	2050
Italy	8.3	18.2	36.0
Japan	4.9	17.2	35.9
Spain	7.3	16.7	34.1
Germany	9.7	16.4	28.4
France	11.4	16.6	27.1
China	4.5	6.8	23.6
United Kingdom	10.7	16.0	23.2
United States	8.3	12.3	20.6

Table 4. Population aged 80 years and over (Percentage of total)

Region	Year		
	1950	2005	2050
World	0.5	1.3	4.3
Africa	0.3	0.4	1.0
Asia	0.3	1.0	4.5
Europe	1.1	3.5	9.6
(Italy)	1.1	5.1	15.2

reality, since they are already around us as teenagers and young people. During the past century, retirement age remained unchanged at 65 years in many countries. Today, the percentage of 65 year old people is highest in Italy, Japan and Spain and it is projected to exceed one-third of the total population of these countries by the year 2050 (Table 3). However, by far the most rapidly increasing portion of the population is that aged 80 years and over. Among the different regions today, their proportion is highest in Europe (3.5%) and it is highest in the world in Italy (5.1%). The United Nations project that by 2050, octogenarians will make up more than 4% of the population in the world, more than 9% in Europe and more than 15% in Italy (Table 4). As mentioned above, today, the highest proportion of the "oldest-old" (80 years and over) is in Italy, followed by Japan and France: it is projected, that by 2050, it will be the highest in Japan and Italy, followed by Spain and Germany (Table 5). The sex ratio of the elderly population is of importance for the planning of health services; among those aged 60 and over, there are 68 men for 100 women in

Table 5. Population aged 80 years and over (Percentage of total. Selected countries)

Country	Year		
	1950	2005	2050
Japan	0.4	4.8	15.3
Italy	1.1	5.1	15.2
Spain	1.0	4.1	12.3
Germany	1.0	4.4	12.2
France	1.7	4.7	10.9
United Kingdom	1.5	4.4	8.8
United States	1.1	3.6	7.3
China	0.3	1.1	7.2

Table 6. Sex ratio at 60 and 80 years and over in the year 2002. (Men per 100 women)

Region	60 years+	80 years+
World	81	53
Africa	83	69
Asia	88	61
Europe	68	41

Table 7. Life expectancy at birth by sex (years)

Region	Year			
	2005		2050	
	Male	Female	Male	Female
World	64.3	68.7	72.8	77.5
Africa	49.3	50.6	63.8	67.0
Asia	66.8	70.8	75.0	79.5
Europe	70.2	78.4	77.5	83.6
(Italy)	77.5	83.6	82.2	88.1

Europe and 74 in Italy. Among those aged 80 and over, there are somewhat less than 50 men for 100 women both in Europe and in Italy and 53 men for 100 women worldwide (Table 6).

Life expectancy at birth has dramatically increased during the past 50 years, and it continues to increase. By the year 2050, it is forecasted to increase worldwide to almost 73 years for men and more than 77 years for women. Corresponding figures for Europe are expected to reach more than 77 years for men and more than 83 years for women, whereas the projections suggest that by 2050, in Italy it will be more than 82 years for men and more than 88 years for women (Table 7). In a meeting of African leaders 20 years ago they concluded: "Longevity has been our quest for ages; now that we have found it, can we afford it?" [7]. Humankind is growing rapidly and aging rapidly, as indicated by the median age. What is it? It is an imaginary line, dividing the population into two exactly equal parts, those who are younger and those who are older than the median age. In 1950, it was less than 24 years worldwide and less than 30 years in Europe,

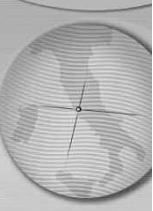


Table 8. Median age (years)

Region	Year		
	1950	2005	2050
World	23.9	28.1	37.8
Africa	19.0	18.9	27.4
Asia	22.0	27.7	39.9
Europe	29.7	39.0	47.1
(Italy)	29.0	42.3	52.5

Table 9. Potential support ratio. (Number of persons aged 15 to 64 years per one person aged 65 years or older)

Region	Year	
	2002	2050
World	9	4
Africa	17	9
Asia	11	4
Europe	4	2
(Italy)	4	1

including Italy. Today, it is 28 years, worldwide, 39 years in Europe and 42 years in Italy and the United Nations project that by 2050, it will be close to 38 years worldwide, more than 47 years in Europe and more than 52 years in Italy (Table 8). In view of these changes, it is easy to see that there is a need for institutional reform, since many of our institutions are catering for a population structure that doesn't exist any longer. A few examples of such institutions are social security, health care, housing, education and even the very concept of the "Nation-State", which became too small to do the big things, but it is still too big to do the small things. Another consequence of the changing population structure is a change in the so-called potential support ratio, the number of persons in the working-age group (15 to 64 years) in relation to those in the retirement age group (65 years and older). Today, on a worldwide basis, there are 9 working-age people for one in retirement. In Europe and in Italy, the ratio is only 4. However, it is projected that by 2050, the worldwide ratio will drop to 4, the European ratio to 2 and the Italian one to only 1 (Table 9). Hence, in the Italy of tomorrow, for each person in the working-age group there will be another one in retirement who will most probably need some support. How can this be achieved?

However, the most sensitive issue facing the next generation is that of the children of tomorrow. In 1950, one third of the world population consisted of children (0 to 14 years); the corresponding figure for Europe and Italy was 26%. Today the worldwide figure is 28%, but that of Europe is less than 16% and of Italy only 14%. The projection is that by the year 2050, children will make up only 20% of the global population,

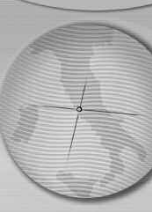
Table 10. Population of children (0-14 years) (Percentage of total)

Region	Year		
	1950	2005	2050
World	34.5	28.2	20.2
Africa	42.0	41.5	28.7
Asia	36.5	27.8	18.3
Europe	26.2	15.9	15.0
(Italy)	26.3	14.0	13.1

Table 11. Total fertility rate per woman (Replacement level: 2.1 children per woman)

Year	World	Europe	Italy
1965	4.9	2.4	2.5
1975	3.9	2.0	1.9
1985	3.4	1.8	1.4
1995	2.8	1.4	1.2

15% of the European and only 13% of the Italian population (Table 10). Hence, in Italy, there will be more 80-years old people than children. Behind these data, there is an exceptionally rapid decline in the total fertility rate. In order to keep a population at a constant level, a replacement level of 2.1 children per female is needed, which has been the case worldwide since as late as 1965. However, only 10 years later, in 1975, European and Italian fertility rates dropped below the replacement level and by 1995 they were extremely low: 1.4 and 1.2, respectively (Table 11). If such a low fertility rate is maintained for a longer period of time, it must result in a significant decline in the total population. In fact, never before in history have birth rates fallen so far, so fast, so low, for so long around the world. The implications of this - for good and for ill - are as yet unclear. I frequently find, that - obsessed by the urge of the human mind for analogy and generalisation - humankind is in a febrile search for simplistic explanations to increasingly complex problems. Such a simplistic view is that it is contraception that is responsible for the sudden decline in fertility. Contraception is the means, but not the cause. A multitude of factors are responsible for the exceptionally low fertility, such as an increasing female autonomy, major gains in female education, increasing female labour force participation, the changing pattern of union formation, the increasing instability of unions and some ideological perceptions about the new role of women in society and in the family. There are some classical ingredients of this demographic revolution, such as the rise in life expectancy, the use of contraception, urbanization and densification, the elimination of

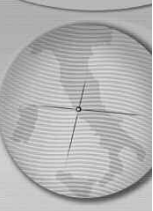


illiteracy and some fundamental structural changes in society. There are also some new ingredients, such as social atomisation and related feminism, collectivized pension benefits, globalized nomadism, the loss of majority by the youth and the “end of the work” syndrome, including life-long unemployment. The extent of social changes in Italy is excellently shown by the data published by Prof. Golini from the University of Rome; between the cohorts of Italian women born in 1946 and 1966, respectively, the percentage of those who don't live in any kind of partnership increased from 30 to 60 per cent, and among Italian men from 24 to 44 per cent (Table 12). Just imagine, what kind of life these people will lead as they are growing old. It seems that gender equity is here to stay; the process is irreversible, it permeates every aspect of modern life, but we don't know as of yet whether or not there may be a price to be paid in terms of a diminished quality of life. Is there a remedy? I think so. Re-discover the family! Whereas it is morally and ethically impossible to diminish the number of elderly (although I suspect that some “nice” people may consider a modernised version of Taigetos for the very old), it is still not too late to create and support a “child-friendly” pronatalistic society. The children of the year of 2050 are still not born. Their number may be more, or less, depending on the perception of the family by the present generation. In this context, I would also like to share with you a few reflections about science. In essence, it is an instrument, *ancilla*. There was a time, when it was an instrument used in theological debates, *ancilla theologiae*, in addition to its “classical” use to develop more and more deadly weapons, *ancilla belli*. Today, it is mainly *ancilla pecuniae*, a money-making instrument, but its proper use must be, and will be *ancilla humanitatis*, an instrument used to improve the human condition. Scientific research was the *raison d'être* of my long life, but is the science omnipotent? Certainly not! Are there any major problems associated with our science? I see at least three. One was formulated almost 500 years ago by Rabelais (1534): “Science without conscience is but the ruin of the soul” and the last century provided many examples of

Table 12. Percentage of Italian women aged 25 and of men aged 30, who don't live in any kind of partnership (By birth cohort)

Born	Women	Men
1946-50	31	24
1956-60	40	35
1966-70	60	44

the misuse and abuse of science and – as yet – there seems to be no end to it. The second problem is the increasing discrepancy between our scientific and ethical-moral development; as Martin Luther King said “the means by which we live, have out-distanced the ends for which we live. Our scientific power has outrun our spiritual power. We have guided missiles and misguided men” [8]. I have called the third, and perhaps biggest problem confronting future generations of scientists, “the monumental challenge”. In fact, there is a monumental challenge on the horizon for future generations of scientists: to convince some five to six billion fellow men and women that fanatic faith, fundamentalism and obscurantism will not improve the quality of life of their children and grandchildren, and that only science has the proven ability to do so. Finally, when considering our common future, a philosophical question is frequently posed to me: how sapiens is homosapiens? It is difficult, if not impossible to answer this question, given the enormous inhomogeneity of the species. How to find a common denominator for homo scientificus, dogmaticus, fanaticus, bellicosus and many other subspecies? Perhaps the best answer was provided by Kahlil Gibran: “In truth we are neither wise nor foolish. We are green leaves upon the tree of life, and life itself is beyond wisdom and surely beyond foolishness” [9]. Another “big” question, I am frequently asked by scientists of the younger generation: Is there a future for homosapiens? It is easier to answer it, since I am convinced that there is. I think that Bertrand Russell provided the best answer by saying that “in a biological sense, man, the latest of species, is still an infant. No limit can be set to what he may achieve in the future” [10]. The greatest of Hungarian composers, Béla Bartók said once: “If I ever would cross myself, I would say this: In the name of nature, science and art”. If I am permitted to paraphrase Bartók, my message to my younger colleagues would be: In the name of human dignity, science and charity” [11]. A crucial role of utmost importance for the medical profession will be to function as the chief custodians of human dignity, which is threatened more and more by the unlimited materialism and merciless capitalism of our “modern” times. My favourite poet, T.S. Eliot wrote in 1940: “The only wisdom we can hope to acquire is the wisdom of humility; humility is endless” [6]. Meanwhile I don't disagree with him, but I feel that there is also another wisdom we can attain: I called it “the infinite wisdom of hope”. Never ever give up hope! And please, use every opportunity to provide more hope to the younger



generation; they need it so much! They need all kinds of different hopes. As Epictetus said: "A ship ought not to be held by one anchor, nor life by a single hope" [12].

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