

# The future of ageing

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JÜRGEN MITTELSTRASS

Department of Philosophy, University of Konstanz, Konstanz D-78457, Germany. E-mail: Juergen.Mittelstrass@uni-konstanz.de

This paper considers the forms of life of old age and the opportunities presented by these forms of life (i.e. optimal ageing) as well as corresponding research programmes into gerontology. Ageing and old age are usually viewed more as a biological, medical and socio-economic problem and less as a form of life that can be optimized and cultivated. Viewed from this perspective, the gerontological research programme is the programme of interventionist science. This, of course, includes natural scientific research, which today is organized along very specialized disciplinary lines. The point to grasp is that the gerontological research programme is an integrative programme, and thus something pursued in an interdisciplinary, even transdisciplinary, manner. This possibility is supported by the fact that there is apparently no uniform genetic programme that could explain the ageing process and prevent differential ageing. In the introductory part of the paper, a differentiated culture of ageing is discussed, followed by a descriptive part, in which various research programmes are presented. The conclusion takes up some ideas on the interdisciplinarity or transdisciplinarity of a future science of ageing.

## Preliminary remarks

The title of the paper – the future of ageing – must sound somewhat peculiar. After all, the future is *becoming*, ageing is *decline*. Is there a future of declining? Certainly not in the sense that decline includes the future, that decline itself includes the tendency to become its opposite. What I mean is also not that, in the future, there will be more or less only decline, that life is ageing and thus will itself come to an end and with it humankind. What I mean is rather something quite simple: my topic is ageing and old age as an uncharted form of life and the further career of ageing and old age in the research programmes of science. Furthermore, my title quotes the title of a 1992 book that systematically collected the results of an ambitious project of the (former) Academy of Science in Berlin.<sup>1</sup> In the following, I shall make use of these results under three keywords in arguing,

in particular, for the integrating or transdisciplinary character of research on old age and ageing. First, however, a brief excursion into Greek mythology and into an impending disorder of forms of life.

Tithonus, son of King Laomedon of Troy and the nymph Strymo, was a handsome youth. He became the object of the attentions of the goddess Eos, better known as Homer's rosy-fingered dawn, who loved all that is young and beautiful and had already carried off three other handsome male specimens. Among them was Orion, who hunted with Artemis and was later killed by her. Eos abducted Tithonus to Ethiopia where she conceived Memnon, who later fell at Troy in the battle against the Greeks, and Emathion, who was later killed while trying to prevent Heracles from stealing the golden apples of the Hesperides, the daughters of the night. Eos begged Zeus to make Tithonus immortal, a request that he granted, but she forgot also to request eternal youth for him. So the new immortal became increasingly old and grey and wrinkled. When he was finally too weak even to move anymore, and Eos could no longer bear to see him, she laid her dried out wizened husk of a husband in a cradle and hung it in a bedchamber so that only the feeble piping of the once strong and handsome Tithonus could be heard. Finally, Eos transformed him into a cicada, so that he could cheer her up with his chirping and, once a year, slip out of his old skin. One can now see what imprudent immortality can lead to and that immortality without (eternal) youth is hard to bear.

Although immortality died out with the Greek and Roman gods, nonetheless some of what is said about them and their mortal creations retains a wistful truth. Our life, too, one could say, runs its course between desirable youthfulness and chirping cicadas. Before we die, we lose our youth and even with various sheddings of skin, as practised today in the form of cosmetic surgery, it does not come back. But one thing at least has become different compared with Greek mythology: we become ever older, but as we get older we become ever younger, at least in comparison with our ancestors, who were long since old at an age at which we today are still young and who invented a generation age length of 30 years, an age at which some of us first start to ask whether we should not think about ending training and beginning professional careers. Immortality is not approaching, but life has displaced itself, on the one hand, in favour of the cicadas – this is what is meant when we speak of a threatening senescence of society – and on the other hand, to their detriment – when we speak of increasing youthfulness in a society and of changing forms of life that are ever more confusing and disarrayed from the perspective of an older, even archaic view of life.

### **Old age is young**

Old age and ageing, the process that leads to old age, are difficult categories,

especially when viewed from the perspective of a future inherent in them. This is not only the case today, throughout history there have constantly been difficulties in dealing with old people. In early modern Europe, the way that leads from old age was regarded as burdensome and dehumanizing ('nichtz dann mer sorg, arbeit, verdriessen, schmerzen, kranckheit und sunde'<sup>2</sup>), through its glorification in later 18th-century sensibility (old age as 'the crown of life'), to idylls in the 19th century. And since the turn of the century, as in the 16th and 17th centuries before, youth has again determined the form of life and the ideal of humankind; old age is assigned a place within a false transfiguration of the past.<sup>3,4</sup> Medicine also does its part by comprehending the ageing processes as processes of degeneration, of decay and decline; simultaneously, medical therapies are directed at slowing down this process. Notions of rejuvenation, which once found expression in stories about fountains of youth or mills for old men and women<sup>5</sup>, begin to claim scientific interest. If old age is characterized by sickness and loss of function, it can be combated by the restoration of health and the ability to function. At the same time, in the wake of the introduction of a retirement age, old age has been 'discovered', now in an institutional sense, as an independent segment of life. Where lifelong labour was once the norm, and this was the case until the introduction of modern systems of pensions in the 18th and 19th centuries, there was no place for such a view. Until then, old age was a status, not a temporally limited or limitable form of life.<sup>4</sup> But old age, just as ageing itself, is still today an 'unknown', or at least uncharted, form of life from a number of perspectives.

It is this form of life, ageing and old age, and the chances that it conceals within it, that is our subject here. Thus, the concept of the good life, which was already the focus of the ethics and anthropology of the Greeks, is not limited to young life or middle age, it applies also to ageing life and old age. To reduce this to the categories of decline and poverty (of life chances) is not only a sign of social shortsightedness but also of scientific lack of imagination. This is made clear by (philosophical) anthropology and the (psychological) concept of optimal ageing, among others.

Thus, talk about the future of ageing is aimed primarily at the hidden riches of a form of life that is commonly viewed and measured only in the categories of decay, especially in a society such as ours, that in all its wishes and realities, is one-sidedly orientated towards youth. Another expression for this is that old age, in a certain regard, is still quite young.<sup>1</sup> By this I mean, on the one hand, that only in our century has old age become a form of life for many people. In the western world the average life expectancy rose from 45 years in 1900 to about 75 years today<sup>6</sup> and, on the other hand, for just this reason, what old age can achieve, what potential it contains, is not yet known. We speak of ageing and old age as if we already knew what it is and what it can be.

In fact, a differentiating culture of ageing is still in its infancy. This culture, in turn, is not just an object of everyday life but also an object of the sciences. All of these – biology, medicine, psychology, sociology, economics and many other disciplines – have contributed to preventing what is misleadingly called the senescence of society from becoming an undifferentiated collective fate and have helped to extend a form of life that belongs as much to our nature as do the forms of life of childhood, adolescence and the adult mid-life, which in turn reaches back into the past youth and forward into many of its components in old age. Life in all of its phases is a memory that knows about its past and, in anticipation, looks at its future. Why should the one side, youth, be rich and the other side, old age, be poor?

It has rightly been emphasized that gerontological knowledge, knowledge about old age and ageing is incomplete in three ways: 'it is first of all incomplete in the usual sense of the course of scientific knowledge acquisition: the development of a science is always incomplete. Furthermore, contemporary gerontological knowledge is incomplete because gerontology is a very young science and gerontological knowledge is incomplete because human civilization has only now caught up with the phenomenon of old age.'<sup>7</sup> As it seems at the moment, the science of ageing and old age with a multidisciplinary structure and an interdisciplinary or transdisciplinary research perspective, is not only merely at its beginning, but it has also not yet properly conceptualized its subject matter. This is shown by the confusing variety of disciplinary specializations that particularize the problem, instead of grasping it in its (transdisciplinary) wholeness. Among these specializations in the disciplinary perspective are: geriatrics, gerontological psychiatry, anthropological gerontology, psychological gerontology, psycho-geriatrics, bio-gerontology, cyto-gerontology, neuro-gerontology and gerontological linguistics. These all deal with old (and ageing) people, they all increase our knowledge of old (and ageing) people, but they are also all liable to lose their subject in its unity. Old (and ageing) people are dissolved by the particularizing approach of the sciences.

Now, in fact, talk about old (and ageing) people is problematical even in a life world perspective. It presupposes a phenomenal unity that does not really exist. Or, in other words, just as the young person does not really exist as such, so too, the old person also does not really exist, not just in the comparison of different cultures but also just considering one and the same culture. Furthermore, it is a truism that many young people seem, and are, old in their way of life, and many old people seem, and are, young in their forms of life. Youth and old age are not merely questions of years, they are also, and perhaps far more than we believe, especially questions of differing and often temporally interchangeable forms of life. Psychology has a number of such tales to tell. But this means that the relation of gerontology, as a science of old age and ageing, to other forms of disciplinary

knowledge of old age and ageing is not simple. The unity of subject matter is not itself a simple phenomenon and, considered scientifically, not a simple construction. Nonetheless, it should not be heedlessly abandoned in favour of a large disciplinary variety.

There is an additional feature that makes things more complicated and is constitutive of the youth of the science of old age and ageing. What I mean is that gerontological knowledge is not merely descriptive and explanatory, it is also interventionist or ought to understand itself this way. It intervenes because it changes things and does not just describe. And this must be the case wherever it is a question of optimizing and of humane structuring of ageing and old age. In these affairs, too, we are just at the beginning. We consider ageing and old age, for instance, as a medical or a socio-economic phenomenon, we describe processes of decline, we calculate social security liabilities, but we dedicate too little time and attention, even in the sciences of ageing and old age, to questions that deal with optimizing and cultivating old age. The gerontological programme, based primarily on 'gerontologizing' various subdisciplines under a common perspective, is in this sense the programme of an interventionist science.

### **Integration**

In gerontology as a research programme there are still basically two contrasting perspectives available: that of natural science and that of the humanities and the social sciences. This is to be expected since not only our biological nature but also our cultural nature is involved in ageing. Disciplines from the natural sciences and the humanities or social sciences represent ageing and old age in different ways. The problem is not so much one of the simple questions of truth and falsehood as it is of the jurisdiction of one-dimensional knowledge and, once again, of the integration of one-dimensional or disciplinary knowledge into the whole 'truth' of its object, the ageing and aged human being, however problematical this simplifying expression is.

The relationship between natural-scientific and humanistic perspectives is not simple. Thus, a more narrowly biological research perspective will usually concentrate on processes of degeneration, that is, on aspects of declining biological capacities and functional abilities and on the post-reproductive phase of ontogenetic life.<sup>7</sup> Research on old age and ageing thus becomes research on mortality, which studies define as being opposed to development or becoming, and which is future oriented without losing the future. A research programme originating in the humanities or the social sciences takes just the opposite approach: while not denying the biological processes of decay, it emphasizes those aspects of ageing and old age that are expressions of quite different processes.

These are the world of the mind, of feelings, but also a world of actions whose physical boundaries are narrower but whose cultural boundaries may be much wider. Here, age-specific bodies of knowledge and actions come into view<sup>8</sup> that do not compete with a physical world but make it clear that development is not the exclusive property of youth. This, in turn, is in a certain sense trivial or at least it conforms to everyday experience, but it becomes an important aspect when the self-understanding and situational understanding of gerontological research is at issue. In the categories of cultural anthropology, development and scarcity are not mutually exclusive. On the contrary, if we follow Gehlen<sup>9</sup> it is precisely the perception of scarcity, of lack or limitation, that powers progress. Man is a 'biologically deprived creature' not just in old age, although this side of our nature acquires its definite determination in old age.

This does not mean that bio-medical and socio-humanistic perspectives have to be disparate or that a common integrative research programme is not possible. This is shown, on the one hand, by the increasing interest of medicine in preventive research strategies and aspects of activating rehabilitation<sup>10</sup> and, on the other hand, by the fact that there is differential ageing and that this concerns both biological and psychosocial structures. One example of this is the course of the development of intelligence in which (according to the results of the Seattle longitudinal study of ageing and intelligence) even in old age (individual) improvements in performance can be detected.

There is apparently no uniform genetic programme that could explain the ageing process and prevent a differential ageing.<sup>7</sup> This also accounts for the fact that biologists have also said that the decisive question is not about death but about the causes of long life,<sup>7,11</sup> that is, about the existence of a post-reproductive phase that cannot selectively affect the gene pool of the next generation. Evolutionary points of view would seem rather to speak against the phenomenon of ageing; the search for post-reproductive genetic mechanisms affecting selection has been unsuccessful. This is the general situation confronting biologically oriented theories of ageing. Ageing, or old age, seems to be an evolutionarily unforeseen state or, at best, one that results from deficits in the primary life and developmental processes. One example for this is the thesis that there are late-acting and thus selectively unrecognized deleterious genes that cannot be eliminated by selection.<sup>11,12</sup> For an analysis of ageing and old age oriented towards the humanities or social sciences this opens up a number of avenues. Biology is not set aside, but it does not explain everything.

Furthermore, the biology of ageing is itself undetermined. There are an undecided multiplicity of variant theories of ageing, including free radicals, the theory of repair mechanisms, according to which a basic capacity for DNA repair declines and thus provides the mechanism for the ageing process, the theory of pacemaker organs, for instance, the immune system and the neuro-endocrine

system, whose functions decline with age, and finally the theory of genetically programmed ageing with the differentiation between longevity genes, senescence-genes and ageing-genes which determine the ageing process. Each of these theories is plausible and has an experimental basis, and no one has succeeded in privileging one of them over the others. On the contrary, there is much evidence that ageing, even at a microbiological level, is a multidimensional or multifactorial process.<sup>13</sup>

A biological research programme would therefore have to pursue, in particular, the following goals<sup>1</sup>: to identify the genes and gene products that determine life span and the process of ageing; to study the expression and repression of genes, contained in this programme, in their dependency on the developmental phases of the individual's life; to analyse the regeneration and repair mechanisms at the molecular level in their age dependency; to study the influence of ageing on the general regulatory and control systems (neuro-endocrine system, immune system); to develop parameters for quantifying ageing processes at the molecular level (biological markers of ageing). This is an extensive programme and offers a great scientific prospect for ageing research.

On the side of the humanities and social sciences, the programme of research in gerontology is no less ambitious. Let me take just one example: the psychology of ageing, which deals with the psychological characters, mechanisms and conditions of the ageing process as well as with the psychological aspects of influencing and coming to cope with the limitations and deficits associated with growing old.<sup>14</sup> In this case, psychology does not develop its own concept of ageing nor does it simply restrict itself to a biomedical concept, but rather extends this concept, adding a general concept of development, within which ageing is understood as 'each (positive or negative) change in the adaptive capacity of an organism'.<sup>15</sup> Development is considered in all its phases as determined by plasticity (it can change throughout the life span), by multidimensionality (it is different in different areas), and by multidirectionality (it shows gains and losses in every phase of life). All told, this kind of psychology of ageing, which itself displays an interventionist character to a high degree, is opposed to a thoroughgoing deficit model of cognitive ageing, such as is characteristic under a more general research perspective for biomedical theories. Integration is called for, although by no means already achieved.

### **Gods and men**

Whither goeth old age? This question, too, remains open. Optimistic predictions expect us to be able to 'slow down' or put off illnesses to such an extent that they 'occur' only after a biological maximal age, assumed to be about age 90, and thus no longer fall within the normal lifetime. Old age would lose its sickness and its

fear of sickness.<sup>7,16</sup> We would all be like Achilles until our deaths. Pessimistic predictions connect increasing age with increasing morbidity.<sup>17</sup> Each healthy year of the extended life is paid for at a high price because around three quarters of the life extension time is spent being sick.<sup>18</sup> However, probably none of these predictions, some of which partake in a little science fiction and others of which testify to disappointing experiences, will be realized in 'pure' form. The former because they neglect natural evolution, which may present us with unpleasant surprises (like AIDS); the latter because they seem to underestimate scientific progress, for instance, in Alzheimer's syndrome. But clear-sightedness in this (prognostic) field is not what is important. What is decisive is rather that old age (also from the perspective of science) comes into view once again as a form of life that cannot be defined merely by the failing of 'growth' and the initiation of 'decay'. The future of ageing and old age is its (re)discovery as a genuine form of life.

The description of this form of life, if it is done from the perspective of the 'good life' or of 'optimal ageing', is by no means easy. Notions of a successful life are too different, and it would be too vexing to measure a successful life just in terms of added years. Someone who lives to be very old will, as a rule, see more sorrow, partake of a more unsuccessful life and stand over many graves. Here in the opening and describing of life opportunities lie much greater tasks for science and society than they want to imagine at present. Optimizing strategies will, in any case, not only have to focus on physical but also on psychological and socio-economic aspects. Ageing counts as optimal if it 'proceeds under such favourable conditions that the life time acquired, the organic functionality, but also the subjective quality of life, is clearly increased with respect to the average in a comparable population'.<sup>19</sup> While this is clearly not a task for science alone, it certainly is a task for science in the interventionist sense of gerontological research programmes.

Once again, I stress that ageing is a multidimensional phenomenon that reaches far beyond the biomedical sphere and whose description and explanation can only be successfully accomplished if we do not explain partialities in isolation but rather comprehend totality in context. Developments, perceptions, causalities of quite different sorts are interconnected here. That is why, as already emphasized, there is no one science of ageing; not biology, which tells us of the genetic factors that control ageing, and not medicine, which deals in a caring, diagnostic, and therapeutic manner with ageing. Just as ageing is a multidimensional phenomenon, so, too, do the sciences of ageing demand a transdisciplinary research programme. Disciplinary knowledge is certainly a precondition for the investigation of ageing (and old age) in all dimensions, but it cannot by itself explain ageing; or in another formulation: it always explains something but not the whole, which in turn cannot be compounded out of the explained aspects.



There are no simple causalities connecting the parts. Neither does our psychological knowledge of ageing and old age follow in some definite manner from our biomedical knowledge of ageing and old age, nor does our psychological knowledge explain in any definite manner the social facts of ageing and old age. The problem entitled 'Ageing and old age' is like the problem called 'Health and environment'. In both cases, the scientific and life world problems that affect us most do not do us the favour of defining themselves according to our disciplines.

This is what constitutes the peculiar intimacy of ageing and old age in all forms of life. It is true that there are social conflicts between the old and the young, but these are of a different kind from other social conflicts, for instance those between the sexes. The latter are carried out from a particular perspective, which is not that of the other side, from the perspective of man or woman; the former are conflicts which – although this is often not noticed – everyone, every man and every woman, has to carry out with him- or herself, insofar as we are not at the same time man and woman, but we are all (actually and in anticipation) getting older. This means that age and ageing are always familiar; they are not merely the fate of others but precisely our own fate.<sup>1</sup> Therefore, there is scarcely anywhere that science is so close and familiar to one's own life as in the case of the gerontological research programme. Only if we were gods, and as such pursued divine science, would gerontology be dispensable or be merely an amusement that we pursued with ageing organisms, with ageing or non-ageing ciliates and with bacteria that do not seem to age at all. But we are not gods. And it is precisely this that makes exertions in gerontology from the perspective of science and social policy so human and so necessary.

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**About the Author**

**Jürgen Mittelstrass** is Professor of Philosophy at the University of Konstanz and Director of the Center for Philosophy of Science. He was formerly Vice-President of the Academia Europaea.