

Education on Religion-and-Science: Attitudes and Ideas

with Tonie L. Stolberg, "Student Thinking when Studying Science-and-Religion"; and Jacek Tomczyk and Grzegorz Bugajak, "On Evolution and Creation: Problem Solved? The Polish Example"

ON EVOLUTION AND CREATION: PROBLEM SOLVED? THE POLISH EXAMPLE

by Jacek Tomczyk and Grzegorz Bugajak

Abstract. We present the results of research carried out as a part of the project Current Controversies about Human Origins: Between Anthropology and the Bible, which focused on the supposed conflict between natural sciences and some branches of the humanities, notably philosophy and theology, with regard to human origins. One way to tackle the issue was to distribute a questionnaire among students and teachers of the relevant disciplines. Teachers of religion and the natural sciences (biology, chemistry, and physics) and students of theology, philosophy, and the natural sciences (specializing in biology and/or anthropology) were asked to answer eleven questions concerning the perception of the conflict between evolutionism and creationism, the definitions of creation and evolution, the existence of a human spiritual element, and the ways of interpreting the Bible, especially the first chapters of the book of Genesis. We present selected results of this questionnaire.

Keywords: creation; evolution; Genesis; human origins

Human beings as a species belong to the realm of animate nature, but we have always been convinced of our unique status in this realm. The theory of the stability and invariability of species, accepted until the nineteenth

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century, placed humankind at the top of the animate world. The biological vision of the stability of species was perfectly compatible with the biblical image of the creation of the world. The book of Genesis presents people as special creatures, made in the image and likeness of God. The second half of the nineteenth century saw the rise of Charles Darwin's theory of evolution. In the light of his theory, the human being was but one of the biological species and subject to the same biological laws as other organisms. His anxiety about the possible conflict with religion was then quite well-founded, but it is unlikely that he could foresee that the theory of evolution would be the proverbial bone of contention for the following 150 years. Time and again, natural scientists, theologians, and philosophers engage in debates that take up the issues of evolution. Often, such discussions facilitate the casting of new light on some old problems, which of course is very rewarding and encouraging; however, there also are many fruitless controversies that not only fail to provide any new answers but breed even more confusion.

Now and again, the confrontation of scientific knowledge with the biblical picture of the creation of humans returns. On Polish ground this seems to be inspired by ideological quarrels between the proponents of evolutionism and creationism imported from the United States (Miller, Scott, and Okamoto 2006). This state of affairs was the stimulus for the research project "Current Controversies about Human Origins: Between Anthropology and the Bible" launched within the international program Global Perspectives on Science and Spirituality (GPSS). The project, undertaken in 2005–2006, focused on the probable conflict between the natural sciences and the philosophical-theological approach to the problem of human origins. The aim of the project was to establish whether such a conflict really exists in Poland, and, if that is the case, to learn what reasons people attribute to such conflict.

In an attempt to achieve this aim, a questionnaire was distributed among students and teachers representing three branches of science and humanities: theology, philosophy, and natural sciences, especially biology.¹ Teachers were chosen as a target group because in their everyday work they at least occasionally face the issue of a supposed conflict between evolution and creation. Also, both teachers and students of the relevant disciplines should have more sophisticated knowledge in their fields than the average person and therefore be more immune to irrational prejudices that often derail sound debates about evolution and creation. The choice of the disciplines represented by the respondents is obvious given the issue at stake.

We assume that the reasons given for the possible conflict between the natural sciences and theology concerning human origins may be linked with some of the following factors:

1. Specialized education of the respondents. The ability to give a correct definition of such concepts as *evolution* or *creation* should correlate

with the type of education. Natural scientists are well acquainted with the terminology concerning evolution and thus fully comprehend the concepts related to this issue, and theologians are familiar with the concepts connected with creation.

2. The respondents' age. Poland was subject to communist ideology for more than forty years. The curricula concerning evolution were strongly influenced by the Marxist materialist dialectic both in secondary schools and at the university level. If it is true that the perception of the conflict between evolution and creation depends on the age of the respondent, the older people, brought up in communist ideology, should emphasize the divergence of opinions between the natural sciences and theology with regard to human origins. Younger respondents should be less inclined to admit the existence of such a conflict.

3. Declared faith. Deeply religious people may consider the biblical account of creation as the primary source of information about the beginning of the world and may disregard scientific findings.

4. Different ways of interpreting the scriptures, especially the first chapters of the book of Genesis.

It also is possible that the sources of the conflict are to be found in completely different areas, and the research should point out where to look. Recognizing the reasons for the conflict seems to be the first important step leading to the overcoming of long-held misunderstandings in this area in the science-and-religion dialogue.

THE STATE OF AFFAIRS—SOME HISTORY AND CURRENT OPINIONS

The problem of the conflict between the natural sciences and theology with regard to human origins has been widely discussed in different works. The French Jesuit and paleoanthropologist Pierre Teilhard de Chardin, as a theologian and a scientist, always supported the idea of evolution. In his opinion, the natural sciences did not have to collide with theology because the former employs a biological concept of causality, which simply defines a chain of precedent and subsequent events, whereas theology deals with ontological causality, the dependence of a lower being on a higher one. The creative act of God, which takes place beyond time, cannot be identified with temporal and immanent causes. One can therefore both accept the theory of evolution and believe in the idea of creation (Teilhard 1955, 154). Teilhard also criticized the demand raised by theologians that science should support the idea of monogenism—the conviction that all humans originated from a single pair of their common parents. Teilhard stressed that the “hypothesis of monogenism” was not scientific and pointed out that whenever anthropology speaks about “the first man” the concept should always be understood as referring to a population and not a single

individual. As a scientist Teilhard was well aware that all species originated in the process of speciation, which is always a group phenomenon, and for this reason all humankind could not descend from one couple, either. In his opinion, monogeneity and poligenicity were purely theological concepts. As such, they remained scientifically unverifiable. But in theology they could serve the purpose of explaining the universality of original sin (Teilhard 1955, 206).

Equally interesting are Karl Rahner's considerations concerning original sin and the problem of the "first Adam." This German theologian supported the explanation of the universality of original sin on the grounds of the monogenic origin of humankind, although he tried to prove it by means of metaphysical, not scientific, concepts (Rahner 1954, 318).

In Poland the question "evolution or creation?" was undertaken in the 1970s and 1980s by Bernard Halaczek (1975, for example). According to him, the conflict was not rooted in the literal reading of Genesis but rather stemmed from the observance of the scholastic rule of causality (*nihil reducitur de potentia ad actum nisi per ens actu*) (nothing can be reduced from potency to act except by a being in act). This principle took for granted such a relation between cause and effect that made it impossible to conceive the rise of a more perfect ("greater") being from a lesser one. According to Halaczek, another reason for conflicting views was partly of historical and partly of methodological nature. In the past, both the scientific and the theological view seemed so perfectly complementary that the theory of the fixity of species was for many centuries identified with the theory of creationism. This incorrect, but understandable, identification made the seamless concordance break in the second half of the nineteenth century, when many theologians saw the theory of evolution as a dangerous weapon against the idea of divine creation. Halaczek, like many other authors (Heller and Zycinski 1990, for example), emphasizes the fundamental distinction between the natural sciences and theology with regard to their respective subject matter, which is defined as the theory of separated epistemological levels. The natural sciences study the material world, and their basic method is the empirical method. Theology relies in the first instance on revelation and is concerned with supernatural reality. There is neither a point of convergence nor common ground where a struggle between them could occur.

A more radical stance is represented by Arthur Peacocke (2004), Keith Miller (2003), and in Poland by Kazimierz Kloskowski (1999). All of them pose the following questions: Can the methodological separateness of these levels be the ultimate solution of the problems concerning human origins? Must the creation of such a wall of methodological separateness be the last act of the controversy? In their opinion, the answer to such questions should be negative. They point toward another option, which is neither theological nor solely scientific but belongs to philosophy. Philosophy has at its disposal the means to create a coherent picture of the world that would

draw upon other disciplines (here: theology and the natural sciences) while not belonging to any of them in particular. The dialogue between the evolutionary vision of nature and human origins and the religious belief in the existence of God the Creator can be carried out on the ground of evolutionary creationism. The issue at stake is the conviction about the “cooperation” of God and nature in the shaping of the world, including human beings. The idea, which in the past was expressed in philosophy by the concepts of secondary causes that are dependent on God, can be translated into modern terms by referring to the laws that govern the development of the animate world. It can be said that God created a world that is capable of evolutionary development. In this sense God acts through evolution. In the light of contemporary natural sciences and religious belief in creation, “we arrive at the image of God continuously creating, God the eternal Creator, since God continuously gives existence to the processes which are creative and result in the appearance of new forms” (Peacocke 2004, 209–10). Evolutionary creationism does not violate the principle of the separateness of epistemological levels because it does not impose anything on either scientists or theologians. At the same time it offers a coherent vision of the world for all who consider both “pillars” as important constituents of their worldview.

In our brief overview of the works on the subject we cannot overlook numerous studies concerned with the theory of intelligent design (ID) (see Perakh 2004; Young and Edis 2005), which claims that intricate biological structures such as some cell organelles could not have come into existence by means of Darwin’s natural selection because they are irreducibly complex. The concept of irreducible complexity is usually explained using the example of a mousetrap. No single element of this device is meaningfully useful; the sense is revealed only when we view the whole, which has been designed and assembled by Somebody, a Designer, who has known in advance what purpose it would serve and how this function can be performed. It is claimed that many biological mechanisms are likewise irreducibly complex, which implies that they too must have been designed. However, even if the proponents of this theory are correct when they claim that the current state of knowledge does not allow us to explain in detail some biological phenomena, it does not automatically follow that science will not explain them in the future—and if such explanations are provided there will be no need to postulate the existence of the intelligent designer. Such a defense of religion that rests on the shortcomings of contemporary science must therefore be defective and untrustworthy, taking into account the unceasing progress of scientific research.

We want to stress that the works dealing with these issues are largely based on theoretical considerations. There are no dependable studies that present people’s attitudes toward these matters. In Poland, no such research concerning the perception of the supposed conflict between theology and

the natural sciences has been carried out so far. Interesting research of Miller's group (Miller, Scott, and Okamoto 2006) concerned UE countries in general. Moreover, they do not touch many problems (for example, the way of understanding the concept of creation, or the existence of the human spiritual element). They also do not include peculiar groups of respondents (such as teachers of religion and teachers of natural science). The results presented here therefore stem from an original and new kind of research.

THE QUESTIONNAIRE AND THE RESPONDENTS

In the years 2005–2006 we distributed our questionnaire in two regions of Poland: the south of the country (upper Silesia) and central Poland (the surroundings of Łódź and Warsaw). These two regions were chosen for a number of reasons. First, they are characterized by a high or very high density of population (in Silesia, 377 people/km², in Łódź and its surroundings 140 people/km², and in the Mazovia Region 146 people/km²). Second, the areas are characterized by a relatively high social and economic status. At the time when we carried out our research, the unemployment rate in these areas was one of the lowest in the country—19.9 percent in Łódź and its surroundings, 17.1 percent in Silesia, and 15.2 percent in the Mazovia Region. To compare, the level of unemployment in the eastern parts of Poland (around Lublin) amounted then to nearly 27 percent and in southeast Poland 30 percent. Third, these areas are characterized by a similar level of religiosity. In Poland, a great number of people consider themselves believers. In 1991, 89.9 percent of Poles defined themselves as believers; in 1998, 95.3 percent; and in 2002, 92 percent. In the chosen areas as many as 91 percent declared faith in God, 86 percent considered themselves as religious or deeply religious, and 72 percent said they practiced regularly. The only difference was the percentage of those who regularly attended Sunday mass: in Łódź and its surroundings it was 23 percent, in Warsaw and its surroundings 25 percent, and in Silesia 40 percent.

We distributed the questionnaire among the teachers of selected schools and students from randomly chosen universities—Cardinal Stefan Wyszyński University, University of Warsaw, University of Łódź, the Theological Seminary in Łódź, and Jan Długosz University in Częstochowa. The aim of the questionnaire was not to compare the views in different parts of the country but to find out what Poles from such regions as described above, and therefore sharing certain social characteristics, think about evolution and creation.

Randomly chosen secondary schools also received the questionnaires and letters explaining the aim of the research. School headmasters were asked to distribute the questionnaire among the teachers. A similar method was used to sample students' opinion; in this case, lecturers were asked to distribute the questionnaire during their seminars. Anonymously filled-in questionnaires were then sent back by mail. The entire procedure took one

year. In total, we prepared 1,000 copies of the questionnaire, 500 of which were distributed among teachers and 500 among students. We received back 170 completed questionnaires from teachers and 279 from students.

The introductory questions concerned the respondents' age, sex, denomination, and education. (In the present article we disregard the results concerning the respondents' sex and discuss only the results related to our preliminary hypotheses.)

The examined representation of teachers was divided into three age groups: 26–35 years of age (teachers with little experience from a young generation born in the turbulent 1970s); 36–45 years of age (teachers with average work experience, brought up in the 1960s); and over 45 years (teachers with long work experience, brought up in the times of strict communist ideology). All of the age groups were represented by similar numbers of respondents—57, 60, and 48 respectively.

Students were not divided into age groups, because all of them were 19–25 years old (older students are fairly rare in Poland). This range did not seem wide enough to split it into subcategories.

Teachers of religion and the natural sciences (biology, chemistry, physics), as well as students of theology, philosophy, and the natural sciences (biology and anthropology) were asked to fill in the questionnaire consisting of eleven questions concerning such issues as the relation between evolutionism and creationism (conflict, independence, coherence); the way of understanding the concept of creation; the way of understanding basic concepts of the theory of evolution; the existence of a human spiritual element; ways of interpreting scripture, in particular the first chapters of Genesis; whether the theory of evolution provides arguments for the non-existence of God; and whether the theory of evolution provides arguments against the idea of creation. The questions were closed, but comments could be added in the space provided at the end of the questionnaire.

The questionnaire was addressed to teachers of religion and natural sciences. In the course of analyzing the responses it turned out that many teachers taught more than one subject. This fact made us classify them in the following way: (a) teachers who teach only religion; (b) teachers who teach only biology or “nature”; (c) teachers who teach religion and some other subject; and (d) teachers of other subjects.

Students of different universities who completed the questionnaire were grouped according to the faculty where they studied. The respondents from each category numbered as follows: philosophy, 79 (28.3 percent), biology/anthropology, 75 (26.9 percent), theology and canon law, 102 (36.6 percent), and students who did not provide information about their faculty, 23 (8.2 percent).

Choosing for future comparison teachers of religion and students of theology is fully justified, because in the Polish educational system theological studies entitle one to teach religion in schools. Courses known abroad

as “religious studies” are only rarely offered at Polish universities and are not very popular among students. It is therefore students of theology who usually become teachers of religion.

SELECTED RESULTS OF THE QUESTIONNAIRE

1. In the group under examination, the vast majority of the respondents—96 percent of teachers and 95 percent of students—declared themselves to be believers. Specifying the concrete religious community was optional, and only some respondents indicated to which church they belonged (48 percent declared themselves to be Roman Catholics; the remaining 52 percent did not specify their denomination). Poland is a predominantly Roman Catholic country. According to the data from 2006 published by the Conference of the Polish Episcopate, the Catholic Church in Poland has 36.6 million members, which is about 92 percent of the country’s population. This number does not reflect the number of regular churchgoers, however, which constitute approximately 40 percent of believers. Other churches present in Poland include the Polish Autocephalic Orthodox Church (509,000 members), the Augsburg-Evangelical Church (77,000 members), the Greek Catholic Church (53,000 members), the Pentecost Church (21,000 members), the Adventists of the Seventh Day (9,500 members), and the Baptists (9,000 members).

The questionnaire dealt only with the respondents’ self-identification in the matters of faith. Issues concerning religious practices and concrete moral attitudes were not taken into consideration.

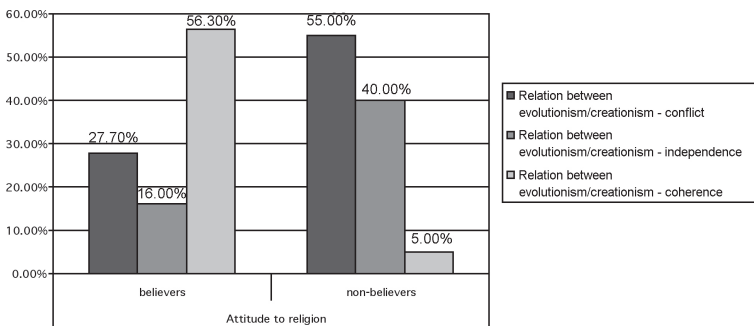
2. The key question of the questionnaire concerned the perception of the possible conflict between creationism and evolutionism. This issue actually deals with the priority of theological or scientific *episteme* in deciding about human origins. In the following analysis of the answers in relation to the attitude toward religion, the respondents were taken jointly (teachers and students together), because the distribution of the declared (dis)belief is nearly the same in both groups. The conflict is mostly noticed by nonbelievers (55 percent). Among the believers the conviction that the two concepts are mutually exclusive was expressed by less than 30 percent. People who identify their worldview with religion usually see the coherence of theological and scientific claims, which they see as complementary to one another. Among nonbelievers, only 5 percent of the respondents allowed for such coherence (Figure 1).

This comparison clearly points to the fact that the opinion concerning the relationship between evolutionism and creationism largely depends on the respondent’s attitude toward religion. The provided data can be interpreted in such a way that nonbelievers, who lack interest in religious matters, do not have sufficient knowledge about the teaching of the church and therefore suspect incompetence on the part of theology in the matter

of human origins. Such individuals may treat some elements of the teaching of the church, for example the explanation of original sin, as if it aimed at presenting a historical event, while in the light of contemporary paleo-anthropology such an understanding must be excluded. They therefore miss the most important issue, namely the fact that the teaching about original sin does not explain how it first came into the world and how it is transmitted—this will always be a part of *mysterium iniquitatis* (the mystery of evil)—but rather concentrates on the fact of human disobedience and, connected with it, the necessity of redemption (Pietras 1999, 50; Schwager 1997, 116). Similarly, the teaching about the creation of the world often is identified with the temporal moment of coming into existence. Disregarded in such an approach is the main sense of the dogma, which maintains that the world *has been* created by God; in other words, whatever exists is continually sustained by the Creator and owes to the Creator its existence. At stake is not the temporal beginning of the world but its continuous dependence on God with regard to its existence. The conflict between evolution and creation therefore may result from a lack of sufficient philosophical and theological awareness.

One cannot exclude another explanation of these results, namely, the possibility that the believers who (unlike nonbelievers) postulate harmony and coherence between theological and scientific claims base their opinion on an erroneous definition of evolution or creation. We return to this problem in later sections.

3. Grouping the teachers according to their age, and thus according to their teaching experience, was meant to observe the possible coincidence between their worldviews and the time of their education. It could be assumed that the teachers with the longest work experience, brought up in the times when communist ideology held full sway in the Polish People's



$\chi^2 = 20.62$; df: 2; $p < 0.001$

Fig. 1. The declared relation between evolutionism and creationism and the attitude toward religion.

Republic, would present views that take for granted the conflict between evolution and creation.

Poland was the largest country to fall under Soviet control under the terms of the Yalta Agreement after World War II, and the place of religion always remained different here than in the other countries of the region. The years under the Nazi occupation and the bloody terror of this period deepened religious feelings and practices. This strong bond between the majority of the society and the Roman Catholic Church forced the communist government to adjust its strategy to the situation. The first years after the war (1945–1948) were relatively peaceful. This, however, was meant to conceal the true intentions of the regime who first wanted to soften people’s resistance against terror from the East and the rule imposed by force. The following period, after 1948, saw the gradual strengthening of the communist power, this time based on the rule of terror, and with a far more hostile policy toward the church. It was the time of persecutions and arrests. The government took control of *Caritas*, the largest church-run charity organization, with its 1,000 nonprofit enterprises and 25,000 employees. A new ministry dealing solely with the matters of the church (the so-called Office of Confession) was brought into existence with the singular intent of fighting the church by administrative means. The communist regime endeavored to impose an atheist, anti-religious, and anti-church ideology on the entire society. The educational system, youth organizations, and the media—including the press, radio, television, and special publishing houses—played significant roles in achieving this aim. Proponents of dialectical materialism and the official anti-religious state propaganda presented Christians as naive, simple people who take for granted the words of the Bible about mixing clay and forming the first man. Darwinism was used in the struggle against all religious beliefs, including the idea of creationism, which was described as an outdated world-

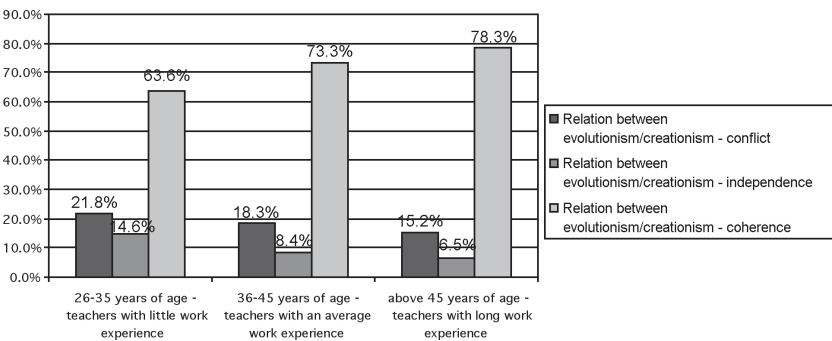


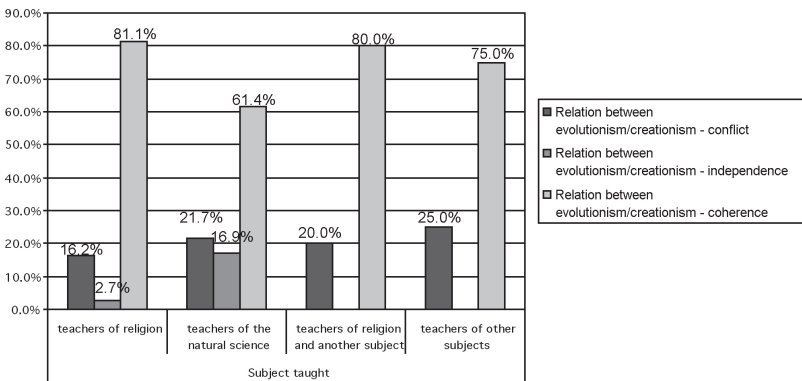
Fig. 2. The relation between evolutionism and creationism and the age of questioned teachers.

view. The theory of evolution was put forward as a tool for providing an intelligible and comprehensive picture of the world. In the light of these opinions, human peculiarity consisted only in quantitative differences that at one leap became qualitative differences. The program of secularization was especially designed to affect persons who because of their profession had a direct influence on the intellectual formation of the next generation. It is no wonder, then, that such a program affected mostly teachers and students (teachers-to-be) of the time.

The results of the questionnaire show little evidence, however, that the teachers raised and trained in the Polish People’s Republic are less critical with regard to the relationship between evolution and creation than the younger teachers (Figure 2). This may be due to the current secularization of the younger generation that accounts for the growing decline of both theological and philosophical knowledge. It shows also that the ideological influence of the past was weaker than expected.

4. Interesting results appear in the comparison between the subject taught by teachers and their evaluation of the relation between evolution and creation (Figure 3). Only one-fifth of the teachers declare the conflict between evolutionism and creationism. There is no substantial difference in this respect between teachers of biology and teachers of religion.

Worth noting, however, is that as many as 17 percent of the teachers of the natural sciences accept that theology and science are independent with regard to the question about human origins. It means that they are aware of and are ready to accept the methodological separation of research areas. As far as teachers of religion are concerned, this separation was recognized by fewer than 3 percent of the respondents. We may seek an explanation of



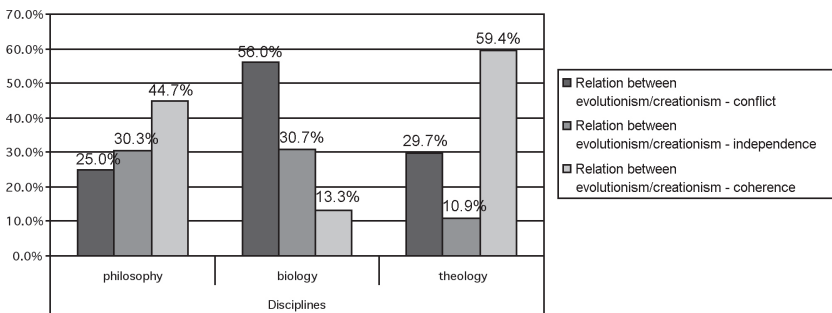
$\chi^2 = 11.93$; df: 6; $p < 0.01$

Fig. 3. The relation between evolutionism and creationism and the subject taught.

this fact in the curricula of theological studies. Before a student is introduced to detailed problems from the area of theology, he or she first gets acquainted with the preliminaries of the philosophy of nature or anthropology. Such courses present the biological and nonbiological peculiarity of the human being. Thus, the natural sciences constitute a canvas for further philosophical inquiries. Teachers of religion therefore are inclined to believe that the natural sciences and the humanities influence and complement each other in their description of humans. This view is not shared by the representatives of the natural sciences who do not tackle any philosophical or theological problems. It follows that the teachers of biology are more at ease with accepting two separate views of the world, the theological and the scientific.

Moreover, the respondents who teach religion alongside some other subject more often declare the contradiction between evolutionism and creationism than those who teach only religion. This correlation can be explained to some extent by the reorganization of the Polish educational system after 1991. Radical changes in the curricula, necessitated by among other factors demographic depression, forced most teachers, including teachers of biology or physics, to acquire extra qualifications that would allow them to teach new subjects, for example religion. It is estimated that about 20 percent of the teachers of religion at first taught completely different subjects. This may account for their more critical view of the relation between evolutionism and creationism than the opinions of their colleagues with an exclusively theological background.

The same relationship (discipline taught/studied versus opinion about the relation between evolution and creation) was analyzed separately with regard to students. The view of conflict is significantly high among the students of biology (Figure 4). This may be caused by the way biology is taught at universities or by poor religious education among young people



$\chi^2 = 44.67$; df: 4; $p < 0.001$

Fig. 4. The relation between evolutionism and creationism and the discipline of studies.

in general. Most contemporary students were taught religion at secondary school, so such a conclusion may point to an improper way of teaching this subject. However, we cannot exclude the possibility that the conviction about the conflict is transmitted at the university level. For instance, Darwin's *On the Origin of Species* is frequently interpreted not only as a text about nature but also as a polemic with religious beliefs of the author's times. Darwin did not intend to challenge the idea of creation but wanted to question the biological concept of the invariability of species. Although the problems concerning the teleology of creation preoccupied his mind, his motivation was not ideological—to subvert the teaching of the church—but scientific: to disclaim the theory of the stability and invariability of species. It was only thanks to Darwin's ideological interpreters, such as Ernst Haeckel, that his theory came to be known as a science introduced for the sole reason of defeating Christianity and the church.

Although our results showed that the opinion about the conflict in question clearly depends on the studied discipline, it is not only the students of the natural sciences who declare the conflict view. Among the students of philosophy and theology respectively 25 and 30 percent of the respondents also noticed the contradiction. It is difficult to determine why so many of them claim that there exists a clear conflict between biological knowledge about human origins and creationism. One possible explanation is that students of the humanities, in their search for answers concerning human nature, spirituality, and cherished values, gain this knowledge from philosophy and theology, but because it cannot be verified empirically it is considered as disadvantaged and weak in the eyes of the younger generations. This may be the reason why people who study the humanities see the conflict between evolutionism, which is identified with certain and verifiable knowledge, and creationism, which is to a lesser or greater degree based on speculation.

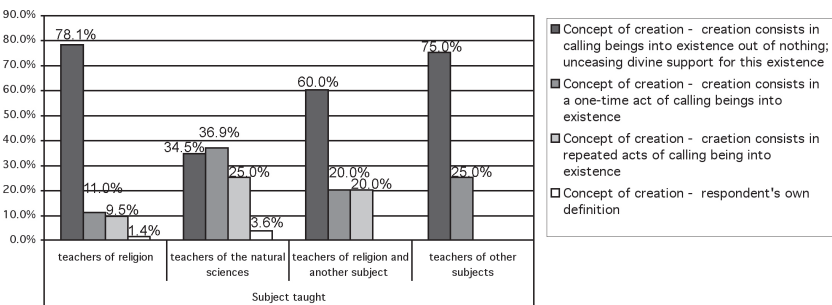
The answers to the question of the relationship between evolution and creation show in general that although the conflict between theological knowledge and natural sciences concerning human origins is not really widespread either among teachers or students, nevertheless about one-fifth of the respondents believe it exists.

5. The next questions dealt with the understanding of the terms *creation* and *evolution*, because one possible reason behind the claim about the contradictory nature of these concepts is their ambiguous interpretation. Respondents were asked to choose one from among four suggested definitions of creation. The first, and the one best fitting the Catholic doctrine of creation, was phrased as follows: "The essence of creation consists in calling beings into existence out of nothing and in unceasing divine support for this existence." This definition was chosen by a huge majority of the

teachers of religion (Figure 5), although those who taught religion as well as some other subject chose this answer less often. As mentioned earlier, these are teachers who originally were trained in a subject other than religion and their theological training was secondary, imposed on them by demographic and economic factors. This raises questions about both their openness to new theological knowledge and the quality of this kind of postgraduate theological studies offered especially in recent years to religious-educators-to-be.

The relation between choosing the correct definition of creation and the subject taught is clear, which is perhaps not surprising. But the fact that only one-third of natural-sciences teachers understand correctly the meaning of *creation* explains why this group is the least ready to see evolution and creation as coherent explanations of human origins (see Figure 3).

Note that 37 percent of the teachers of natural sciences and 20 percent of the teachers who teach religion alongside some other subject chose the definition that stresses a one-time act of creation. Such a false understanding of creation may be one of the factors explaining the existence of the conflict between the natural sciences and theology with regard to human origins, because biological knowledge is based on evolutionary principles that presuppose the mutability and heterogeneity of all living organisms while excluding the possibility of a sudden occurrence of all peculiar features of a given species. For instance, the origin of Neanderthal man is described as a result of an ongoing process of appearing and accumulating the characteristic features of these hominids rather than some sudden, one-time, simultaneous occurrence of all these features (Klein 1999, sec. 6; Trinkaus 1986, 203–6). The specific morphology of *Homo neanderthalensis* did not appear at once, as a complete set of all the features that define it, but emerged gradually. Creation, understood as a one-time act, implies the sudden appearance of a fully formed human being. On these terms, con-



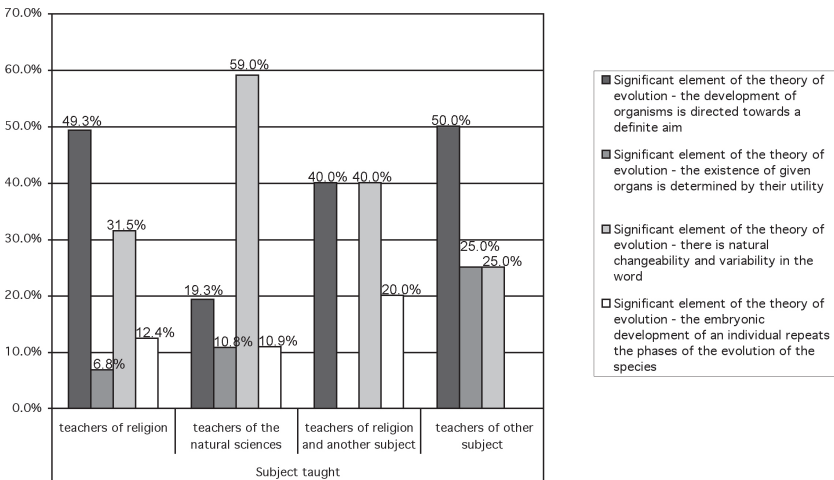
$\chi^2 = 31.42$, df: 9; $p < 0.001$

Fig. 5. The way of understanding the concept of creation and the subject taught..

temporary humans could not have had any morphologically primitive ancestors. Such an understanding of the concept of creation contradicts scientific knowledge.

The question concerning the appropriate definition of creation had a parallel in the question about the correct understanding of the basics of the theory of evolution (Figure 6). The respondents were given four options to choose from in answering the question: “Which rule constitutes a significant element of the theory of evolution?” The first option read: “The development of organisms is directed towards a definite aim.” The second, based on Lamarck’s theory, was phrased thus: “The existence of given organs is determined by their utility.” The third (most correct) answer postulated the existence of “natural changeability and variability in the world,” and the fourth referred to the biogenetic law formulated by Haeckel: “The embryonic development of an individual repeats the phases of the evolution of the species.”

The correct answer was usually provided by those who taught natural sciences, while the teachers of religion, in choosing the claim that “the development of organisms is directed towards a definite aim,” must have been motivated by their teleological tendencies in interpreting nature. This may explain why the great majority of them (80 percent) see no conflict between evolution and creation (see Figure 3). In their opinion, the affirmation of the teleological definition of evolution stands in perfect agreement with the theological concept of divine providence.



$\chi^2 = 20.69$; df: 9; $p < 0.02$

Fig. 6. The understanding of the basics of the theory of evolution and the subject taught.

6. Among the questions we also included the issue of accepting the human spiritual element. Almost all respondents affirmed the existence of such an element (Figure 7). It must be stressed, though, that the concept is so general that it does not imply faith in God. The current analysis disregards the details of the answers to the question of the origin of such a spiritual element. However, when asked to point out the sphere that provides arguments for the existence of this element, the teachers of the natural sciences chose religion (50 percent), psychology (40 percent) and genetics (6 percent); whereas the first answer was chosen by 90 percent of the teachers of religion, only 5 percent of them chose psychology and only 3 percent genetics. Notably, those who teach religion alongside some other subject made entirely different choices. As many as 20 percent pointed toward genetics, and the remaining 80 percent more predictably toward religion. This suggests that the biologists who are most familiar with the laws of genetics and know their helplessness in answering many important questions seek support in the humanities. However, a superficial knowledge of genetics may stay behind a kind of “enchantment” and lead to uncritical, almost unlimited trust in this discipline.

7. Looking for the reasons for the conflict, we cannot disregard the question of biblical hermeneutics, for it is well known that some creationists interpret the scriptures in the literal way. The content of scripture provides the basis for formulating the articles of faith. These are formulas pronouncing whether and to what degree some theological truth is contained in the revelation. On this basis one can distinguish different degrees of theological qualification of the given article of faith. Roman Catholic theology² speaks about the following dogmas: *de fide divina catholica definita* (truth that ought to be accepted by divine and universal faith and is defined in a

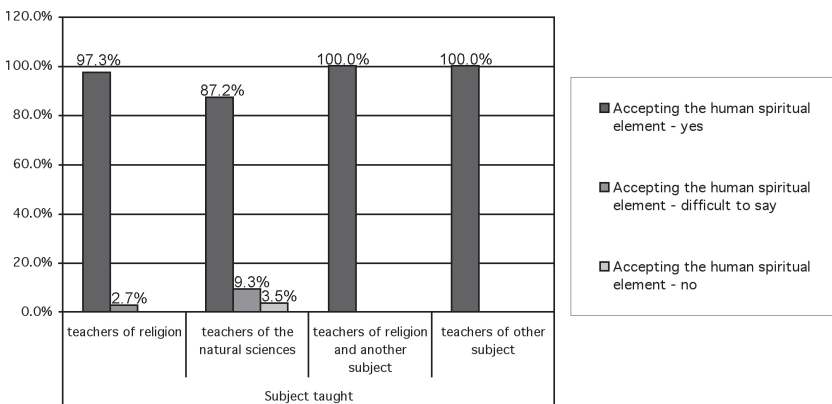


Fig. 7. The question of the existence of the human spiritual element.

formal, ceremonial way); *de fide divina catholica* (truth that is not proclaimed in a ceremonial way but ensues from the universal teaching of the church); *de fide divina* (truth that ensues from a private revelation and that obliges, in a facultative manner, only the person to whom it was revealed); *de fide ecclesiastica* (truth accepted on account of the authority of the church); *fidei proxima* (theological truth that is in the course of being recognized); *theologice certa* (truth that has not been revealed by God, or has not been revealed as yet, at least at the present stage of our knowledge of the revelation, but is considered true by the majority of theologians). The truthfulness of the dogmas of faith depends, however, not on the verifiability of historical statements of scripture but on divine revelation.

We may recall here the teaching of Augustine, who claimed that whatever could be proven in a definitive and certain way about the nature of things could not contradict the scriptures. The biblical authors wanted to instruct their readers not about the nature of things or the reality perceived by the senses but about the ways leading to salvation. The official attitude of the Roman Catholic Church toward the ways of reading and interpreting the truths contained in scripture was proclaimed by the Council of Trent (1545–1563), and it was determined by the need to respond to the challenges from the Protestant churches. Many historians point to the fact that the popularization of the biblical texts (for the first time widely accessible in the vernacular languages) and the rejection of the authority of the magisterium of the church in favor of the personal judgment of the reader, supported by the Protestants, was a natural reaction against the low level of Renaissance homiletics, frequently obscured by various mythological motifs. This is why the documents of the Council refer to this problem. The decrees of the Council include, for instance, the formula whose text in the Latin original reads as follows:

Praeterea ad coercenda petulantia ingenia decernit, ut nemo, suae prudentiae innixus, in rebus fidei et morum, ad aedificationem doctrinae christianae pertinentium, sacram Scripturam ad suos sensus contorquens, contra eum sensum, quem tenuit et tenet sancta mater Ecclesia, cuius est judicare de vero sensu et interpretatione Scripturarum sanctarum, aut etiam contra unanimem consensum Patrum ipsam Scripturam sacram interpretari audeat, etiamsi huiusmodi interpretationes nullo unquam tempore in lucem edendae forent. (Moreover in order to curb [some] presumptuous opinions we proclaim that no one who relies on his own prudence in the matters concerning faith and morality, and belonging to the Christian teaching, and who bends the Scriptures to suit his opinions, should dare to give such explanations concerning the Scriptures contrary to the sense, that has been and is upheld by our Holy Mother, the Church. For it belongs to the Church to judge about the true sense and interpretation of the Holy Scripture). (Schmelzer and Denzinger 1998, sec. 1507)

Likewise, the First Vatican Council referred to the question of the correct reading of the revealed truths contained in scripture by recalling the old Catholic rule *veritas veritati contraria esse non potest*—truth cannot contradict

truth. The Fathers of the Council formulated their opinion on this matter in the following statement:

Not only does the Church not fight against the progress of human sciences and knowledge, but supports them in various ways and pursues their development. Neither does it disregard or reject the advantages which stem for the people from these sciences and knowledge, but rather confirms that, when carried out in an ethical manner, with the help of God's grace, they lead to God if they come from Him, the master of all knowledge. Of course, the Church has no objection to the fact that such branches of learning were governed by their own rules and employed their own methods in their respective fields, but recognising this rightful freedom it points out that they should not contradict God's teaching, breeding error, or, going beyond their own limits, deal with the matters of faith and distort them in any way. (Schomelzer and Denzinger 1998, sec. 1799)

In other words, if God is the source of both natural and supernatural truths, there can be no contradiction between science and faith.

In line with this teaching, the great majority of the participating teachers admitted that the text of Genesis shows in a symbolic way the fundamental truth about God and humanity (Figure 8). The respondents were fully aware that the picture of the creation of humankind presents the matters of highest importance in a peculiar anthropomorphic guise and that it would be grossly naive not to distinguish between those truths and the form in which they are presented to the reader. The biblical account shows that the human being was made "of the earth" and therefore is a part of nature and, as such, has been called to glorify God in the name of creation as a whole. The human being also is more than only a part of nature, since God breathed divine spirit into the "clay" of the human body. The message therefore points to the ontic peculiarity of man in relation to all animals.

Only 3 percent of the teachers of the natural sciences and no one in the other groups read the text of Genesis in a literal way. Thus, the perception of the possible conflict between evolution and the vision of creation cannot stem from the literal interpretation of scripture, which seems to make the situation in Poland, in this respect, quite different from that in some other countries.

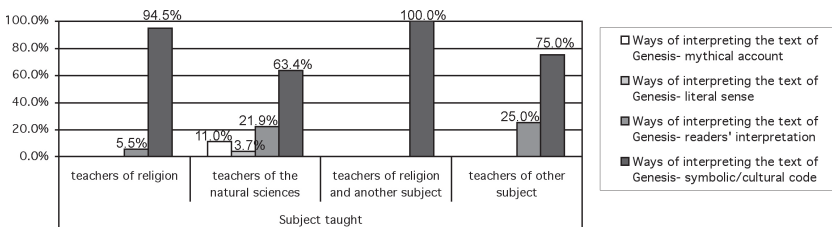


Fig. 8. Ways of interpreting the text of Genesis.

CONCLUSIONS

1. The conflict between creationism and evolutionism does not play a significant role in Poland. The problem concerns only one-fifth of the respondents.

2. The conflict is far more pronounced in the group of nonbelievers. This distinguishes Poland from other countries, notably the United States, where the majority of people with strong religious beliefs seem to maintain that there is a conflict between the natural sciences and religion.

3. The major source of the conflict, as well as of a certain form of a too-easy agreement, is to be sought in the wrongly understood ideas of evolution and creation. At the same time, the conflict does not stem from the literal interpretation of scripture.

4. Only one-third of all teachers of the natural sciences understand correctly and can point to the correct definition of *creation*. A misunderstanding of creation may explain their opinion that conflict exists between the natural sciences and theology.

5. Many teachers of religion understand evolution as a process directed toward a definite aim. Such teleological account of evolution, which seems to stand in agreement with the theological concept of divine providence, may be a reason for seeing evolution and creation as coherent descriptions of human origins.

In the course of the last 150 years the discussions between the proponents of the theory of evolution and the advocates of the creationist view of human origins often have been fraught with mutual hostility and accusations. Theologians, who felt threatened by the scientific interpretation of human prehistory, rejected the theory of evolution, considering it a view contradicting the biblical narrative and the principle of causality and therefore offensive toward both God and humankind. Natural scientists, accused by theologians of forging the evidence, tried to turn the tables on their adversaries and were determined to prove that statements contained in the Bible contradicted the results of their research, and concluded that the vision of human origins propagated by the theologians was contrary to scientific truth. In their eyes the Bible was wrong. Thus both theologians and scientists confused the spheres of their competence. Theologians formulated verdicts in the matters of biology whereas natural scientists deemed themselves competent to interpret the book of Genesis. Viewing this period with hindsight, it becomes clear that the theory of evolution prompted both scientists and philosophers to address anew the phenomenon of the human being. Today, although some official statements of the church have put an end to some misunderstandings, it still cannot be said that all problems have been definitively solved. Thus, the presented research has touched one of the most pressing needs of the present world—the need to recognize and uphold the complementary status of religion and science.

NOTES

1. There also was another form of the questionnaire addressed to university researchers. Its questions, however, were significantly different in their content and form than those asked of the teachers and students, for which reason they are not analyzed in the present paper.

2. We restrict our considerations here to the doctrine of the Roman Catholic Church because the interdenominational differences in the attitude to scripture and revelation are so significant that an analysis in more general terms could easily become too general or inadequate. Also, the Roman Catholic perspective of scriptural considerations is justified by the predominant denomination in the country where the poll took place.

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