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Ghosts or Absence of Light? The Understanding of Shadows

A Contribution to the Understanding of the Ontogenetic and Historical Development of the Notions about Spatial Dimensions

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Abstract. – Ethnography and historical disciplines report on different kinds of folk or premodern societies' ideas and superstitions regarding shadows that are not to find among the collective representations of modern, industrial societies. Shadows were seen as material substances and as doubles of persons and objects, as mystical beings capable to exert all kinds of magical influences. After certain time, however, these ideas were replaced by the rational view that seems so self-evident to every modern adult person. The article shows that developmental psychology has found the same mystical ideas among children. Only older children, due to their psychological development, discover the rational explanation of the origin and nature of shadows. It is argued that the strict parallel of the ontogenetic and historical development of the understanding of shadows is by no means an exception but reflects the same parallel concerning the development of the complete understanding of nature and world, physics and cosmos. Overall, developmental psychology delivers a key to understanding the historical development of humankind, thus forming a basis for ethnology or cultural anthropology specifically, or the human disciplines in general. This in former times widely demonstrated view was replaced by the currently prevailing ideas of "cultural relativism" and "universalism of mankind" especially after 1980. However, the empirical data do not support relativism and universalism but rather the developmental approaches of the previous generations of the human disciplines. [*shadow, light, space, physics, soul, ghost, superstition, psychological development*]

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Introduction

Ethnology and ethnography have been describing for several hundred years up to now that premodern societies have a different understanding of world and nature than modern ones. It was described that premodern, primitive, or archaic humans have a different understanding of causality, chance, number, logic, physical entities such as time, space, length, volume, mass, etc., and a divergent worldview generally, basing on magical-animistic and mystical pillars. The question was raised whether these differences only concern ideas, ideologies, theories, and worldview or moreover beyond that the basic patterns of reason and mind. Some authors worked out that beneath the divergences of worldview universal patterns of reason and mind are not identifiable, that is, the divergences rather concern every aspect of psyche, reason, and mind, including the most underlying and most fundamental reasoning functions such as causal or logical categories or basic mechanisms such as the understanding of time and space. This article here strengthens this position by demonstrating that premodern humans even understand spatial dimensions completely different as modern humans do. This will be demonstrated regarding the understanding of shadows, as it has been reported from premodern societies.

Ethnology and ethnography have been describing that premodern humans tend to regard shad-

ows as emanations of the objects or persons that casts them, as ghosts or beings, and as objects of different kinds of superstition and specific treatment. These ideas are widespread right across the whole premodern world, across the five continents, across all races and cultures, from oldest times up to the rise of modern civilization. Although different premodern cultures know different kinds of superstitions regarding shadows, there are common features underlying identifiable right across the whole premodern world.

The article here uses the notions of developmental psychology in order to find a scientific explanation to these phenomena. Developmental psychology found out that children's understanding of shadows goes through several stages, starting from a magical-animistic one over some intermediary stages to a rational and objective one, the latter one reached with ten years roughly. Developmental psychology could show that children's divergent understanding of shadows does not originate in divergent ideas only but in primitive psychological structures. Children simply do not understand the physical causes and geometrical relations that produce shadows. They do not understand shadows as absence of light but as substances or beings. Therefore, their superstitious ideas related originate in lower psychological stages and structures, in shortcomings concerning the understanding of spatial, causal, and logical dimensions or of simplest physical entities. Overall, this research shows that the superstitious ideas of the premodern world likewise root in these psychological stages and are not confined to the realm of ideas and superstitions only. Thus, highest percentages of premodern humans simply did not understand the physical origins of shadows, something whose understanding appears modern humans as inborn or a priori evident.

Altogether, this article supports the research that tries to establish developmental psychology as the fundamental theory to ethnology or cultural anthropology or social sciences. From 1840 to 1940 roughly, numerous authors of several human disciplines, including ethnology, described the far-reaching resemblances between children and premodern or primitive adults. The two main ideologies of our time, cultural relativism and universalism of mind, prevailing roughly since 1980 across continents and disciplines, object to the developmentalist tradition. However, despite their tremendous influence some researchers have been following the former theories of developmentalism, showing the crucial role of developmental psychology to ethnology specifically and human disciplines generally. A single example, it may be that of the understanding of shadows, suffices to evidence the resemblances between children and premodern adults, respectively the central role of developmental psychology to ethnology. The scrutiny of the understanding of shadows suffices to devastate the fundamentals of relativism and universalism.

Developmental Psychology and Ethnology

The founders of ethnology such as E. Tylor, J. Frazer, E. Clodd, J. Lubbock, and A. Bastian, of sociology such as H. Spencer and A. Comte, of psychoanalysis such as S. Freud and C. G. Jung, and of child psychology such as Sully, Chamberlain, Romanes, Preyer, Hall, Wallon, Piaget, Werner, Stern, Zeininger, Baldwin, Janet, and many early representatives of several human disciplines such as Elias, Schneider, Schultze, Vierkandt, Brunner-Traut, Feuerbach, Frankfort, etc. described similarities between children and premodern or primitive adult humans. Especially Werner dedicated a complete monograph to the description of these similarities covering the whole psyche and world understanding that refuted any suspicion the resemblances could be an error of interpretation (Werner 1948; Werner and Kaplan 1948). Piaget, the doyen of developmental psychology in its complete history, likewise described the resemblances right across the whole range of psyche and world understanding including logic, physics, social affairs, law, politics, and religion. He did not dedicate a whole monograph to the subject but inserted in most of his books on child psychology some remarks concerning the comparisons (Piaget 1959, 1969, 1975/VIII–X; Oesterdiekhoff 2016c).

Piaget postulated four stages of human development, the sensorimotor, the preoperational, the concrete operational, and the formal operational stage. While the first three stages cover the development of the child during his first decade, the fourth stage concerns the human development from 10 to 25 years of age. Humans transform their whole psychological system, down to the basic structures of reason and logic, when advancing from the lower to the higher stages. In fact, Piaget came to the same result as Schultze (1900) and Werner (1948) and already earlier Romanes (1888) and Chamberlain (1901).

With the Piagetian "Cross-Cultural Psychology" a new era of research was born. This branch of psychology conducted research across hundreds of

social milieus and ethnicities during the last 80 years, with a quantitative summit from 1960–1990. It was found that folk societies, to use a term of Robert Redfield, illiterate or semi-literate peoples, traditional and archaic societies, underprivileged milieus and smaller or greater percentages of people living in developing nations establish only the preoperational or concrete operational stages or mixtures of both. They do not attain the fourth stage of human development, the formal operational stage. This concerns the whole range of human development, including logic, physics, social affairs, politics, law, and religion. This empirical research confirmed the early assumptions of many scholars of the late 19th and the early 20th centuries, especially those of Piaget, Werner, Schultze, Elias, Tylor, Frazer, Luria, and Lévy-Bruhl. Every description regarding children's psychology, no matter which subject is in focus, likewise concerns the description of mind and reason of premodern adults. Both groups of humans share the same patterns of mind, logic, physics, social affairs, politics, law, and religion.[1]

Premodern adult humans share with children their stages and structures (their qualitative development) but differ in their life experience and practical skills (their quantitative development).[2] However, the role of qualitative development overrides that of the quantitative development: The commonalities are more relevant than the differences (Oesterdiekhoff 2016b). "Arrested development" is the term for the early stop of premodern man. His brain and psyche are not forced and attracted from early infancy onwards to climb on higher stages due to the lack of modern socialization facilities, such as modern school curricula, modern job opportunities, and further modern achievements. If he cannot use the several sequential developmental windows, then he has not the possibility to attain the higher stages (Oesterdiekhoff 2016a, 2015b, 2013a). For example, young Pirãha children still can learn to draw a straight line or to count 1, 2, and 3 or to add 1+1=2, the adult Pirãha cannot learn these simple notions anymore, even not after 8 months of daily schooling (Everett 2010: 180–183).

Modern socialization alone brings humans to run through the sequential stages in order to attain the formal operational stage, which they can successfully develop only in the second decade of life. 50–60 % of humans living in modern societies develop substage A of formal operations only, 40–50 % also develop substage B. Humans that develop substage B stay on developmental ages of humans aged 15–25, those of substage A stay on stages of humans aged 10–15. Premodern adults that stay on the concrete operational stage exhibit developmental ages of children aged 6–12, and those limited to the preoperational stage do not surmount levels of children aged 6.[3]

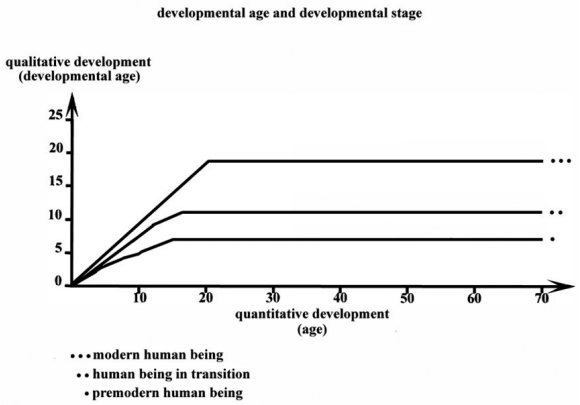

Fig. 1: Developmental Age and Developmental Stage.

Hallpike (1979) was the first to deliver a comprehensive theory to the data of Piagetian cross-cultural psychology. He further showed the relevance of the data to ethnology, describing the similarities between children's and premodern human's understanding of physics and worldview, logic and causality, conceptual realism and magic. Habermas (1976) had already applied some of this research to sociological theory. Ibarra (2007) reconstructed the Maya culture in terms of developmental psychology, Brunner-Traut (1996) did the same regarding ancient Egyptian culture, Radding (1985) regarding the culture of the European Middle Ages, Gablik (1976) regarding the history of arts, and LePan (1989) regarding the history of English literature. Piaget (1975/VIII–X; Piaget and Garcia 1989) reconstructed the history of sciences in terms of developmental psychology, describing that the inventors of rational science during the 17th century were the first to establish the formal operational stage, while medieval philosophy and science corresponded to the lower stages only.

1 Dasen and Berry (1974); Dasen (1974, 1977); Hallpike (1979); Freitag (1983); Havighurst and Neugarten (1955); Lurija (1982); Oesterdiekhoff (2009, 2011, 2012, 2013a, b, 2015e, 2016a, c, d); Peluffo (1962, 1967); Philp and Kelly (1974); Waddell (1968); Modgil and Modgil (1976/VIII).

2 See Hallpike (1979) and Oesterdiekhoff (2009).

3 Modgil and Modgil (1976/VIII); Oesterdiekhoff (2013a, b, 2009, 2011, 2012, 2016b, c).

Table 1: Stages of Development

Sensorymotor stage 0–2 years of age	Mammal societies	Speechless intelligence
Preoperational stage 2–6 or 8 years	Premodern societies, especially nature peoples	Conceptual or nominal realism Magical beliefs and practices Belief in metamorphosis Non-conservation of physical entities such as length, volume, number, etc. Animism, personification of objects Belief in ghosts, witches, etc. Belief in myths and legends Strong religiousness Belief in immanent justice and adherence to objective responsibility Support of severe forms of punishment Authoritarian forms of social relations Egocentrism of mind and behavior Kohlbergian moral stage 1
Concrete operational stage 6–12 years	Premodern societies, including the educated classes of the ancient and medieval civilizations, and some milieus in early modern societies	No understanding of syllogisms and logical deductions First logical classifications Decrease but no annihilation of the preoperational characteristics mentioned Strong religiousness Kohlbergian moral stage 2
Formal operational stage Substage A 10–15 years	Modern societies	Disappearance of the phenomena of the two earlier stages mentioned Development of self-reflexivity, of combinatorial, systematic, experimental abilities, and of hypothetico-deductive conclusions Replacement of the magical-animistic by empirical-causal categories Disenchantment of worldview Decline of religion and rise of agnosticism Enlightenment and emergence of humanism, rise of the humane forms of punishment Rise of democracy and civil society Kohlbergian moral stages 3 and 4
Formal operational stage Substage B 15–25 years	Some percentages of people in the currently most advanced nations	Abilities to understand theories Democracy, civil society, liberty rights develop higher Humanism and pacifism are strongly supported Breakthrough of agnosticism and atheism Kohlbergian moral stage 5 (and 6)

The whole history of humankind can only be understood in terms of developmental psychology. The premodern history of science, philosophy, worldview, religion, law, politics, morals, manners, lore, etc., originates in the lower psychological stages. Moreover, even the history of population growth, economy, and society is understandable only against the knowledge developmental psychology provides. The establishment of the fourth stage of human development, the evolution of the formal operations, caused the era of Enlightenment with its criticism of slavery and punishment law, superstition and magic, and with its creation of the ideas of democracy, constitutional state, liberty rights, and humanism. It caused sciences, humanism, democracy, industrial economy, the supremacy of the Western culture, and the origination of modern, industrial society.[4]

4 Oesterdiekhoff (2013a, 2014, 2015a, 2011); Habermas (1976); Piaget (1975/X).

Human Development, Culture, and History

However, the article here deals only with the demonstration of the explanatory power of developmental psychology to the understanding of the physical world among premodern peoples or folk societies. There are many studies that have already shown that premodern peoples understand nature and physics, causality and chance, movements and force, physical entities such as mass, volume, weight, space, time, etc. according to the preoperational or concrete operational stages. The similarities do not only concern general understandings of nature such as animism and magic but also fundamental notions such as the understanding of the movements of clouds or projectiles, waves and winds, or the perception of pictures, perspectives or shadows (Hallpike 1979; Oesterdiekhoff 2009, 2011, 2015d, c, 2016e, c). The similarities cover the whole range of mind and reason, down to the smallest details such as shadows.

Psychogenesis of the Understanding of Shadows

During the first decade of life, there are four stages of the understanding of shadows identifiable (Piaget 1969: 180–194; 1975/VI: 232–248). During the first stage, typical for children around five years of age, children explain shadows as being made by two factors collaborating. On the one side, a shadow emanates from the object as a being that leaves the object, as a ghost who leaves a body, or as a person who leaves a house. Thus, shadows are seen as parts of the object nearby, as effluvium or emanation, or as a double of the object. A shadow a person casts on the ground is an ingredient part of the person himself, it is dependent and independent alike, material and immaterial alike, and it is a being alive, something like a ghost. A shadow is a substance, a material being, and not the mere absence of light. Even the dark color of the shadow does not come from the mere absence of light but from dark matter. On the other side, the same shadow comes from the surroundings, from the trees nearby, from the roofs nearby, from the furniture nearby, from the clouds or the night.

Gall (5;0) What makes this shadow? – *The sky*. – How? – *Because it is night.* [Gall points to the shadow.] – But where does this shadow come from? – *From the book*. – And how is the shadow of the book made? – *From the sky*… Roc (6;6) [We then make a shadow with a pocketbook.] Where does this shadow come from? – *It comes from the sky*. – Is there shadow there? [In our open hand] – *No*. – And there? [under the hand and putting the hand on the table]. – *Yes*. – Where does it come from? – *From the sky*. – What is the shadow made of? – *Of the trees* (Piaget 1969: 182).

This double causation is typical for physical explanations of children generally. Children at this stage likewise explain movements generally by the composition of an internal and an external motor. The cloud makes wind by its movement that enhances its movement; every projectile flies on its own will and strength, thus making wind, which supports its flight. Double causation, made by the object and its surrounding alike, also covers the explanation of the origination of shadows.

During the second stage, with 6 or 7 years, the idea of double causation and of mystical participation between the nearby and distant shadow collapses. From now on shadows solely emanate from objects nearby and not from distant surroundings, too. Shadows are doubles of objects only.

Leo (7) How is that? – *It is because all the steps you make, the person on the ground always follows your feet.* – Why? – *Because it is the model of the person*. – … When it is night, does he make one too? – *He makes one, then but you don't see it because it's night*. – How do we make one? – *You make it when you walk, because every step you make, it follows us behind.* – Why does it follow us? – *Because it is the person who makes it on the ground*. – But how can the person do that? – *He walks.* – Where does the shadow come from? – *It comes out of the person, we have a shadow inside us* (Piaget 1969: 186f.).

During the third stage, with 8 years roughly, the child starts understanding the relation existing between shade and light. The child sees that the shadow falls on the opposite side of the light source, with the object amidst. However, the child of the third stage still does not understand the nature of shadows, the physical link between light and object, that is, shadows as resulting from the absence of light in consequence of physical hindrances. He still does not understand shadows as absence of light but as emanations or substances. Thus, he still believes that objects throw shadows even at night. Therefore, he explains the place of the shadow opposite to the light source by the internal will of the shadow. The shadow wants to go there where darkness waits, or it flees from the light, or it is driven away like a dog by an angry man. Only from the beginning of the fourth stage,

with ten years of age, (modern) children understand that shadows are not substances, beings, and emanations but mere absence of light in consequence of hindrances.

For during the early stages shadow is held to be a substance which travels about, which accumulates at certain points, and which is often thought to be alive and conscious. During the subsequent stages, shadow is still regarded as a fluid which emanates from the objects themselves. It is only once the necessity for a luminous source has been noticed that the substantialist explanation, having become useless, is replaced by the correct explanation (Piaget 1969: 191).

The explanation to the children's ideas has to refer to children's still low mental capacity, a low sense for reality, a low level of attentiveness, and, coming from this, a low capacity to understand geometrical relations and physical entities. It would not be enough to refer only to children's still low knowledge of geometrical relations or to their prevalent magical-animistic ideas. "For to explain the phenomenon of shadows is, at bottom, to rely upon judgments of geometrical relations; it is to place oneself in imagination behind the object which acts as a screen and to grasp the fact that from that position the light is hidden. As soon as you have succeeded in handling these relations of perspective, you will understand why shadows vary in shape and orientation according to the position of the source of light, and in this way alone, the substantialist explanation will be rendered useless. To explain a shadow is therefore to ascertain by means of the logic of spatial relations to what extent you can or cannot see the light if you walk round the object, which acts as a screen. The explanation of shadows is purely geometrical" (Piaget 1969: 191f.). However, the understanding of the geometrical relations is only the culmination point but not the single explanation basis. This is the complete anthropological or psychological stage the child stays upon, that is, his complete psyche and nature. Children's low sense for reality, low level of attentiveness, his scanty causality categories, and his mystical and animistic ideas altogether account to the phenomenon, that is, his whole psychological nature causes the understanding of shadows.

Overall, (modern) children by their ninth year understand shadows as substantial parts of bodies, while their rational understanding only appears with children aged 9 years and older, when they come close to the fourth stage of human development, the formal operational stage. As premodern peoples do not develop the fourth stage of human development, it is expectable that their understanding of shadows resembles the one children have. In fact, premodern shadow understandings match to the stages 1–3 described, children have aged 5–8.

The Understanding of Shadows among Premodern Peoples

Primitive peoples usually explain that their shadows are a part of their personality or individuality, are their soul or their emanation. "The shadow essentially belongs to a person or object. Therefore, the shadow has the same power as the person or can suffer the same amount as the person does" (Bieler 1987: 127, transl. by G. O.). These peoples think that the shadow they cast is their soul, ghost, or life principle. Thus, they really think that the ghost or soul is visible and material, a real substance. On the other hand, they do not think that the shadow or the soul is only matter and beyond that is nothing. They neither have any idea of pure matter nor the idea of pure soul or ghost as something completely immaterial and invisible. As children, premodern peoples conceive matter as animistic and alive, while conversely they recognize soul, mind, and psyche as material and substantial. Both groups do not discriminate mind and matter, soul and substance, psyche and physis, idea and fact, subject and object according to the way adolescents do when staying on the formal operational stage, and accordingly, the way Western philosophy and science is used to do since Descartes with his sharp and historically new distinction between *res cogitans* and *res extensa*.[5] Therefore, both children and premodern peoples believe in the material form of souls and ghosts. Thus, they really believe that shadows are their souls, their doubles, and their life principles, visible and material. Conversely, both groups do not regard shadows as matter only because they have no idea of matter only, of dead matter, and of dead things. Therefore, both groups neither regard shadows as mere absence of light nor as dead substance but as the material and visible appearance of a soul or a ghost. Thus, both groups regard shadows as mystical beings.[6]

Of course, this does not mean that the shadow is seen as the single appearance of the soul. It is only one form or one manifestation of the soul or the

5 Lévy-Bruhl (1930: 126); Piaget (1959); Oesterdiekhoff (2013a: 129–138, 276–281).

6 Lévy-Bruhl (1930: 134, 139); von den Steinen (1894: 364); Piaget (1959, 1969).

life principle of the person. Ethnology has shown that premodern ideas regarding the soul are numerous, contradictious, and unsystematic. For example, premodern peoples also believe that their souls exist twofold, both in themselves and in certain animals, which are seen as doubles, a belief, widespread in totemic religions right across the premodern world (Lévy-Bruhl 1930: 145, 158). However, the shadow is a part of the person, one manifestation of the soul, often the most important one, inseparable from the inner core of the individual. In any case, there is a strong mystical participation between shadow and person. The human body and its shadow are two parts of the same individual or two kinds of manifestation of the person (Lévy-Bruhl 1930: 154f.). Primitive mentality takes it for granted that the same person can be multiplied in two, three, or more appearances. However, even if a person is manifested in numerous appearances, it is nevertheless only one person indivisible (Lévy-Bruhl 1930: 156, 133, 143).

Numerous forms of superstition in premodern societies come from this mystical and substantial interpretation of shadows. Right across the continents, it was believed that sickness is a weakness of the shadow, while death implies a loss of the shadow. Conversely, a sick person casting a long shadow may expect a soon and complete recovery (Bieler 1987: 133). Many premodern peoples avoid passing a lake where their bodies could cast shadows on the water's surface because they believe that the lake could pull their shadows or their souls beneath the water so that they would die. The same superstition is held regarding some rocks or woods.[7] For example, some stones on the Banks Islands were called "eating ghosts." It was believed that the ghosts living in the stones pull out the souls of the shadows cast by people going by so that their fate is sealed (Frazer 1977/I: 278). Or some people believe that witches can steal shadows so that the bereaved persons lose their souls and have to die.

Generally, it was held across the continents and cultures that damages affected to the shadows could damage the person (Lévy-Bruhl 1930: 140). This behavior reminds to present-day customs of younger children who try to beat or to catch their own shadow or that of others. Some games of children concern the tries to step on other children's shadows and those who are hit at first lose the game (Bieler 1987: 129). For example, it was believed in India, Europe, and elsewhere that pricking a shadow with a knife or a sword could hurt the owner of the shadow (Frazer 1977/I: 278). The punishment law of medieval Europe knew the punishment of shadows as representatives of their owners. For example, medieval German law, e. g., the customary law fixed in the Sachsenspiegel, the Saxon law book, ordered that convicted free persons, who were charged by unfree persons, should be punished by the unfree persons who then beat the shadows of the culprits (Bieler 1987: 128f., fn. 28; citing von Künßberg 1925: 113f.).

Near the equator, objects and persons do not cast shadows during the middle of the day. Therefore, there have been superstitions in this world region that persons do not leave their home or that they hesitate crossing places during this time. It was believed, that without their shadow or their soul they are unprotected or doomed to die (Frazer 1977/I: 280). In ancient China, it was custom that the bystanders of a burial were cautious that their shadow did not fall into the coffin or the graveyard in order to prevent the loss of their shadow and their life (Frazer 1977/I: 278).

In Romania and Greece one hundred years ago, it was custom to catch shadows and bury them under a new house that was going to be built. The house builders measured the length of a shadow of a person and made a hole for the shadow under the new house. Therefore, people passing a building site heart the warning "Take care that they do not catch your shadow." In Southeast Europe at that time, there were shadow traders who sold shadows to architects in order to supply them with shadows needed for house building. Obviously, these customs paralleled the customs to kill and bury chickens or lambs for the same reasons, likewise usual in these regions at that time. Both customs, to take shadows of humans and real animals as sacrifices to houses, have replaced ancient customs that practized the killing of real humans for the building of new houses. It was believed, that these sacrifices would secure the support of the gods regarding the stability of the house's architecture (Frazer 1977/I: 280f.; Tylor 1871).

Furthermore, in Italy some generations ago, it was believed that a step on a child's shadow could prevent him from growing further (Bieler 1987: 128). More, it was assumed that the shadow of valuable persons or objects could bring health and luck. For example, the shadow of some trees or bushes was held to be able protecting against witches or sicknesses (Bieler 1987: 130). Conversely, the shadows of trees that were considered as being harmful can make humans sick (Bieler 1987: 131). People in China or some Slavic na-

7 Lévy-Bruhl (1930: 134); Codrington (2012: 176); Frazer (1977/I: 281).

tions surmised that oracles basing upon the scrutiny of the movements of a shadow could predict the destiny of the person related to the shadow (Bieler 1987: 134).

Conclusions

Overall, right across the continents and cultures, premodern people believed shadows are emanations of persons and objects themselves. They took shadows as manifestations and appearances of persons and objects, as their souls and their doubles. They had a mystical interpretation of shadows and understood them as the visible part of a person's soul. The deep cultural rooting of these beliefs is proven by their practical consequences. Therefore, also ancient penal laws based some of their regulations and procedures upon this mystical understanding such as the existence of shadow traders, the custom of burial of shadows, and the avoidance patterns regarding shadows. All this proves the fact that premodern humankind had a mystical understanding of shadows.

It is obvious that children's understanding of shadows described by Piaget completely match to the premodern understanding of shadows. There is a point-to-point correspondence between children's understandings of shadows and that of premodern cultures. Moreover, the description made by Piaget is more exact than that of ethnographers and historians. Further, developmental psychology delivers a full explanation to the primitive beliefs. It explains the cognitive and psychological mechanisms that create the primitive belief systems. It describes the children's incapacity to understand the role of geometrical relations, the ignorance of the nature of shadows as mere absence of light, the low attentiveness of children, the animistic and magical tendencies of children, etc., all accountable to the phenomenon. Developmental psychology explains further the four stages of shadow understanding ranging from the most primitive level to the rational and objective level of understanding. Therefore, developmental psychology delivers not only a fuller description than ethnography does but still more a full explanation of the phenomenon. Ethnography and historical research can only contribute descriptions of the phenomenon. They neither can explain why premodern peoples believed in these mystical ideas nor why modern peoples surmounted them. Developmental psychology, however, is able to explain why premodern peoples adhered to these beliefs and why modern humankind eradicated them.

Moreover, ethnography could describe that premodern humankind had a mystical understanding of shadows but not that this mystical belief also rooted in simple misunderstandings of geometrical relations and in ignorance of the nature of shadows as mere absence of light. Thus, the ethnographic method was unable to answer to the question whether the mystical ideas would exist next to a properly physical understanding of shadows, or rather in consequence of a lack of their physical understanding. However, developmental psychology can answer to this question. It has shown that whenever a human being has surmounted the mystical and substantial understanding of shadows he only then has won the right physical understanding, while the lack of the physical understanding is always accompanied by the mystical and substantial interpretation. Therefore, it is absolutely clear that premodern humans who shared the mystical interpretation also shared the ignorance regarding the physical and geometrical relations. Overall, developmental psychology alone, not ethnography, can gain a full understanding of the depth and the scope of the phenomenon.

It is evident that some scientists, engineers, and architects in ancient times already stood on the fourth stage of shadow understanding. It is also clear that many premodern people still stood on the first stage, even in China during the 19th century. One of the most famous examples well known in ethnology was given by De Groot (1910). A long shadow thrown by a passing coach was understood as a promise to Chinese fishermen that they would catch many a fish the other day. The shadow of today was seen as cast by the fish net full of fish tomorrow. This is an example of the parallel existence of a close and a distant causer to a single shadow, typical for the first stage.

Modern children between their ages 5–8 have the same understandings of shadows as greater parts of the premodern humankind right across the continents from the Stone Ages up to the end of the premodern world. Some examples above mentioned even concern European traditions and customs as they still existed around 1900. As in the previous chapters of the article described, premodern peoples have understandings of nature and world, physics and cosmos, space and time, causality and logic that completely match to preoperational and concrete operational stages, that is, to children's ideas below their tenth year of life. Therefore, the result of this article on shadows cannot surprise anymore, but matches to the overall understandings of physics in the premodern

world, as it is documented by the developmental researches related.

The preoperational or concrete operational understanding of shadows is not a module separable from the entire psyche of the human being. It rather reflects not only the complete understanding of physics but also the complete understanding of the world, including its social, moral, political, and religious dimensions. It reflects the whole psychological or anthropological stage of the human being. Children and premodern human beings not only share their understanding of world and physics; they share their whole psychological life and their nature. They share, as being mentioned above, their stages and structures (their qualitative development) but differ in their experience and knowledge (their quantitative development).

A single phenomenon, small and immaterial as the phenomenon of the understanding of shadows really is or might appear, suffices to evidence the equation premodern man = child + greater life experience and suffices to evidence that developmental psychology bases ethnology and all other historical disciplines. The sober scrutiny of this single phenomenon is sufficient to show that the human disciplines generally and ethnology specifically have lost ground over the past 40 years in consequence of their adherence to the wrong ideologies "cultural relativism" and "universalism of mind." It is evident that the great prewar traditions, such as those of the British school (Tylor, Frazer, etc.), the French school (Lévy-Bruhl), and other research traditions basing upon developmentalism, were much superior to the currently prevailing relativistic positions taken for granted by the majority of present-day social scientists for dubious ideological and political reasons. This article shows how social sciences can surmount the intellectual desert with this regard of the past 40 years and can rehabilitate formerly great traditions and advance beyond them alike.

References Cited

Bieler, Ludwig
1987 Schatten. In: H. Bächtold-Stäubli (Hrsg.), Handwörterbuch des deutschen Aberglaubens. Bd. 9; pp. 126–142. Berlin: De Gruyter. [Unveränd. photomechan. Nachdr. der Ausgabe Berlin 1941]

Brunner-Traut, Emma
1996 Frühformen des Erkennens am Beispiel Altägyptens. Darmstadt: Wissenschaftliche Buchgesellschaft. [3. Aufl.]

Chamberlain, Alexander F.
1901 The Child. A Study in the Evolution of Man. London: Walter Scott.

Codrington, Robert Henry
2012 The Melanesians. Studies in Their Anthropology and Folklore. London: Forgotten Books.

Dasen, Pierre R.
1974 Cross-Cultural Piagetian Research. A Summary. In: P. R. Dasen and J. W. Berry (eds.); pp. 409–423.

Dasen, Pierre R. (ed.)
1977 Piagetian Psychology. Cross-Cultural Contributions. (Preface by J. Piaget). New York: Gardner Press.

Dasen, Pierre R., and **John W. Berry** (eds.)
1974 Culture and Cognition. Readings in Cross-Cultural Psychology. London: Methuen.

De Groot, Jan J. M.
1910 The Religion of the Chinese. New York: Macmillan.

Everett, Daniel L.
2010 Das glücklichste Volk. Sieben Jahre bei den Pirahã-Indianern am Amazonas. München: DVA.

Frazer, James George
1977 Der goldene Zweig. Eine Studie über Magie und Religion. 2 Bde. Frankfurt: Ullstein Verlag.

Freitag, Barbara
1983 Der Aufbau kindlicher Bewußtseinsstrukturen im gesellschaftlichen Kontext. Eine Untersuchung schulpflichtiger Kinder in Brasilien. München: Fink Verlag.

Gablik, Suzi
1976 Progress in Art. London: Thames and Hudson.

Habermas, Jürgen
1976 Zur Rekonstruktion des Historischen Materialismus. Frankfurt: Suhrkamp. (Suhrkamp-Taschenbücher Wissenschaft, 154)

Hallpike, Christopher R.
1979 The Foundations of Primitive Thought. Oxford: Clarendon Press.

Havighurst, Robert J., and **Bernice L. Neugarten**
1955 American Indian and White Children. A Sociopsychological Investigation. Chicago: University of Chicago Press.

Ibarra García, Laura
2007 Creencias, mitos y rituales en el mundo prehispánico. Una explicación desde la teoría histórico-genética. Guadalajara: Universidad de Guadalajara.

Künßberg, Eberhard von
1925 Die Volkskunde und ihre Grenzgebiete. *Jahrbuch für historische Volkskunde* 1: 69–125.

LePan, Don
1989 The Cognitive Revolution in Western Culture. London: Macmillan.

Lévy-Bruhl, Lucien
1930 Die Seele der Primitiven. Wien: Wilhelm Braumüller. [Engl. Version: The "Soul" of the Primitive. Chicago 1971]

Lurija, Aleksandr R.
1982 Cognitive Development. Its Cultural and Social Foundations. Cambridge: Harvard University Press.

Modgil, Sohan, and **Celia Modgil**
1976 Piagetian Research. Vol. 8: Cross-Cultural Studies. Windsor: NFER.

Oesterdiekhoff, Georg W.
2009 Mental Growth of Humankind in History. Norderstedt: Books on Demand.
2011 The Steps of Man towards Civilization. The Key to Disclose the Riddle of History. Norderstedt: Books on Demand.
2012 Was Pre-Modern Man a Child? The Quintessence of the Psychometric and Developmental Approaches. *Intelligence* 40/5: 470–478.
2013a Die Entwicklung der Menschheit von der Kindheitsphase zur Erwachsenenreife. Wiesbaden: Springer Verlag.
2013b Relevance of Piagetian Cross-Cultural Psychology to the Humanities and Social Sciences. *American Journal of Psychology* 126/4: 477–492.
2014 The Role of Developmental Psychology to Understanding History, Culture, and Social Change. *Journal of Social Sciences* 10/4: 185–195.
2015a Denkschrift zur Gründung des Max-Planck-Instituts für Humanwissenschaften. Münster: Lit-Verlag.
2015b Interrelations between the Brain, Psychological Stage Development, and Societal Evolution. *Anthropological Notebooks* 21/1: 5–21
2015c Karl von den Steinen's Analysis of the Brazilian Indian's Mind and Worldview Reconstructed. A Contribution to the Interrelationship of Ethnology and Developmental Psychology. *Mankind Quarterly* 56/1: 30–50.
2015d The Nature of "Premodern" Mind. Tylor, Frazer, Lévy-Bruhl, Evans-Pritchard, Piaget, and Beyond. *Anthropos* 110: 15–25.
2015e Why Premodern Humans Believed in the Divine Status of Their Parents and Ancestors? Psychology Illuminates the Foundations of Ancestor Worship. *Anthropos* 110: 582–589.
2016a Child and Ancient Man. How to Define Their Commonalities and Differences. *The American Journal of Psychology* 129/3: 295–312.
2016b Cognitive Modules or Evolutionary Stages? The Relationship between Developmental and Cross-Cultural Psychology. *Human Evolution* 31/1–2: 69–83.
2016c Is a Forgotten Subject Central to the Future Development of Sciences? Jean Piaget on the Interrelationship between Ontogeny and History. *Personality and Individual Differences* 98: 118–126
2016d Magical Causation of Death in Archaic Societies. Cultural Anthropology in the Light of the Cognitive-Developmental Approach, Exemplified by the Scrutiny of Causes and Consequences of the Mystical Interpretation of the Death. *Anthropos* 111: 224–238.
2016e Sociological Functionalism or Developmental Psychology as a Theoretical Foundation to Ethnology? Radcliffe-Brown's Analysis of the Andaman Islanders' Religious Beliefs Revised. *International Journal of Anthropology* 31/1–2: 61–77.

Peluffo, Nicola
1962 Les notions de conservation et de causalité chez les enfants provenant de différents milieux physiques et socioculturels. *Archives de psychologie* 38: 275–291.
1967 Culture and Cognitive Problems. *International Journal of Psychology* 2/3: 187–198.

Philp, Hugh, and **M. Kelly**
1974 Product and Process in Cognitive Development. Some Comparative Data on the Performance of School Age Children in Different Cultures. *British Journal of Educational Psychology* 44/3: 248–265.

Piaget, Jean
1959 The Child's Conception of the World. New York: Littlefield, Adams.
1969 The Child's Conception of Physical Causality. (Transl. by M. Gabain.) Totowa: Littlefield, Adams.
1975 Gesammelte Werke. Studienausgabe. 10 Bde. Stuttgart: Klett-Cotta.

Piaget, Jean, and **Rolando Garcia**
1989 Psychogenesis and the History of Sciences. New York: Columbia University Press.

Radding, Charles M.
1985 A World Made by Men. Cognition and Society, 400–1200. Chapel Hill: University of North Carolina Press.

Romanes, George
1888 Mental Evolution in Man. London: Kegan, Trench & Co.

Schultze, Fritz
1900 Psychologie der Naturvölker. Leipzig: Verlag von Veit.

Steinen, Karl von den
1894 Unter den Naturvölkern Zentral-Brasiliens. Reiseschilderung und Ergebnisse der Zweiten Schingú-Expedition 1887–1888. Berlin: Reimer Verlag.

Tylor, Edward B.
1871 Primitive Culture. 2 Vols. London: J. Murray.

Waddell, V.
1968 Some Cultural Considerations on the Development of the Concept of Conservation. (Paper Presented to a Genetic Epistemology Seminar, October 1968. Australian National University, Sydney).

Werner, Heinz
1948 Comparative Psychology of Mental Development. Chicago: Follett.

Werner, Heinz, and **Bernard Kaplan**
1948 The Developmental Approach to Cognition. Its Relevance to the Psychological Interpretation of Anthropological and Ethnolinguistic Data. *American Anthropologist* 58/5: 866–880.