Natalia Zlydneva

The Trace of the Avant-Garde in Soviet Educational Cinema★

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In Soviet film history, the educational and popular-scientific genres of cinema appear to be intertwined, and it is often hard to separate them. For this reason, this study considers the issue of educational cinema in the post-war Soviet period, in all of its manifestations, although it concentrates mainly on the problem of how to represent scientific issues. It also investigates whether educational cinema only represents the invisible processes of the physical world or is also engaged in discovery in the realm of the human mind.

The main theoretical point to be discussed in respect to educational cinema concerns the limits of visualisation in representing modern scientific achievements by cinematic means. I will also consider the nature of these limits as signs. In this connection, one should keep in mind that cinema in its early days was seen as an instrument for recording features of the human environment and catching the visible world in motion and placing it on a two-dimensional screen. In technical terms, a film camera properly meets these requirements, since it has at its disposal a system of lenses and other gadgets. On the other hand, cinema in general creates a realm of possible worlds and, in this respect, not only reflects reality but also builds its own visual entity, deriving its power over viewers from their previous cinematic experiences. In this way, educational cinema tends to maintain a fragile balance between the texture of a scientific fact, with its inclination towards pragmatics, and the subtle substance of fantasy. As a part of its ideological propaganda apparatus, Soviet educational cinema was required to meet the needs of mirroring the 'objective' world and, at the same time, it possessed the advantage of having relative freedom to present non-visual—mental and/or imagined—reality. This is why the discussion of Soviet educational cinema can proceed from theory straight to the issue of political and ideological reflection.

Educational cinema can be properly examined from the viewpoint of visual semiotics. Films suit the purpose of visual presentation of scientific matters and the process of thinking due to their semiotic nature. Cinema operates with a sign system that consists of discreet elements, as does a natural language. Each of these atomic elements manifests itself in a unit—a shot—which, together with other shots, forms a unity much the same as in any text. Meanwhile, being essentially visual, every particular shot, as well as the text as a whole, in presenting messages iconically, constitutes a sort of indiscreet unity. Thus the language of film may be considered an indiscreet unity formed by discreet elements. It corresponds well with scientific methods of describing the world as far as it reveals its similarity to science, which is mainly based on discreet terms in its interpretative strategy.

There is also a more profound congeniality between cinematography and science which relates to their common ambition to create virtual worlds. In educational cinema, the semantics of a possible world has a specific vocabulary, full of contradictions, which implies conveying abstract notions in terms of 'positive' knowledge and presenting the latter through 'non-positive' visual perception. The urge of cinema and science to create possible worlds is combined with their common aspiration to intrude into the essence of existence. These two polar tendencies are intertwined in a paradoxical way. Namely, as every scientific discovery is based on the assumption of both creating a sort of new world and on a deep penetration into the objective one, cinematic presentation tends to create an illusion of reality and, at the same time, takes viewers as far away from their daily life routines as possible. The correspondence between science and mythology is evident: both of them describe their subjects by means of using different descriptors. Cinema reveals its mythological nature in the way it structures the visible world: metonymy prevails over metaphor and a meaning is produced by presenting the whole through its parts. This process is highly typical of both the archaic past of human culture and, more importantly, of the avant-garde of the 20th century (Ivanov 1998).

The common features of cinema and science in this kind of duality are particularly evident in the scientific narrative of educational films. The narrative strategy of educational cinema varies from a simple biography of a scholar and illustrative description of his work to attempts to create visual equivalents

of sophisticated scientific issues or invisible processes in the natural world by means of cinematic language. The latter project requires an especially intricate means of expression and stimulates formal experimentation. Modern equipment makes it possible to fulfil this goal. Nowadays, the educational film industry has many technical devices at its disposal to serve these purposes: time-lapse cinematography makes it possible to record slow processes (for example, the growth of plants), while high-speed cinematography transforms extremely rapid processes into slowed-down pictures (e.g. a bullet shattering glass); a microscope adapted to a camera lens penetrates the micro-world, while a camera for underwater recording can capture the world hidden in the depths of the ocean. These devices aim to make visible what is otherwise inaccessible to human vision and to intensify insight into the world. Appropriating scholars' equipment, educational cinema even strives to appropriate scientific discourse.

Meanwhile, to bridge the gap between screening the progress of science and reaching its audience, educational cinema has had to develop a visual narrative language with images comprehensible to an ordinary viewer. In order to do this, the cinema uses the visual sign system of a society, framing the world in its specific way. It bases its language on the experience of art history, which it adapts to its own purpose; it also considers rules of visual perception and their psychological consequences. Thus, in modern educational films, the complexity of technical adjustments and a full range of means of expression are combined to form a semiotic unity.

In the Soviet Union, the complex nature of educational cinema provided a good foundation for those who intended to escape from other fields of 'regular' film-making. It also seemed to be attractive for those directors who aimed to make experimental films in situations where the social conditions were highly unfavourable for any manifestation of individuality and personal achievement. This was the case in Soviet educational cinema. Because of state propaganda, harsh censorship and double standards in ideology, educational cinema provided a sanctuary for a great number of brilliant film-makers, mainly Jews from provincial regions, who were forced to leave the official mainstream and/or were willing to escape the pressures of censorship and challenge themselves in a more or less independent professional field.

The field of educational cinema was not only relatively free of censorship, in terms of formal language, due to its specific non-ideological subject, but was also relatively well-financed. Being a part of the military apparatus, Soviet science was fully funded. As a result, science, as well as scholars, enjoyed a high social status and the outcome of their activity was a part of the ideological propaganda that proclaimed the unlimited possibilities of a 'new human being' who had grown up in the country of triumphant socialism. Along with increasing military power, the fundamental and natural sciences (mathematics, physics, biology etc.) had excellent conditions for development, and the educational cinema mirrored this. It benefited greatly from connections with a field which was relatively free of state pressure, by producing films that both reflected the independence of the scholarly milieu from ideology and created its own independent realm of experimental cinematic language. The visual language of Soviet educational cinema owed a lot to the cinema of the 1920s, as well as to the great experiment of the Russian avant-garde in general.

To trace the history of Soviet educational cinema one should go to the very early days of Russian film-making. The first educational films were shot in 1898 for scientific purposes and aimed to explore the physical forces affecting the body of an ice-breaker. At the beginning of the 20th century, a great contribution to Russian educational cinema was made by the science department of Alexander Khanzhonkov's studio. As a pioneer of educational cinema, Khanzhonkov established a special science department and attracted major Russian experts to the making of films on agriculture, geography, zoology, botany and medicine. In some of these films, the documentary mode was combined with acting. For instance, in his film on alcoholism and its consequences, an episode presenting children of mentally retarded drunkards included a scene with the famous actor Ivan Mozzhukhin portraying a drunkard who

sees a devil coming out of a bottle; the special effects in this scene were carried out with the help of Ladislas Starevich. In the 1920s, Soviet educational cinema was significantly influenced by German *Kulturfilm*. The 1920s witnessed the very first attempts to create visual equivalents to sophisticated scientific concepts.

One of the first projects of a cinema beyond fiction (a sort of abstract intellectual cinema free of standard narration) was carried out by Sergei Eisenstein. The genre of popular-scientific films was established by Vsevolod Pudovkin. He created a pioneering film on the mechanics of brain functions (*Mechanics of the Brain*, 1926) and used montage to present scientific experiments. The first films on theoretical concepts and discoveries presented their subjects in a rather illustrative way and, thus, stand in contrast with the same type of films from the 1960s, which based their means of expression on the achievements of the fictional cinema of the 1920s. In the 1930s, educational cinema became a part of the ideological propaganda machine (for instance, a couple of films on biology referred to the idea of permanent class struggle). At that time, educational films for schools and for mass education were produced in large numbers, mainly on topics related to physics, which were especially popular among young people. The popular-scientific film industry was entirely integrated into the production of educational films. Only after World War II, when it moved from schools to cinemas and started to demonstrate immediate contacts with contemporary scientific processes, it elaborated its position to be a completely independent genre.

Educational cinema reached its climax at the time of Khrushchev's 'Thaw' and remained a highly interesting field until the end of the 1970s. It became an area where cinema could produce a popular transcription of scientific achievements and where important social and ethical problems were brought up for discussion. The approaches to scientific narrative in films were numerous, and the variety of genres was broad: there were films based on documentary, dramatisations, and (partly) animated films; many new visual devices and special effects were used. In the 1950s and 1960s, the representations of science were saturated with the mythology of the powerful personality and scholars were treated as isolated heroes (e.g. *One Tamm* (*Один Тамм*, 1972)). The emphasis on heroic mythology, incorporated into the educational discourse (although any scientific school is known to be a result of efforts of not an isolated person but a large group of scholars), brought to light its links with the general cultural context of the time, which estimated an individual but was also not free from an idea of a strong personality eliciting the memory of the Stalin époque. Operating in the field of discovery, the educational film focused on the human being as a social being and concentrated on humanitarian issues. It also turned to the world of animals, presenting it as an analogue to the world of mankind and, thus, stressing issues of social psychology. Additionally, many of the themes of popular-scientific films of the 1960s and 1970s were influenced by the dialogue between the so-called lyrics and physics, which took place in Soviet society at that time. The problems that film-makers addressed harked back to a number of traditional, deeply philosophical Russian questions (What is to be done? What is real spirituality? How does technological progress improve society? etc.). Educational film became a field of relatively free discussion on some of the most important social problems. These themes were expressed in the titles, which were highly indicative of the time: *What is the Theory of Relativity* (*Что такое теория относительности*, 1964) and *This Right Left World* (*Этот правый левый мир*, 1971) by Semyon Raitburt; *Me and Others* (*Я и другие*, 1971) and *Can Animals Think?* (*Думают ли животные?*, 1970) by Felix Sobolev. In these titles, the duality of the post-Stalin world was brought to light, revealing a black and white model of perception.

In the 1960s and 1970s, the 'buffer zone' of educational cinema became apparent in the experimental approach to the subject. It brought to the forefront the issue of means of expression borrowed from the cinematic language of the 1920s. In contrast to the educational cinema of the 1920s, characterised by plain and illustrative narrative strategies, the educational cinema of the Thaw era turned to achievements of the feature film-making of the 1920s and developed

a language of signs based on desautomatic significations (montage, slow-motion and fast-motion effects, extreme low- and high-angle framing, reverse motion etc.). The artistic insights of the 1960s revealed their links to the mythological mode of thinking, which had defined the poetics of the historical avant-garde a number of decades earlier. Archaic stereotypes appeared in a binary system of representation, intensifying the above-mentioned contrasts in the framework of black and white perception: personal/public, hero/mass, good/evil. A significant trait of the period concerned the revealing of an alternative side of social life, as well as the other sides of existence in general. The language of educational cinema also adapted the avant-garde type of rhetoric, which implied a wide range of speech figures: oxymoron in a clash of distant and close foregrounds and backgrounds and enlarged detail as a metaphor, as well as pleonasm in agglomeration of equal elements. Besides immanent artistic goals, the appeal to the avant-garde heritage conveyed a clear (although entirely ulterior) message of the social resistance of the 1960s.

The modes of representing science in Soviet educational films can be illustrated by three films, which cover the most significant features of the 1950s and 1960s, when the avant-garde origins of narration appeared. In each of these films the semantic level defined the level of expression and—*vice versa*—the language of film determined the plot, in which it revealed its links with the avant-garde poetics.

The first example is *One Tamm (Один Тамм*, 1972*)*, directed by Marianna Tavrog. It deals with the eminent Russian scholar Igor Tamm (1895–1971), the Nobel Prize winner of 1958 in the field of theoretical and nuclear physics. The film was designed to represent the most significant discovery made by the scholar in a popular way. Meanwhile, the main focus was not on scientific problems, but rather on the scholar's personality and ethical aspects of his attitude towards essencial social issues. Tamm was one of those Soviet physicists who openly opposed (together with one of his disciples and colleagues, Andrei Sakharov, later the leader of Soviet dissidents) the arms race between the US and the Soviet Union. The title *One Tamm* referred to a unit of measurement (like a volt) and implied a yardstick of moral categories such as human decency and honesty. The film manifested an appeal to oppose the official Soviet politics and was a result of the process of social liberalisation.

The film's mode of expression corresponds to the message. The plot is presented on a number of parallel levels and in different modes: animation techniques are used as well as visual abstraction to represent certain phenomena of the physical world inaccessible to human sight (for instance, the dynamic nuclear process is portrayed as a cloud of smoke). One of the representations is of particular interest—that of montage sequence. The voice-over narration of Tamm's life is illustrated with a sequence of his photographs, which appear on the screen at high speed and from different angles. These photographic chains convey the scholar's identity, which becomes intensified by means of a montage referring to the documentaries of the silent era. In this visual context, a photograph appears in a double signification system: from the viewpoint of science it indicates the reliability of discreet elements, and from the viewpoint of ethics it appears as a metaphor for personal dignity in the mendacious ideology of Soviet society. This double message of the film was made possible by the intertextuality of the mode of representation.

One Night for Reflection (Ночь на размышление, Slava Zukerman, 1972) was banned from screening due to censorship problems, and the director, who later became a famous film-maker in the US, had to emigrate. It mainly consists of staged scenes and thus it cannot be considered as belonging to the educational genre proper. The film deals with a range of ethical problems presented in a rather abstract way, connecting it firmly with the cinematic innovations of the 1960s. It tells the story of a scientist faced with an ethical dilemma: whether to continue his professional career in difficult conditions of field-work or to accept a well-paid position at the cost of losing his professional honour. This typical Russian dilemma was invested with political overtones in the Soviet reality. The plot is based on an extended dialogue between the main character and his *alter*

ego, who simultaneously resembles Faust and a KGB officer. The two characters are portrayed by the same person—the famous Soviet theatre and cinema actor Innokenti Smoktunovsky. Although it does not concentrate on issues of science, its use of intriguing visual and narrative devices to represent intangible and invisible phenomena creates a dense metaphorical discourse. First and foremost, I have in mind the way a certain process of thinking is represented by interchanging slow-motion sequences with speed-motion ones. The increased speed is particularly interesting: the shot in speed-motion of cars at a busy city intersection provides an apt metaphor for the vanity of human aspiration. Small cars dashing about resemble insects and refer to the Russian avant-garde, namely to the 'insect code' as a reverse side of its utopian ideology. The insect code was frequently used in the 1920s, both in painting and in cinema. Alexander Rodchenko's photography, for example, presents this code on the level of composition: in many images the large objects in the foreground formed a clashing contrast with the small images in the distant background. The diminished dimension of objects signified their humble status. At the same time, the discreet elements of the film correspond to a discreet mode of thinking: the dialogue between the two 'personae' of the same person evokes the interaction between the two cerebral hemispheres of the brain, a topic it shares with the first Soviet educational film from the 1920s, Pudovkin's *Mechanics of the Brain*.

Finally, Vladimir Kobrin's work deals with surrealistic projections in the scientific discourse of educational cinema. Kobrin (1942–1999) directed experimental films in the framework of the popular-scientific genre in the late 1980s and the 1990s. He worked for the state studio Centrnauchfilm (Центрнаучфильм), which specialised in producing educational films and which, after the collapse of the Soviet Union, became an independent enterprise. The period of perestroika had a lot in common with Khrushchev's Thaw, a fact confirmed in particular by the language of cinema. Although Kobrin's films belong to a slightly later period—his main works were produced in the late 1980s and the 1990s—they are strongly influenced by the formal devices of the Russian avant-garde of the 1920s. Kobrin's contribution to experimental educational cinema in Russia is significant, as he managed to bridge the gap between Russian avant-garde achievements and the Western avant-garde trends of the 1930s–1960s. As for many other film-makers in Soviet Russia, the popular-scientific genre turned out to be a sort of ecological niche for Kobrin, who sought to go beyond Soviet idealism, to a discussion of the role of science in society and, simultaneously, a presentation of an individual eschatological projection of the future, by infusing scientific discourse with mystery and vagueness. He and a group of his colleagues were primarily influenced by Chaplin's oeuvre, which combined paradoxes and tragedies of human existence with a naïve perception of the world (Kobrin 2005). They also followed the pattern of trickery represented by the cinema of Georges Méliès and Norman McLaren. Additionally, traits of surrealistic painting obviously inspired the group, especially the work of Salvador Dalí, whose images and symbols (a doll, a clock etc.) emerge in Kobrin's *Homo Paradoksum* (1989).

Kobrin's films demonstrate a mixture of nightmarish dreams, drastic chains of association, and play with visual signs full of strong images and sexual metaphors. The titles of his films eloquently demonstrate the significant shift from a positivistic approach to the scientific object to emphasising its irrational nature: *The Issue of Radioactivity* (*Явление радиоактивности*, 1977), *Transistors* (*Полупроводники*, 1979), *The Physical Basics of Quantum Theory* (*Физические основы квантовой теории*, 1980), *The Subject and Tasks of Biophysics* (*Предмет и задачи биофизики*, 1982), *Thermodynamics of Biological Processes* (*Термодинамика биологических процессов*, 1986), *Homo Paradoksum* (1989), *Steps to Nowhere* (*Шаги в никуда*, 1992), *Future Continuous* (1993), *The Third Reality I* (*Третья реальность I*, 1995), *From Absolutely Nothing* (*Абсолютно из ничего*, 1997), *GraviDance* (1999) etc.

The film *Self-Organisation of Biological Systems* (*Самоорганизация биологических процессов*, 1989) appears to be especially typical of Kobrin's experimental studio at the early

stage of his creative quest. It provides an insight into the problem of synergy (developed by Ilya Prigogine and others) which was very popular at that time, and projects the conflict between chaos and the order of biological systems onto social life. The scientific issues are articulated very suggestively by using surrealistic visual language and mystic sensibility. The film recalls the new figurative painting of the late avant-garde period, a time when Soviet art was very closely connected with West European trends. The mode of representation plays a central role in Kobrin's films, and devices such as reversed and/or superimposed images, increased speed of movement etc. are frequently used. The specific film language develops a number of incredibly suggestive and subjective chains of association, which are sometimes difficult to comprehend and remain open to individual interpretation. The conglomeration of visual space, evoking Baroque rhetoric, is a significant feature of his style. His grotesque approach, which defines the ironic mode of narration, is also noteworthy.

Kobrin's films represent the most radical point in the development of popular-scientific cinema. His deep penetration into the representation of scientific problems sought to destroy the utopian idea of the positivistic world-view. The paradoxical approach to social problems in his work reveals a sense of ethical ambiguity.

In conclusion, the following should be pointed out:

1. During the Soviet times, educational cinema was a domain where film-makers managed to find an opportunity to produce experimental films.

2. Scientific discourse and its visual representation raise a set of problems worth discussing in the context of visual semiotics. A correlation between signification system and reference (signifiers) can be found which is highly typical of the Russian art of the 20th century and its experimental practices in general.

3. The mode of expression in the Soviet educational cinema of the 1960s goes back to early Russian cinema in the 1920s and refers to avant-garde rhetoric.

4. The most eminent Russian directors working in the field of educational cinema projected scientific issues onto the realm of social life, combining the educational strategy with ethical problems. The creative imagery of Kobrin's films transformed the political chaos and immorality of the perestroika period into surrealistic metaphors.

FILMS

Can Animals Think? (*Думают ли животные?*), dir. Felix Sobolev. Ukraine, 1970

From Absolutely Nothing (*Абсолютно из ничего*), dir. Vladimir Kobrin. Russia, 1997

Future Continuous, dir. Vladimir Kobrin. Russia, 1993

GraviDance, dir. Vladimir Kobrin. Russia, 1999

Homo Paradoksum, dir. Vladimir Kobrin. Russia, 1989

The Issue of Radioactivity (*Явление радиоактивности*), dir. Vladimir Kobrin. Russia, 1977

Me and Others (*Я и другие*), dir. Felix Sobolev. Ukraine, 1971

Mechanics of the Brain (*Механика головного мозга*), dir. Vsevolod Pudovkin. Russia, 1926

One Night for Reflection (*Ночь на размышление*), dir. Slava Zukerman. Russia, 1972

One Tamm (*Один Тамм*), dir. Marianna Tavrog. Russia, 1972

The Physical Basics of Quantum Theory (*Физические основы квантовой теории*), dir. Vladimir Kobrin. Russia, 1980

Self-Organisation of Biological Systems (*Самоорганизация биологических процессов*), dir. Vladimir Kobrin. Russia, 1989

Steps to Nowhere (*Шаги в никуда*), dir. Vladimir Kobrin. Russia, 1992

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Thermodynamics of Biological Processes (*Термодинамика биологических процессов*), dir. Vladimir Kobrin. Russia, 1986

The Third Reality I (*Третья реальность I*), dir. Vladimir Kobrin. Russia, 1995

This Right Left World (*Этот правый левый мир*), dir. Semyon Raitburt. Russia, 1971

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