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FORMING THE ECOLOGICAL COMPETENCE OF PUPILS

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Abstract

The article considers the questions of forming of the ecological competence and the development of the pupils' ecological culture. We analyse the results of the research of the developed three-stage system of forming the ecological culture and the safety of pupils, change of motivation, and their competence during the experiment. We consider the questions of training and education of pupils based on the competence-based approach. We show that the process of ecological training and education represents acquiring of integral experience of the solution of problems of vital activity and formation of the key competences due to the development of "fitting" of social and professional roles and performance of various functions in an ecological society of pupils of different ages. We present the process of formation of functional literacy and research activity of pupils at the example of the traditions of ecological society of pupils of Oryol lyceum No. 18. We describe the complex regional ecological research in the forest natural boundary near Oryol by various techniques.

Keywords: Competence-based approach, ecological approach, ecological safety, functional literacy, ecological culture, social and professional roles.

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1. Introduction

Environmental problems arose throughout all the history of the mankind, having the significant effect on its course. So, in the history of relations between human society and nature we distinguish: crisis of collecting and primitive hunting (40-50 thousand years ago), crisis of hunting economy (5-10 thousand years ago), crisis of an ancient agriculture and cattle breeding (4-5 thousand years ago), industrial crisis (from the 17th – 18th cc. to the middle of the 20th century).

In relation to studying of psychological features of competence as a whole unit, it should be noted that they aren't a simple summary of knowledge, abilities, personal qualities and methods of behaviour (OECD, 2004). Person's competence as an attribute of his/her maturity, efficiency and successfulness as a subject of various classes of interaction is a new psychological formation allowing to solve differently professional, social and personal problems and each of its components is a part of an integrated whole. Characteristics of the psychological features of competence don't follow directly from characteristics of the mentioned above components though the level of their development and nature of their interconnection influence the level of individual competence (Seiler, 2007). The acmeological approach assumes inclusion in the content of education of an integral experience of solving problems of vital activity and forming of core competencies due to the development of "fitting" of social and professional roles and accomplishment of various functions (Selevko, 2004).

From our point of view, the competence taken in a complex of its types provides development of the ecological culture of a person, allowing not only to use various regularities (including psychological) in improving the quality of activities but transfers the personality to another level of functioning (Heckmair, 2005; Haan, 2010; Backes, Backes, Drago, 2011). Competence of an ecological safety is the vital structure ensuring the security of a person as a live system.

Now society faces the choice: either to keep the existing method of interaction with nature that inevitably can lead to an environmental disaster, or to keep the biosphere suitable for life, but for this purpose, it is necessary to change the developed type of activities (Vesti SoES, 2000; Pavlov, 2012; Pavlov, Demyankov, Fedyaeva, 2016; UNESCO,2010). The latter is possible on condition of a radical reorganisation of people's outlook, breaking of values in the area of both material, and moral culture and forming of a new - ecological culture (Environmental education, 2005).

In scientific literature two sides in the system of ecological culture are distinguished: material and moral (Pavlov, 2010). According to many modern authors (Ermakov, Zverev, Suravegina, 2002; Heckmair, 2005; Vesti SoES, 2000; Reyers, Jaarsveld , McGeoch, 2007; Selevko, 2004; Kazakov, Pavlov, 2011; Kazakova, 2004; Zakhlebnyy, Dzyatkovskaya, 2007) the structure of ecological culture represents the system of interconnected components:

- ecological relations,
- ecological consciousness,
- ecological activities.

In the content of ecological relations, the following structural elements are distinguished - the social-and-ecological and real and practical relations. Ecological consciousness is connected with our awareness of hopelessness and, moreover, a disastrous character of orientation to a domination of a converting type, the technocratic thinking style based on aggressive attitude to nature. Its important part is

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its appeal to deep, serious comprehension of an ecological situation in the world, to the need of using of achievements of modern technologies for ecological needs.

Ecological activities are characterised as an integrative notion, covering different types of human activities both in material and in ideal spheres, connected with studying, development, transforming and preserving the environment.

In ecological education, the scheme describing the effectiveness of education and socialisation of a personality has the following form: ecological literacy - ecological education - ecological competence - ecological culture - ecological mentality (Reyers, Jaarsveld, McGeoch, 2007).

The initial step of forming of the ecological culture of the personality is ecological literacy (Blinnikov, 2002) which is described by four components:

1. understanding of nature as mankind habitat, its "home";
2. scientific knowledge of interaction of nature and society;
3. organisational and other abilities of nature protection activities;
4. skills of handling of the devices fixing an environment condition.

Literacy provides, in general, awareness and using of tools in nature protection activities. Motivational and valuable components here are social norms, requirements, prohibitions that need to be carried out.

Functional literacy is characterised by the level of mastering of learning tools, it includes a capability to solve standard vital problems on the basis of applied knowledge in various spheres of activity and is supplemented with a number of features: readiness for increase in level of education on the basis of the conscious choice of educational programs; ability of the choice of forms of leisure activities in nature, profession of an ecological profile; accomplishment of one's duties and protection of one's rights in the field of environmental protection (Dakhin, 2004).

Unlike literacy, ecological education, according to a number of researchers (Zverev, Blinnikov, Zakhlebny, Suravegina, Ponomareva, and others.), is the result of a system of ecological education which includes: ecocentric type of thinking; responsibility for preserving the environment; interest in environmental problems; knowledge, abilities, skills necessary for their identification, research and solving; understanding of the value of life in all its manifestations; practical experience of activities for improvement of the state of the environment (Ermakov, Zverev, Suravegina, 2002).The following necessary stage of formation of an ecological culture of a personality is ecological competence (Heckmair, 2005; Rauch, 2010). If literacy is getting of knowledge and skills, education is the experience of creative use of the gained knowledge and abilities, and with the experience of the emotional and valuable attitude towards reality, and then the essential feature of competence is understanding of meanings, of the social and personal importance of ecological activities for solving of ecological problems. Ecological culture is characterised by reproduction and augmenting of these meanings in the course of activity.

2. Research Questions

Nowadays we speak about the survival of the mankind, therefore, the modern period of development of civilisation is characterised as the world ecological crisis (Körner, 2003, p. 3-6). The

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natural gene pool degrades; regulatory functions, stability and intensity of bioproduction process decrease. The real threat of loss of stability of the biosphere, and, therefore, the real threat to the development of civilisation are created. The complex of the changes and their reasons makes up an environmental problem of the end of the 20th and the beginning of the 21st centuries, and it defines man's behaviour and increases demands for education and competence of the younger generation. Education is one of the major social institutes determining personal, civil, professional formation, a safety of a person and it has had considerable changes for the last decade (UNESCO, 2005). The Federal state educational standard accepted in December 2010 changes the paradigm of modern education and aims at the development of skills and competence of the younger generation. It is based on the system and activity approach in education. In this regard we put the following question for our research: what are the ways of forming of the ecological competence and the development of the pupils' ecological culture.

3. Purpose of the Study

The relevance of our research represents thirty years' search as even today, there is no single approved federal standard of ecological education, at schools of general education there is still no systematic approach, continuity and consistency in the organisation of educational process, teachers don't know the theory of ecological education. The purpose of the study is to substantiate the necessity for the introduction of systemic approach into the learning organization.

4. Research Methods

We used the analysis and the primary systematization of the results of the research of the developed three-stage system of forming the ecological culture and the safety of pupils, change of motivation, and their competence during the experiment.

5. Findings

During our research, the system of forming of ecological culture and safety of pupils is realised. The feature of the offered system is continuity of training and education at lessons and in extracurricular activities, in out-of-class and out-of-school work, in additional education, which is reached through the main functions of ecological consciousness - educational, developing, organizing and prognostic; in case of development of the ecological relations and during ecological activities. Effective implementation of functions of ecological consciousness, relations and activities leads to forming of pupils' ecological culture, one of the stages of its development is competence. In this connection, we offer a three-stage way of solution of tasks ('forest model'). Each step includes close communication with live objects ('immersion of the child in nature'). To organise this work in Oryol lyceum No. 18 the biological complex and educational ecosystems of the wood and a reservoir were created. One of the main conditions of forming of competence of pupils is the development of their cognitive interest. Communication and work with live objects at the lessons and in the extracurricular activity, during out-of-class and out-of-school work, in additional education allows creating cognitive interest, competence

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and education of pupils (Blinnikov, 2002). Various forms of professionally oriented activities (research, pedagogical and others) improve their competence and culture.

The first step of ecological training and education in this model is the ecological universal education (implementation of educational function). Here the teacher reveals ecological concepts and plans the ways of their studying at each lesson. There are a lot of forms of an ecological universal education. They provide the main task of the first step: pupils must have strong knowledge of live organisms, communities, and also of ecological concepts and regularities (Anishchenko, Zaytsev, Demyankov, 2007). During working at this step literacy, functional literacy and competence are gradually created, the intellectual sphere of pupil's personality is developed, ecological relations are laid.

The second step is an extracurricular and after-hour local history activity and additional education (implementation of the developing, educational and prognostic functions). At this step gradual deepening and development of literacy, functional literacy, competence, ecological relations are continued; the foundation of ecological consciousness is laid.

The special place at the first and second steps is given to forming of creative groups and development of pupils' personalities. The emotional and motivational sphere of a person develops.

The third step of ecological training and education is a practical work, i.e. use of ecological knowledge and abilities in practice in specific affairs (implementation of the developing, educational and organizing function); since the created views and beliefs of pupils must undergo testing practice in the complete planned year-round activities within ecological society of pupils. In this case, traditions unite the senior and younger pupils in informal groups (associations on interests). Informal groups in which everyone will find a personally significant place in nature protection are quicker created. At the same time ecological club of pupils helps to individual development and formation of a personality who does not only think and act independently in modern conditions but also coordinates his/her actions having public value with requirements of nature, society and specific people.

The work of ecological society of pupils in Oryol lyceum No. 18 is carried out in several directions – sectors, it allows pupils to choose the practical activity which most corresponds to their temperament, character, intellectual and physical abilities and to the development of their creative capabilities, competence and culture in general.

Forest sector – its members organise winter additional feeding of birds and animals, make and hang out artificial nesting places, plant trees and bushes, clear the wood of the dry twigs and garbage.

Sector of the fight against poaching (FAP) – as a rule, senior pupils protect fir-trees in the winter, birches and primroses in the spring, extinguish fires and grass fires left in the wood, protect fish during spawning.

The ecological theatre shows performances and propaganda teams to the pupils of Oryol lyceum No. 18 and other schools.

The members of biological complex study animals and look after them. They hold exhibitions and excursions acquainting children and adults with fauna. Biocomplex becomes a kind of a veterinary clinic where people bring wounded animals. The efficient help to animals gives a great ethic supply to all the participants.

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Sector of ecological education – senior pupils and students annually carry out dozens of biological and ecological clubs for pupils of the elementary school and pupils of kindergartens where children do not only learn a lot of new about wildlife but also learn to protect it under the leadership of seniors.

"The small academy" carries out studying of an ecological situation in Oryol neighbourhood and the Oka overheads. Many research works are performed on tasks of the regional nature protection organisations.

In Oryol lyceum No. 18 great attention has been recently paid to the organisation and carrying out of summer ecological and ethnographic expeditions "Ecofil" and "Marches of memory" in recent years. During these expeditions pupils study the village history (for example, the village of Tagino), folklore is registered in video and audio cassettes (songs, couplets), folk art is shot on film and video cameras (embroideries, toys, distaffs and other products), the ecological situation in the village and its surroundings is studied, radiation control is carried out, springs and neighboring forest plantations are cleaned, garbage is taken away from the coast of reservoirs. The propaganda team of the expedition addresses pupils of local schools on nature protection questions and gives concerts. "Marches of memory" - pupils look after graves of soldiers, plant flowers and trees, clear the adjacent territory of garbage, help with improvement of monasteries (in Bolkhov, the village of Novosil).

Work of ecological society of pupils is diverse – its technology has been practised for decades. So the purpose of the movement "Plants at Church" is the development of the spirituality of the younger generation of citizens of Russia in the case of improvement of churches surroundings with the trees grown up by pupils at school farms. In 2 or 3 years before planting in autumn pupils collect mature fruits of a chestnut and other trees, sow them in school farm and grow up planting material. As part of the action in April they plant young trees: prepare holes for planting of trees (there is much construction garbage in the soil and it isn't simple to dig holes); bring humus in holes; dig out planting material at the farm and get it ready for transportation (roots are dipped into clay solution and closed with packets); transport and plant trees with obligatory watering; in summer water the plants. The received results: last year 132 young plants of a horse-chestnut were planted on the territory of the church of Matrona of Moscow under construction in the Northern district of Oryol (all of them took roots!). Blessings of Oryol and Livny Archbishop Panteleimon and the dean father Maxim were received. The action of young ecologists was described in the article "Plants at Church — Sprouts of Kindness in Souls" in the Oryol Town Newspaper.

Action "Forest Fire" is annual event held by the lyceum students and its purpose is to preserve suburban forests and neighbourhoods of Oryol micro districts from wildfires during dry seasons. The action is implemented during operational work of a group of lyceum students of 4-5 pupils: carrying out nature protection raids; hanging out leaflets; conversations with vacationers about the danger of fires in the wood; suppression of the left fires and burning grass. Besides, they hold art and literary competitions (drawings, leaflets, posters). Long-term practice shows that 30-40 left fires are usually extinguished, but in hot summer of 2010 pupils of lyceum No. 18 extinguished 136 fires and grass fires. 10 groups of pupils (46 in all) worked in the neighbourhood of Oryol and its residential district. Thus, pupils made contribution to the preservation of suburban forests. The ecological society of pupils received an official gratitude from the Orel Regional Council of People's Deputies.

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Action 'Springs of the Oryol Region'. The purpose of the action is certification and improvement of springs of the Central Russian Upland - sources of many Russian rivers. During the action, pupils find springs, research, describe and certificate them. During ecological and tourist sorties the participants carry out clearing from garbage and silt in a spring and neighborhoods, stacking stones for thresholds; repairing and producing benches and bridges; changing filling pipes and barrels; cleaning of steles at springs; mowing of grass. They also organise art and literary competitions (poems, essays, drawings).

The teachers encourage pupils in art creativity at each step of the ecological society: recitation of verses, drawing, singing, participation in different contests. Traditions close ranks of its members of different ages had been formed in the ecological society of Oryol lyceum No. 1: reporting and election meetings, Board meetings, dedication in members of the forestry society, parties, training, contests, awarding. Lyceum students created the banners, badges, seals, awards, the chronicle, "the Book of Honour", the museum, premises of headquarters. In activities of school ecological society the following organisational principles are actively used:

- voluntariness of joining and obligation of participation of school students in affairs of ecological society;
- self-government of school students; accurate planning of an annual cycle of works; a group form of work (on 4-7 people);
- control by the forestry society council of accomplishment of the given task;
- encouragement of the best pupils by results of activities;
- training of new members by pupils themselves (work continuity);
- expansion of the sphere and forms of activities;
- the combination of joint work and rest.

Components of the three-stage system of forming of ecological culture and safety are diverse and interact with each other. Our three-stage way creates a sociocultural educational environment, which allows developing a personality of a child through intellectual, emotional and motivational spheres and practical activities (Smirnov, 2008, 2015). There is a continuous development of pupils of kindergartens and pupils of elementary school (club members) to senior pupils and students of higher education institutions (former graduates participating in ecological society actions).

Activity sphere; emotional and motivation sphere; intellectual sphere; person nucleus; individual personal origin.

At the first stage, the informative impulse of a pupil develops and enriches his intellectual sphere. At the second stage, its emotional and motivational sphere is enriched. At the third stage, there is the development of the activity sphere. Therefore, through emotional and intellectual activities, all spheres of pupil's personality are developed.

The conducted research based on the acmeological approach showed that within the three-stage system it is possible to refer to essential factors of forming of competencies of an ecological safety motivation, readiness for activities, accentuation of character and level of social and psychological adaptation. During the research, the share of pupils with a practical type of motivation significantly increased in experimental groups (ecological and mathematical classes) (for 8%), and the share of pupils with the pragmatical type of motivation significantly increased in control groups (for 9%). The level of readiness for activities significantly increased in experimental groups and had an insignificant change in

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control ones. Teenagers, girls and young men of experimental groups have steady nature, an average (adequate) self-assessment and the average level of a lie, and we can assume that these characteristics will contribute to the high level of their adaptation to the changing conditions of a social environment. Pupils at experimental groups have prevailing demonstrative and emotive types, which assume easy establishment and maintenance of contacts, good adaptability to other people. It contributes to high adaptability of teenagers to conditions of a social environment, easy communication with surrounding people.

The level of social and psychological adaptation of the pupils of experimental groups of 15-16 years is higher than that of pupils of philological, humanitarian, and general education classes. Excess is observed in parameters: “adaptability”, “acceptance of oneself”, “acceptance of others”, “emotional comfort”, “aspiration to domination”, “escaping from problems” (here the actual values are smaller but it proves high adaptability) (Pavlov, 2010). The adaptability parameter significantly differentiates all three groups. Experimental groups have a very high level of adaptability (90%) and it significantly differs from adaptability of pupils of philological, humanitarian, and general education classes.

In our opinion, one of the most important components of forming of ecological competence of pupils is their practical inclusiveness in regional research activities in nature. In modern conditions, the priority in regional educational and research activities for pupils is the development of experience of independent productive cognitive activity in the course of their education. The educational research from the point of view of a pupil is a possibility of the maximum realisation of the creative potential. These activities allow revealing oneself individually or in a group, to try one’s hand, to use one’s knowledge, to make oneself useful, to show the achieved result in public. When activities are directed to the solution of an interesting problem (stated by pupils themselves), and its result has a practical character and has an important applied value, the work will be interesting and significant for pupils- young researchers.

The performed regional research works are united in the complex works giving an evident idea of the researched object. An example is the researchers of the forest suburban natural boundary “Medvedev's dacha” conducted by the pupils of Oryol lyceum No. 18 since 1996. For these years many communities, mushrooms, invertebrate and vertebrate animals have been studied. The communities of the natural boundaries have been studied by dozens of pupils for twenty years (Vesti SoES, 2000).

It gave lyceum pupils an opportunity to prepare regional research works submitted at various contests and justly highly appreciated. Pupils of Oryol lyceum No. 18 repeatedly became winners and prize-winners of the International and All-Russian contests received grants of the President of the Russian Federation.

6. Discussion

During the research different techniques were used by the pupils. The standard technique of geobotanical survey consisting of the random set of square trial platforms (size 100mx100m) and registry platforms (10mx10m and 1mx1m) in different types of the wood formed a basis for studying of plants of communities. For this purpose some area, small but having the vast majority of the types growing in borders of the wood, was limited. If we took a small platform (for example, 1mx1 m), then within it, we distinguished only a small part of species composition in the case of more or less complex structure of

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the association. Enlarging the area we noticed how the number of species increased at first quickly and then there came the moment when new species in process of increase in the sizes of the area met less frequently and increase of a number of species was slowed down and, at last, practically stopped at all.

Research of pupils of Oryol lyceum No. 18 confirmed information of a number of scientists that in many types of vegetation of middle latitudes the area of almost complete identification of species of the community doesn't exceed 100 sq.m. Therefore, pupils used this size of the registry platform. Though the main part of species composition is usually found on the hundred-meter platform, nevertheless, as a rule, outside but within the same community, it is usually possible to find some more species.

The pupils described groups of types of the wood (formations and associations) of the natural boundary by Sukachyov's technique and by Pogrebnyak's technique. Changes in the forest natural boundary are presented in compliance with the dynamic typology of the wood of Melekhov. Razumovsky's technique allowed pupils to reveal violations of a root forestation according to increase in biodiversity in the community and to an emergence of plants atypical for this community.

For forest valuation pupils used standard techniques of determination of the diameter of a trunk at the height of 1.3 m and tree heights with a use of a thickness gauge tester, and also technique of visual estimation of rotundity and site class. Churn staff (with the addition of 2 years) determined the age of trees of an ordinary pine.

For assessment of trees condition on the level of development and size of crown, Kraft's technique was used. The standard technique of withdrawal of trees to improvement thinning was applied to identify the best and auxiliary trees, and also the trees which were subject to cutting down. For the analysis of the landscape characteristic of the recreational area, visual assessment by Tyulpanov's technique was used.

The type of the soil and its characteristic were determined by standard techniques, the quantitative composition of metals in the soil was revealed on the spectrograph of soil laboratory of natural resources Departement of the Oryol region.

Microscopic researches of fruit bodies of polypore’s and Agaricales were conducted on a light microscope “Biolam” (magnification from 80 to 900 times). Cuts were prepared by means of the freezing microtome.

For determination of density, occurrence and domination standard formulas of studying of populations were used. Density is determined by a formula V = k/n where V is density, k is the sum of all individuals on all platforms, n is the number of platforms. The occurrence is an indicator of the relativity of a number of platforms in which this species is presented, to a total number of platforms, expressed in %. P = n x100% / N, where n is platforms in which the species is found, N is a total number of platforms. Domination is defined by the attitude of a number of individuals of this species to the total number of individuals of all species. D = k x100% / K, where k is a number of individuals of this species, K is a number of individuals of all species.

The research done by the pupils under the leadership of teachers showed that the natural boundary is a rather big and typical forest area of the Oryol region. It is situated to the north from Oryol. In the first half of the 20th century, it was 12 km away from Oryol. The wood was in a rural zone with small population density. However, by the beginning of the 90s of the 20th century, the natural boundary had actually turned into a suburban forest park of a natural origin. Close to it, there was the whole city, which

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changed significantly natural conditions of the development of the wood. The anthropogenic factor is an essential negative factor of further development of the wood as the vegetable community.

Geographically the wood occupies the area extended in the direction from the south to the north: its length is about 4 km, its width is about 1 km. (the area is 337 hectares). These are three-quarters of the state forest fund of the Volodarsk forestry society of the Oryol forestry. The natural boundary is located on the undulating plain which is cut up by ravines and gulches at the height of 240 meters above the sea level (on the Central Russian Upland). The sites are located on the hill, which is smoothly raising from south-east to north-west. The climate is moderate and continental. On the explored areas grey forest loamy soils of average degree of humidity were found.

The wood is mixed; it consists of broad-leaved trees and coniferous trees. In the natural boundary "Medvedev's dacha" 11 birch forests, with area from 1 to 9 hectares, 12 pineries, from 0.5 to 19 hectares, 1 fir grove of 1.1 hectares, 18 oak groves from 0.4 to 13 hectares, 7 aspen forests from 0.8 to 8 hectares and 5 linden forests from 1 to 11 hectares are found.

In total 890 species of the plants relating to 328 genera and 17 families were revealed. The leading families are Composites (12.3%), Cereals (8.9%), Rose Family (5.8%) and Sedges (5.7%). In the natural boundary, 12 species of rare plants were revealed (Vesti SoES, 2000).

A big variety of types of an underbrush and live ground cover demonstrates (according to Razumovsky) that plants were planted in the place of other community, perhaps oak wood. Earlier presence of an oak wood is proved by a number of factors: presence of specimens of petiolate oak in the I layer; presence of typical satellites of petiolate oak in low cover: fine-leaved lindens, common ash-trees and Norway maple; presence of typical oakery bushes in the underbrush: common hazel, euonymus warty; in a grassy layer - European wild ginger, sweet peas, etc.

7. Conclusion

Comparison of the obtained data with data of ARRISMF for a zone of the coniferous and broad-leaved woods of the European part of Russia allows considering formations of the studied forest natural boundary derivative.

Data obtained by the students show that indigenous forest types were complex pine forests and complex fir groves that is mixed woods with a large number of oaks, lindens, hazel groves. However, considering Sukachyov's opinion that fir groves are indigenous, and pine forests are primarily derived we assume that the complex fir grove existed in this territory hundreds of years ago (perhaps, at the time of the Vyatichi inhabiting these places). Then in his place, there was a pine forest, and during the last several hundred years — oak groves.

Conclusions obtained by the students were confirmed while studying archives and materials of the Oryol forestry. The broad-leaved wood, an oak grove (which appeared approximately in the 17th century), was destroyed during the war. After the war, there was a grassy community there (tall grass type of cutting down according to Melekhov). In 1949 the recovery of the natural boundary "Medvedev's dacha" began with the planting of forest cultures. In 60 years a transition from a monoculture to a natural biogeocenosis becomes noticeable. It is the 3rd stage of the forming of a wood type according to I. S. Melekhov's typology. However, the analysis of flora, soil and humidity of the researched areas allows to

include them in mesophilic 'sudubrava' (on Pogrebnyak's classification) and to complex pine forests (on Sukachyov's classification). It quite corresponds to ARRISMF data for the area of the coniferous and broad-leaved woods of the European part of Russia. According to the data indigenous complex pine forests can be replaced with derivative birch forests and other communities. Thus our research allows constituting the scheme of the development of types of the wood on the territory of Oryol region: complex fir groves complex pine forests oak forests tall grass forest cuttings modern communities ('sudubrava' and oak groves).

Carrying out of regional studies contributed to forming of ecological competence of pupils; having finished Oryol lyceum №18 many of them entered and successfully study at higher education institutions, a number of those who were the members of ecological clubs not long ago have already submitted Candidate's theses; others successfully study in postgraduate courses.

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