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Landscape-cognitive trail "To the mountain Vysoky Verkh" (National Park "Skole Beskids")

Burianyk O.O., Melnyk A.V.

Lviv Ivan Franko National University

Abstract

The landscape diversity of the cognitive nature trail "To the mountain Vysoky Verkh" is characterized within the Skole Beskids National Nature Park, and nine landscape and cognitive stops are proposed that represent typical and unique landscape tracts, botanical, geological and hydrological objects, as well as cultural objects, and processes associated with the human economic activity. The trail begins and ends in the low-altitude landscape of the Dovzhkiv Landscape district of the Stryi-Sianky Verkhovyna and acquaints with the landscape tracts and the high terrain terraced bottom of the river valleys and the area of the hilly low mountains. Most of the trail is located in the Vysokyi Verkh landscape of Skole Beskids and represents the natural territorial complexes of the high-altitude terrain of steep midlands.

Keywords: natural education, national natural park, natural territorial complex, Skole Beskids.

Introduction

The natural education and upbringing are one of the main functions of national natural parks. For this purpose, special trails and routes, called ecological or ecological-cognitive, are being developed and arranged in the territory of national parks [8]. Objects of cognition on such trails are mainly monuments of living and non-living nature - species of plants and animals, their groupings (ecosystems), geomorphological, geological and hydrological objects, that is, separate elements and components of nature. Unfortunately, there are no data on natural territorial complexes on natural and environmental paths developed by national natural parks. Therefore, in practice, the natural education has a component or sectoral character, and a complex, integral knowledge of nature, which is a hierarchical system of natural territorial complexes of various ranks, remains out of focus.

Based on the fact that the natural education should include both the knowledge of the components of nature and natural territorial complexes, it is necessary to develop landscape and cognitive trails [7]. This trail represents the entire variety of natural conditions of a particular territory most fully and comprehensively.

Methodology and methods

The landscape-cognitive trail is an optimal way of forming complex perception of nature in all its diversity for the visitors of the national natural park, because it can be recognized as natural territorial complexes of different hierarchical ranks - landscape terrains, striyas, tracts and facies [3], which are forming the landscape diversity of the territory, and their structural parts - natural components (rocks, vegetation, soils, etc.).

The length of the landscape-late trail should be 5-15 km, since the change of the natural territorial complexes of the higher ranks - terrain and striya, are

noticeable only on the large territory. It belongs to pedestrian-tourist (in some cases, tourist and tourist) by the way of its use.

The landscape-cognitive trail represents a marked route on the territory of a particular landscape region (in some cases, in different landscape areas), which passes through typical and unique natural territorial complexes. Its main purpose is conducting educational work, natural education with youth and wide circles of the population. Functions of the landscape-cognitive trail as an educational means for pupils' youth are to provide conditions for the formation of key subject competences in geography [7]. To the public, the landscape-cognitive trail is a means of complex perception of the environment, propagation of the landscape-based paradigm as a basis for the rational use of nature and the protection of nature, the basis of sustainable development.

The initial prerequisite for the improvement of the landscape-cognitive trail on the territory is the creation of a large-scale (1: 25 000) landscape map showing the natural territorial complexes of various ranks - landscape tracts, striyas, and terrain. We conducted the landscape mapping according to the method of G. Miller [3]. The initial cartographic basis was provided by topographic maps of scale 1: 25000. During the compilation of the landscape map, cosmic images with a resolution of 5 * 5 and 20 * 20 m were used, geological, geomorphological maps and maps of the Quaternary deposits [6], as well as the plan of the forests of Zavadkiv (Prypolonynnogo) forestry [4]. The field studies were conducted through route surveys and work on points of integrated facies research. The processing of materials and the creation of a landscape-cognitive map was carried out in the software of ArcGIS.

Territory of research

The National Park (SKP) "Skole Beskids" (area 35684 hectares) was created on February 11, 1999 [5]. It is located in the Ukrainian Carpathians in the top of the Dnister River basin (in the basin of its right tributary of the Stryi river). on the

territory of the Lviv region within the three administrative districts - Skole, Drohobych, and Turka.

According to the Law of Ukraine "On the Nature Reserve Fund of Ukraine", one of the most important functions of the NPP is the protection of valuable natural systems [1]. Due to this Law, 6 ecological and cognitive paths (short routes designed for one day created for the purpose of environmental education of the population) were developed and marketed by the park's workers and the development department of recreation and tourism of the Skole district state administration on the territory of the NPP "Skole Beskids", and two ecological cognitive routes (have a much longer length than trails and are designed for two or more days), one bicycle route and three motor routes [8].

Results

The route to the mountain Vysokyi Verkh (1176 m) is very popular among the park's visitors. Its length is 16 km and it is intended for 9-10 hours. There was made a landscape map showing the natural territorial complexes of the level of simple tracts, striyas, and localities (Fig. 1) on the basis of our field landscape studies. The map shows a trail with the stops on the map, and a table with a brief description of the stops is drawn up (Table 1).

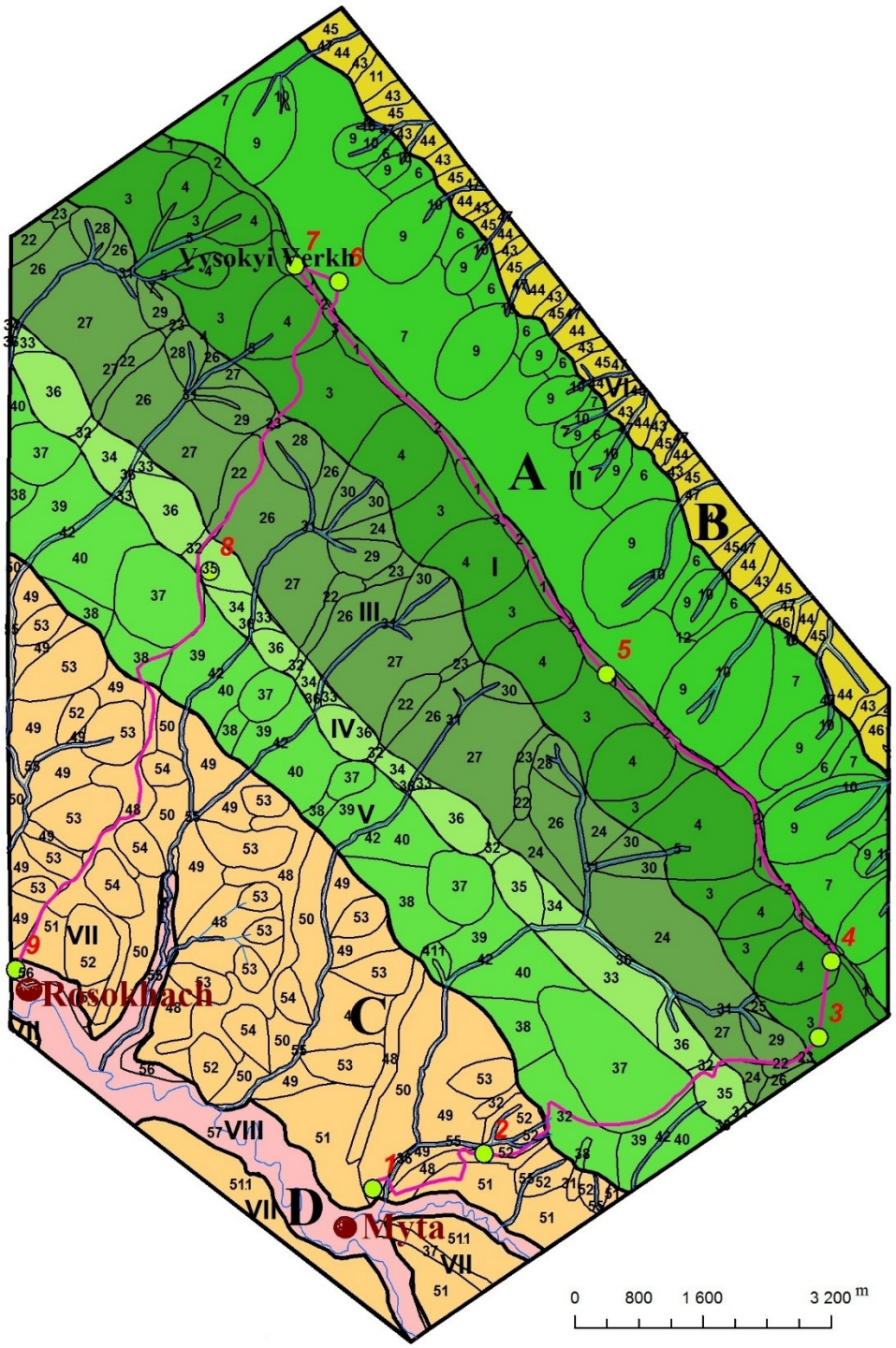

Figure 1. Landscape-cognitive path "To the mountain Vysokyi Verkh"

Landscape area of Skole Beskids. Landscape of Vysokyi Verkh.

A.The terrain of a steep-eroded erosive-denudation forest of the midlands with sycamore-beech, fir-spruce, and spruce forests * in brown mountain-forest soils. ***Striya I. The crest of ridges comprised non-calcareous sandstone-clay medium-rhythmic flysch with secondary mountain-white-and-white meadows and wet suramens on the sod-brown-meadow and dark-brown mountain-forest low-power soils***. 1. Peaks with mountain-white-and-white meadows and wet bilberry-blackberry suramens sod-brown-meadow and dark-brown mountain-forest, low-power, strong skeletal soils. 2. Bowls with secondary buckwheat and whitewash meadows and

wet bilberry-blackberry suramens on turf-brown and dark-brown mountain-forest, low-power, strong skeletal soils. 3. Steep and very steep slopes of the southwestern exposition with wet bilberry-blackberry suramens on dark-brown mountain-forest, low-power, strong skeletal soils. 4. Water reservoirs of southwestern exposure with damp sycamore buchins on brown mountain-forest medium-strength silk-skeletal soils. 5. Locks with wet grey alders and pointy grey beech-fir-tree ramens on the brown mountain-forest soils. ***Striya II. The steep and strongly sloping hills are composed of non-wavy sandstones with layers of argillites and siltstones with moist spruce-fir subachins on brown mountain-forest-low-power soils.*** 6. Combs of steep crests of ridges of the northeast exposition with damp spruce-fir subachins on brown mountain-forest, low-power, strong skeletal soils. 7. The steep and very steep slopes of the northeastern and eastern exposition with wet bilberry-blackberry suramens on the dark-brown mountain-forest, low-power, strong skeletal soils. 9. Reservoir boats of the north-eastern exposition with wet overhangs of sycamore subachins on light-brown mountain-forest, low-power, strong skeletal soils. 10. Plates with wet soils and dentures with grey alders and beech-fir trees on brown mountain forest soils. ***Striya III. The system of steep sloping crests of the ridges is made up of limy argillite flysch with wet suramens and damp sycamore subuchins on light brown mountain-forest powerful soils***. 22. Peaks with secondary buckwheat and whitewash meadows and wet bilberry-blackberry suramens on turf -brown and dark-brown mountain-forest, low-power, strong skeletal soils. 23. Crankshafts with secondary pike-and-bay bouquets and wet bilberry-blackberry suramens on turf-brown and dark-brown mountain-forest, low-power, strong skeletal soils. 24. The steep slopes of the southwestern exposition with damp glacial sycamore subchains on light brown mountain-forest soils skeletal soils. The steep slopes of southeastern expositions with damp pointy grey beech-fir subuchins on light-brown mountain-forest powerful, slightly skeletal soils. 27. The steep slopes of the north-western exposition with wet pointy sycamore subuchins at light-brown mountain-forest, powerful, low-skeletal soils. 28. Reservoir water reservoirs of southern and southeastern expositions with wet bilberry-blackberry suramens on dark-brown mountain-forest weakly strong skeletal soils. 29. Water reservoirs of north-western exposition with wet bilberry-blackberry suramens on dark-brown mountain-forest weakly powerful skeletal soils. 30. Lower parts of the drainage cages with wet bilberry-blackberry suramens on dark brown mountain-forest weakly strong skeletal soils. 31. Fields with wet pointy sycamore and beech-fir-trees on brown mountain-forest soils. ***Striya IV. The system of crests of the ridges and the upper parts of the steep slopes is composed of limestone argillaceous flysch with wet suramens and damp sycamore subuchins on light brown mountain-forest powerful soils.*** 32. Saddles with secondary pike-and-bay bouquets and wet bilberry-blackberry suramens on turf-brown and dark-brown mountain-forest, low-power, strong skeletal soils. 33. The steep slopes of the northwest exposition with wet bilberry-blackberry suramens on turf-brown and dark-brown mountain-forest, low-power, strong skeletal soils. 34. The steep slopes of the south-eastern exposition with wet bilberry-blackberry suramens on turf-brown-meadow and dark-brown mountain-forest, low-power, strong skeletal soils. 35. Drainage basins of southwestern exposition with wet bilberry-blackberry suramens on turf-brown and dark-brown mountain-forest, low-power, strong skeletal soils. 36. Brushes with wet grey alders and beech-fir brooms on brown mountain-forest soils. ***Striya V. The system of dome-shaped vertices separated by deep valleys of streams composed of medium-rhythmic sandstone-argillithic flysch with wet and damp fir suramens on dark-brown mountain-forest medium and low-strength soils.*** 37. Dome-shaped tops with secondary pike-bivalve meadows and wet bilberry-blackberry suramens on turf-brown and dark-brown mountain-forest, low-power, strong skeletal soils. 38. The slopes of the reeds of dome-shaped tops of the south-western exposition

with damp spruce-fir subuchins on brown mountain-forest, low-power, strong skeletal soils. 39. The steep slopes of the south-eastern exposition with wet pointy grey sycamore subuchins on light-brown mountain-forest powerful, slightly skeletal soils. 40. The steep slopes of the north-western exposition with pointy grey sycamore subuchins on light-brown mountain-forest powerful, slightly skeletal soils. 41a. Water-cooled watering funnel with damp pointy grey sycamore subuchins on light-brown mountain-forest powerful, slightly skeletal soils. 42. Fields with wet pointy grey beech-fir trees on brown mountain-forest soils. **B. The high altitude of steep sloping erosion-denudation forest lowlands with spruce-fir-beech, fir and spruce forests in brown mountain-forest soils.** ***Striya VI. The steep and strong-sloping slopes of the river valleys are composed of a non-wavy, fine-rhythmic argillite flysch with damp forearms and damp beech sandwiches in brown mountain-forest strong soils.*** 43. Combs of steep crests of ridges of the north-eastern exposition with damp spruce-fir subuchins on brown mountain-forest, low-power, strong skeletal soils. 44. The steep slopes of the northwest exposition with damp overflowing sycamore subchains on light-brown mountain-forest, low-power, strong skeletal soils. 45. Coarse concave slopes of the south-eastern exposition with damp frost-covered sycamore subuchins on light-brown mountain-forest, low-power, strong skeletal soils. 46. Steep undisturbed slopes of the north-eastern exposition with moist ferns of the sycamore sub-woods on light-brown mountain-forest medium-sized medium-skeletal soils. 46.1. Water basins of south-eastern exposition with sycamore buchins on light-brown mountain-rock deep deep-skeleton soils. 47. Plates with wet pointy grey beech-fir trees on brown mountain-forest soils.

Landscape area of Stryi and Sianky Verkhovyna. The landscape of Dovzhkiv.

C. The high altitude of the hilly erosive-denudational forest lowlands with beech and fir-tree on brown mountain-forest soils. ***Striya VII. The system of transverse branches of the main ridges is separated by deep-drawn streams composed of argillites with thin layers of sandstones and siltstones of the Krosnenskaya zone with spruce-fir-beech forests on brown mountain-forest powerful soils.*** 48. Wide lateral branches of the main ridges occupied by spruce-fir subuchins and after meadows on the brown mountain-forest medium-sized mid-skeletal surface gleyed soils. 49. Strongly divided slopes of northwestern and western expositions with sycamore buchins on light brown mountain-rock deep, slightly skeletal soils. 50. Strongly divided slopes of southwestern expositions with sycamore buchins on light brown mountain-rock deep, slightly skeletal soils. 51. Undiluted slopes of southern exposure with sycamore buchins on light-brown mountain-rock deep loamy-skeletal soils. 51.1. The slopes of the north-eastern expositions, which rapidly break up to the main river valleys, are occupied by spruce forests in brown mountain-forest mildly formed skeletal soils. 52. Coarse slopes are strongly demarcated shallow water drains of southern exposures with sycamore buchins on light brown mountain-rock deep, slightly skeletal soils. 53. Water reservoirs of southwestern and western exposures with sycamore buchins on light brown mountain-rock deep, slightly skeletal soils. 54. Water basins of south-eastern and eastern expositions with sycamore buchins on light brown mountain-rock deep, slightly skeletal soils. 55. Fields with wet pointy grey beech-fir trees on brown mountain-forest soils. **D. High altitude terraced bottom of river valleys with formations of grey alder and beech-fir-spruce forests on brown mountain-forest soils.** ***Striya VIII. The surfaces of the low terraces are composed of loamy-sandy-pebble alluvium with raw silvicles and beech-fir trees in brown mountain forest soils***. 56. Surfaces and lanes of middle terraces are composed of loamy-sand-pebble alluvium with secondary meadows. 57. The surface of the floodplain and the ledges of the low terraces are composed of sand-pebble alluvium with fragments of arid vegetation and grey alders.

Table 1

Landscape-cognitive path "To the mountain Vysokyi Verkh "

Number of the stop	Name of the stop	Tracts	Altitude n.r.m., m
Landscape terrain of hilly erosive-denudation forest lowlands * Landscape striya of the lower part of inclining slopes made of argillites with thin layers of sandstones and siltstones *			
1	Recreational object	Strongly divided slope of southwest exposure* (50)**	750
2	Larch plantations	Steep slope strongly-dismembered not deep water intake funnel (52)	775
Landscape terrain of steep sloping erosion-denudation forest of midlands. Landscape striatum of crests of ridges made of non-wavy sandstone-clay medium-rhythmic flysch			
3	Secondary meadow (sparkle)	The steep slope of the southwestern exposition(3)	1025
4	Anthropogenic upper boundary of the forest	Water intake funnel of the southwestern exposition(4)	1050
5	View of the Stryi-Sianky Verkhovyna	Vertex (1)	1075
Landscape striya of steep and strongly inclining slopes composed of non-wavy sandstones with layers of argillites and siltstones			
6	Source	The steep slope of the north-eastern exposition (7)	1125
7	Church of the Holy Prophet Elias	Vertex (1)	1176
Landscape striya of the system of saddles and steep slopes composed of limestone argillaceous flysch			
8	Root ripe beech forest	Water intake funnel of the southwestern exposition (35)	925

	Landscape terraced bottom of river valleys Landscape range of low terraces made up of loamy sandy-pebble alluvium		
9	Rosokhach village	The surface of the middle terrace is composed of loamy-sandy-pebble alluvium (56)	625

* The abbreviated names of natural territorial complexes are given

** The indexes of uses according to the landscape map are given in the brackets

At the stops during the tour, you can see the interdependence between the natural components that cause the formation of various natural territorial complexes (terrain, stria, and tracts), the boundaries of these complexes and factors that predetermine them, as well as differences in the landscape structure of natural territorial complexes.

The landscape-cognitive path passes within the two landscapes - Vysokyi Verkh and Dovzhkiv, belonging to two physical-geo-geographical regions - the Skole Beskydy and the Stryi-Sianky Verkhovyna [2]. It begins in the high altitude of the hilly erosion-denudation forest and secondary meadow lowland with beech-fir-spruce and spruce-fir-beech forests in brown mountain-forest soils, the landscape line of the lower parts of sloping hills composed of argillites with thin layers of sandstones and siltstones from spruce-fir-beech forests in brown mountain-forest powerful.

For acquaintance with the landscape tracts of this area and the stadium provides two stops. The first stop, which is the starting point of the trail, is located on the territory of Zavadka (Prilopolninsky) forestry of the NPP "Skole Beskids". Here, visitors to the park see tracts in the valley of the Zavadka River.

Fig. 2. Stop 1. Recreational object in the tract of the strongly dismembered slope of the southwest exposition

The second stop is connected with the botanical object. It is located within the area of the tract of the drainage funnel occupied by the derivatives of European larch and larch of the Japanese age of 17-20 years, up to 10 meters high. These plants are exotic, not typical for the Ukrainian Carpathians.

Fig. 3. Stop 2. Modern vegetation in the tract of a steep sloping, strongly dismembered shallow drainage funnel of the southern exposition.

The landscape highway "To the mountain Vysokyi Verkh" predominantly represents the terrain of the steep-sloping erosive-denudated forest middle-mountain and passes through three landscape streams and a series of landscape tracts (Fig. 1). Stop 3 is located in the landscape line, which is represented by the crests of ridges composed of non-wavy sandstone-clay medium-rhythmic flysch. The stop is located within the tract of a steep crash-bumped slope of the southwestern exposure of the meadow vegetation (sphinx). In this place, you can see the main species of meadow vegetation, among which there are also red-billed species. This includes: arnica mountain (arnica montana), which is rare for the Ukrainian Carpathians (the species disappears due to excessive plowing for harvesting as a medicinal raw material); whitefish (pseudorchis albida) (the species disappears due to the economic development of the territory); clove moth (botrychium lunaria) (disappears due to the collection of plants as medicinal raw materials), etc. Also, one can see the effect of the anthropogenic factor on the tract, because here is the road of recreation and economic purpose, which led to the destruction of soil and vegetation cover.

Fig. 4. Stop 3. Secondary bow (caraway) in the tract of abrupt obliquely-ossified gravel slope of the southwestern exposition

At stop 4 you can see the upper limit of the forest, which is due to human agricultural activity. It runs in the Skole Beskids at an altitude of 1050 m. At this stop, it should be noted that beech forests are on higher hypsometric levels than fir trees.

Fig. 5. Stop 4. Anthropogenic upper limit of the forest

Stop 5 is a viewing point, which offers views of the landscaped area Stryiska-Sianky Verkhovyna on Zavadka Valley, which is densely populated terraces - south direction and Skole Beskids – northeast direction. Also, here you can see the difference between the tracts of the slopes of the north-eastern and south-western expositions. North-east are high steep sometimes steep, weakly divided slopes and employed mostly meadow vegetation, as confined to the "heads" of geological strata and the southwest - a gentle, very busy and fragmented forest vegetation and confined to the "shoulders" of geological layers. From this stop there is also a view of the typical middle-highlands and streams of the Skole Beskids.

Stop 6 is confined to the only one source throughout the route to the Vysokyi Verkh. At this stop, the visitor is required to adhere to certain rules of conduct, as this is a protected area of the NPO "Skole Beskids".

Fig. 6. Stop 5. View of the landscaped area of Stryi-Sianky Verkhovyna

Fig. 7. Stop 6. Source in the tract of the steep gravel slope of the north-eastern exposition

Stop 7 is located on the top of the mountain Vysokyi Verkh and is connected with the sacral object - the church of St. Prophet Ilya, which is considered the highest point of Orthodoxy of Ukraine (built in 2011).

Fig. 8. Stop 7. The Church of the Prophet Ilya on the top of the mountain Vysokyi Verkh (1176 m) (www.google.com/search?q=Church + Ilya + Vysokyi + Verkh)

At the stop 8 there is an interesting botanical object - beech forests of natural origin, about 100 years old. In the spring, in the grass cover, the bear onion (cheresha) is very rich in bloom, which is included in the Red Book of Ukraine (its disappearance is associated with the collection of plants as medical and food raw materials and deforestation) [7]. The route ends at the village Rosokhach (stop 9). Here you can get acquainted with the peculiarities of the management and life of the ethnic group of boiyky.

Conclusions

One of the most interesting landscaping and cognitive routes of the Skole N Beskids PP, which is 16 km long (9-10 hours), is characterized by considerable landscape diversity. The landscape map was made on the basis of our field landscapes researches which presents 57 species of tracts, 8 species of stria and 4 types of terrains. The landscape map, made on a topographic basis, allows us to navigate the space and read the features of the relief, the hydrographic grid, as well as the natural territorial complexes of different ranks.

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