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**BIBLIOTECA
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Locul CT

Val. Donatiune Lei

Campanula juncifolia
Campanula trachelium
S. campanulifolia
Rosa damascena

GUIDE DE LA SIXIEME EXCURSION. PHYTO-
GÉOGRAPHIQUE INTERNATIONALE. ROUMANIE, 1931.

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BOTANIC EXCURSION THROUGH „THE CÂMPIA“.

By

Al. Borza

(Cluj).

From the small city of Reghinul-Săsesc on the Mureș, the Ex-
cursion crosses in E — W direction a hilly territory, affected almost
entirely to agriculture, with bare hills, in very small portion scatte-
red with forests. It is the region called „Câmpia“ (the plain).

First we shall give a few summary informations on the phy-
siographic features of this region.

The Câmpia of Transsylvania, comprised between the Mureș
and Someș Rivers, is a territory of approximately 5000 sq. km.

It presents a hilly region, with hills not higher than 700 m,
penetrated by wide valleys, in which, run some times lazy brooks,
which here and there spread, forming lakes that are dammed in by
men, or give birth to natural fens and slimes.

The soil of Câmpia — sea bottom of the tertiary and come to
daylight in the neogen — is a quite good soil for agriculture, in
which to-day is cultivated mostly corn, less wheat and then other
plants. Most of the earth in Câmpia is a clayish soil, after which
comes the marley (lime) and sandy clay, then in different sta-
diums of degradation czornoziome (black earth), sometimes passing
into loes. Here and there on the coast appears dacit — volcanic —
tuff layers. The salt springs and fountains of the verge of Câmpia,
and the salt-pits of Turda, Dej, Cojocna, prove the salt riches of
the underground. On the surface very often appears the efflores-
cence of salt also. The frequent slides of the hills are due to geo-
logical formations; the so produced eminences, the „ticle“ gives a
characteristic physiognomy to Câmpia.

The general climate of Câmpia is continental, with harsh ex-
tremes between + 40° C and — 29° C. The rainfall conditions are
less favorable, with precipitations of which the annual medium varies

between 400 and 700 mm., with a distribution altogether unequal, with extremely dry summers, so that the fountains dry up in whole regions.

In this region the naturalist hardly can find any fragments of natural vegetation, because the man, master here for thousands of years, from neolithic times, transformed the place in fields and pasturage.

However, on many hills may be found small rests of forests,



Stipa-Steppe in the Câmpia.

Fot. G. Bujorean.

formed mostly of oak. The small *Robinia*-forests here and there are the witnesses of the attempts to spread the forest on the extended sterile coasts. For the physiognomy of Câmpia are characteristic the fine hay-fields, sometimes quite close and large, here and there scattered with rests of forests, which make us suspect very often the existence of the former great forests, which were covering most of the parts of Câmpia. On the front of the hills, on the slopes exposed to the sun, the dry pasturages form a chain sometimes on a large extension. They give a monotonous view,

due to shrubs and dry grass and herbs. On the most declivious sides, and where the sun shines the most, are often scattered the associations of the real steppe, with rare vegetations, discontinued, formed of very *forbearing* plants, among which the principal place is played by the species of *Stipa*, and among which appear here and there rare floristic „pontic“ steppe elements also, as *Nepeta ucranica*, *Centaurea ruthenica*, *trinervia* and others.

In connection with the salt layers there are also salt-steppes, covered with *Petrosimonia triandra*, *Suaeda salinaria*, *Salicornia herbacea*, *Statice Gmelini*; but these saltings, sometimes being in need of vegetation, look like real deserts.

THE GEOBOTANICAL PROBLEM OF CÂMPIA.

Out of all these problems the botanists were preoccupied mostly with the origin of the flora of this territory, with special regard to the „pontic elements“.

Beginning from Kerner, in the botanic literature dominated the conviction, that the flora of Câmpia of Transsylvania, as much as the flora of Câmpia of Tisa, are a removed island of the pontic flora, and an isolated exponent of the Russian steppes. The limits and developments of this flora were studied only lately, even though the exact extension of the vegetable formation with character of steppe or „pontic“, as well as the exact scattering of the singular pontic elements, is not well known yet to-day. The problem of the development of this flora and the ways of migration are cleared up only in general outlines. In this respect the indefatigable searcher Ferdinand Pax gave the most fitting outlines of this development. A controversy between Tuzson on one side and Degen, Lengyel, Jávorka and also Hayek on the other, threw also new lights on this important and at the same time interesting problems.

The history of the „pontic“ flora of Câmpia in Transsylvania presents itself, in accordance with the last researches, as follows.

In Câmpia of Transsylvania are represented two types of vegetation climax, superincumbent: the climax of the forest and the climax of grassy discontinued steppes. The first occupies the North and Western declivities, and the last the most slanting declivities exposed to the South. Both of them are presently in function of topographical or relief-factors, which are producing physical local conditions (climatic-edaphic), corresponding on one side to the need

sory. For orientation I give the floristic list, representing the summer aspect of the forest:

Trees:

Quercus sessiliflora (dominant)
Quercus pedunculata
Acer tataricum
Acer campestre
Acer platanoides
Carpinus betulus
Prunus avium
Fagus sylvatica
Populus tremula
Tilia cordata (rare)
Salix cinerea.

Shrubs:

Cornus sanguinea
Corylus avellana
Evonymus verrucosa
Daphne Mezereum
Viburnum lantana
Viburnum opulus
Ligustrum vulgare
Hedera helix
Clematis vitalba
Loranthus europaeus
 (on the beech).

Herbaceous layer:

Ranunculus auricomus
Helleborus purpurascens
Anemone hepatica
Actaea spicata
Asarum europaeum

Viola mirabilis
Viola silvatica
Stellaria holostea
Silene nutans
Sedum maximum
Coronilla varia
Trifolium rubens
Astragalus glycyphyllos
Lathyrus vernus
Lathyrus niger
Lamium luteum
Melittis melissophyllum
Galium Schultesii
Veronica Chamaedrys
Melampyrum romanicum
Campanula persicifolia
Campanula trachelium
Hieracium racemosum
Poa nemoralis
Dactylis glomerata
Melica nutans
Festuca pseudovina
Bromus asper
Carex digitata
Carex pilosa
Lilium martagon
Majanthemum bifolium
Convallaria majalis
Polygonatum multiflorum
Neottia nidus-avis
Cephalanthera rubra

The large number of the sciophytes herbaceous elements proves on one side that the forest is old on this spot, on the other side it shows that the recent glades allowed the heliophytes invaders to occupy the denuded place.

There is by it a portion of a recently cut forest in a full ecological confusion, where between the regenerating beech bushes, the heliophytes ruderal and steppe-species find plenty of place, agglomerated

in great colonies of an irregular dispersion on this territory: *Linaria vulgaris*, *Erysimum erysimoides*, *Anthemis tinctoria*, *Lactuca scariola*, *Erigeron canadensis*, *Cirsium lanceolatum*, *Epibolium montanum*, *Hieracium Bauhini*, *H. Tauschii*, etc.

Then follows a portion of old forest of about 30 years old, spread till towards the top and down in the valley, in a state of progressed maturity. This forest is „well taken care of“ out of sylvic point of view, cleaned of the fire-wood, with rare bushes, and is very shady. It can be found after my appreciation in a stadium of climatic climax less influenced by the culture, and could give us a just idea of the composition of a natural forest in these regions. Therefore I give for it the qualitative and quantitative composition, indicating with the first number the abundance combined with the domination, and with the second number the density or frequency, judging by eye-sight, on a surface of 2 ha.

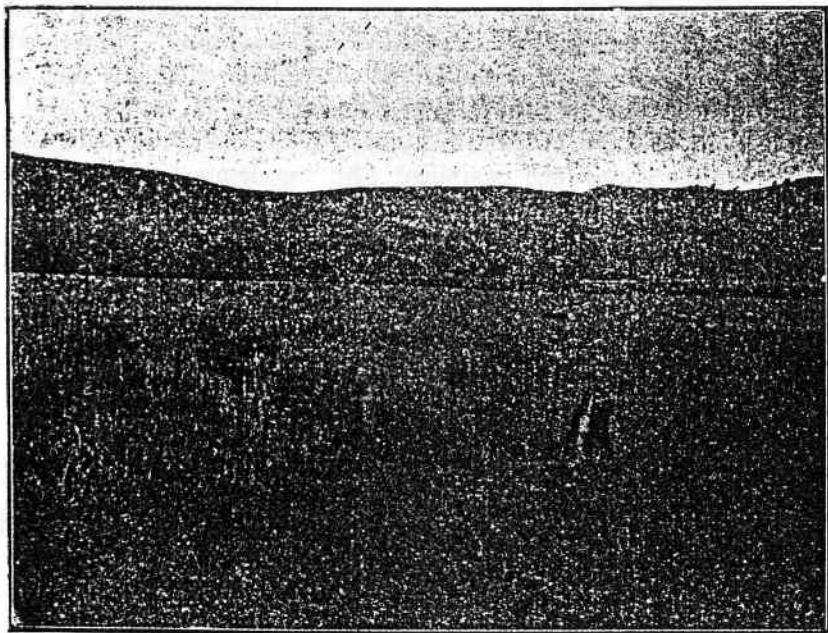
Trees:			
		<i>Lathyrus vernus</i>	1 2
<i>Quercus sessiliflora</i>	5 5	<i>Stellaria holostea</i>	3 1
<i>Carpinus betulus</i>	1 2	<i>Sedum maximum</i>	1 2
<i>Acer tataricum</i>	1 1	<i>Pulmonaria officinalis</i>	1 1
Shrubs:			
		<i>Chrysanthemum corymbo-</i>	
<i>Lonicera xylosteum</i>	1 1	<i>sum var. subcorymbosum</i>	1 1
<i>Sorbus lanuginosa</i>	1 1	<i>Hieracium racemosum</i>	1 3
<i>Staphylea pinnata</i>	1 1	<i>Platanthera bifolia</i>	+ 1
		<i>Melica nutans</i>	5 5
Herbaceous layer:			
<i>Lathyrus niger</i>	1 5	<i>Polygonatum multiflorum</i>	1 3

Mosses are found in a very small number on the trunks of the trees. *Stereodon cupressiformis* and var. *filiformis* dominate. I noticed much *Plagiochila asplenoides* too.³ — The vernal aspect must give a more important complete list than this one very much reduced.

The great difference in the floral list of the three portions of the same forest is a proof of the known fundamental importance of the man's mingling into nature's affair. Left to themselves, after a continuous transformation of the social structure, after the elimination of some components from the first and second portions, will be born a type of forest like the third portion, which is also reduced to the woody sublimax state, with the permanent aspect impoverished through cleaning.

³ Det. E. Pop.

The stages of transition succeed rapidly, as in a kaleidoscop, because they do not represent a stadium of social equilibrium, and are not the expression of any physic or biotic law of relative definitive arrangement and organisation of an association, but represent moments of the phytobiotic struggle of long duration.



The Taga-lake with floating *Phragmites communis*-islands.

Fot. G. Bujorean.

Therefore I insist once more, that the notation of quantitative composition, made for societies in full social evolution, a trice or a rapid phase of the combat, has no scientific value at all only if the phases of successions are noted more often, as in a film.

The plant sociology has to establish the types of association and laws of organisation of the plant societies. These are found in the natural mature association which have to be observed and studied in the first place. The dynamic of successions will follow after-wards.

The forest of Silivaşul-de-Câmpie — judging by its floristic composition — is a mixed dacic forest, which is called *Quercus sessiliflora* *Acer tataricum*-association, and which in our country is very much spread. This association has many variations or subassociations, cha-

racterised by various floristic elements, not to mention the large number of facieses, which are distinguished by the dispersion and local frequency of the elements.

The forest of Silivaşul-de-Câmpie presents an orographic variation, with mountain elements, as is *Majanthemum bifolium*, *Actaea spicata*, the presence of which in Câmpia really surprised me. But these elements are the very precious indicators of the forest's antiquity. They are old elements of tertiary forests, which can last here from very ancient epochs.

A second halt near the „Pădurea Cioarelor“ (The Crows' Forest) at the Cămăraşul-Deşert.

This forest, named also „După Şură“ (Behind the Barn) begins near the national highway of Cluj—Mociu—Şarmaş and occupies about 136 ha. on a mild declivity, which looks towards North and N—W—. The superior verge of the forest touches the crown of the hill, at the points 372 and 435 m. while in the valley it comes down to 80 m. On the top of the hill the forest is limited with places full of shrubs and with sown fields. At the point 372 m. to the forest is attached a glade of old oak trees, which continues into pasturage towards the village.

The forest is taken care of by its owners, Counts Kemény, and is made use of it in a very moderate way. In a glade cultural trials were made with *Juglans cinerea*, which goes quite well. It is 5—6 years old.

The greater part of the forest is rarefied and cleaned of firewood and shrubbs, and presents the following floristic composition and social structure:

Layer of trees:		Layer of shrubs:	
<i>Acer campestre</i>	5 5	<i>Acer tataricum</i>	
<i>Quercus pedunculata</i>		(often tree too)	5 5
(often f. <i>pubibes</i>)	4 5	<i>Staphylea pinnata</i>	4 4
<i>Malus silvestris</i>	4 5	<i>Cornus sanguinea</i>	4 5
<i>Pirus piraster</i>	4 5	<i>Corylus avellana</i>	4 1
<i>Ulmus scabra</i>	1 1	<i>Ligustrum vulgare</i>	2 2
<i>Prunus avium</i>	1 1	<i>Evonymus latifolia</i>	2 1
<i>Malus pumila</i> ⁴	+ 1	(an <i>europaea</i> ? on sides)	
		<i>Evonymus verrucosa</i>	2 2

⁴ Forma magis ad *Malus silvestris* (L.) Mill. var. *hortulana* Schneider vergens.

<i>Viburnum opulus</i>	2	2	<i>Euphorbia amygdaloides</i>	+	1
<i>Viburnum lantana</i>	1	1	<i>Viola mirabilis</i>	+	1
<i>Prunus spinosa</i> var.			<i>Geranium Robertianum</i>	1	1
<i>dasyphylla</i>	1	1	<i>Chaerophyllum bulbosum</i>	1	1
<i>Rosa dumetorum</i>	+	+	<i>Aegopodium podagraria</i>	2	4
Grassy layer:					
<i>Helleborus purpurascens</i>	2	3	<i>Lathyrus niger</i>	1	2
<i>Aconitum moldavicum</i>	1	1	<i>Melittis melissophyllum</i>	1	2
<i>Aconitum anthora</i> (on side)	1	1	<i>Lamium purpureum</i>	1	1
<i>Anemone hepatica</i>	+	1	<i>Lamium maculatum</i>	5	5
<i>Urtica dioica</i>	+	1	<i>Stachys silvatica</i>	2	4
<i>Asarum europaeum</i>	2	2	<i>Scrophularia nodosa</i>	+	1
<i>Chelidonium majus</i>	1	1	<i>Galium silvaticum</i>	1	2
<i>Alliaria officinalis</i>	+	1	<i>Pulmonaria officinalis</i>		
<i>Stellaria holostea</i>	+	1	var. <i>obscura</i>	+	1
<i>Waldsteinia geoides</i>	5	5	<i>Arctium lappa</i>	+	1
<i>Geum urbanum</i>	2	3	<i>Polygonatum officinale</i>	+	1
<i>Euphorbia polychorma</i>	1	1	<i>Lilium martagon</i>	+	1
			<i>Convallaria majalis</i>	+	1
			<i>Milium effusum</i>	+	1

The Crows' forest is particularly damp (humid), and than rich in guano, on account of the numberless crows that are camping here.

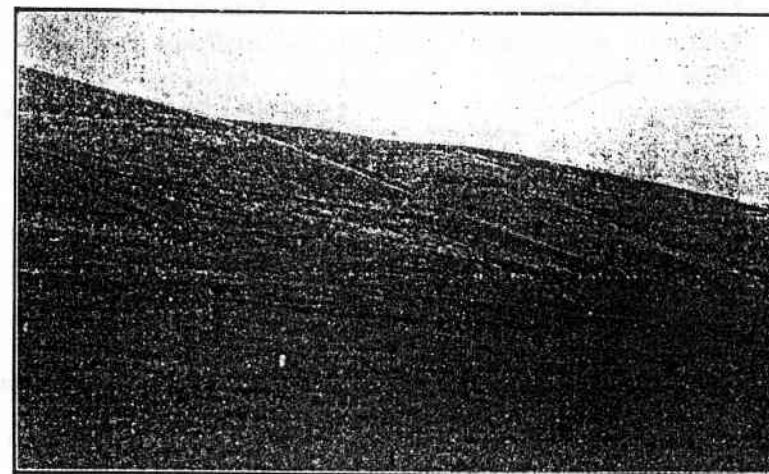
A part of the forest of a few hundred square metres is younger and more dense. There the herbaceous stratum was composed of *Asarum europaeum*, *Waldsteinia geoides* (dominantes) and *Lilium martagon*, with a few accessory elements.

The forest in the middle is interrupted by a large glade, covered with a rich grass carpet and „forbs“.⁵ This artificial extrazonal association — being created and supported as subclimax for hay-field and a sort of parc — is not given here with its complete phytosociological analysis. I mention of its more apparent components *Heracleum sphondylium*, *Veronica maritima*, *Geranium sanguineum*. Here can be found planted a few American-nut trees (*Juglans cinerea*).

Looking at the floristic composition of „Pădurea Cioarelor“ we see that it is a dacic mixed oak-forest, but this forest doesn't present either the complete specific assembly of this association, not even the normal specific assembly, habitual in this kind of forests in general.

⁵ Clements: The phytometer method in ecology. 1924. p. 68.

This state of things is surely caused by the action of man and animals. The abundant presence of the wild apple and pear trees in this forest is probably due to the endeavour of the owners to procure food for their pigs. The pasturing exterminated or lessened other elements, the presence of which here are excepted in this association. Striking is the missing of the lime-tree from this forest, and also of the *Carex* and grasses, common in this aspect of summer season. In the assembly of the vernal period surely appear these characteristic families of the mixed forests.



Stipetum in the valley of Suat.

Fot. Al. Borza.

Traversing Câmpia we perceive yet in different parts the trace, the dry steam of *Stipa Lessingiana* and *St. pulcherrima* which dominates and has the highest grade of covering in the steppes of southern uncultivated slopes.

But in this epoch the vegetation was destroyed by pasturing, and the more mesophytic facies by mowing.

We halt at the steppic reservation of Suat, conserved for four years, untouched by anybody. From far away we are struck by its appearance, so different from the surrounding parts, pastured completely and of an intensive green colour.

The surface of this hill presents an inclination of 15°—45° and is of Southern, South-Western, North-Western and South-Southeastern exposure. The subsoil is clayish (marnos), with vol

canic dacic tuff layers. In the western part the soil is black and deep. Pluviometric observations were made only for one year.

It seems that the soil and especially the exposition determines the formation of the vegetation; we can distinguish easily on the dryer, xerothermic slope with southern exposure the steppe on a moister soil, the meadow association.

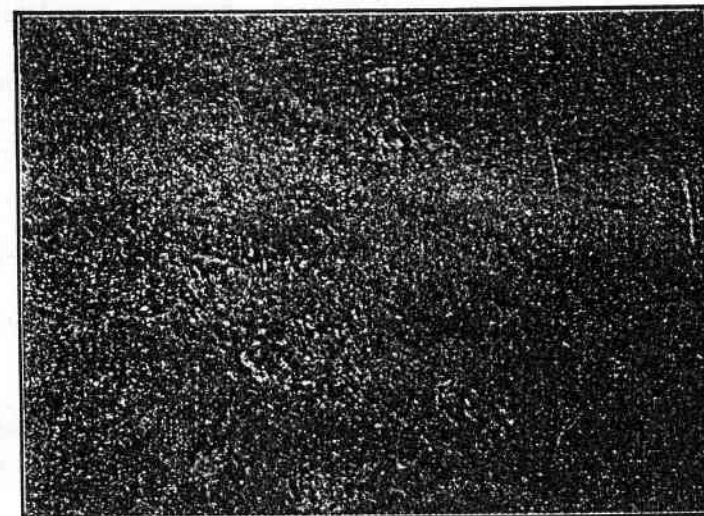
The steppe is a *Stipeto-caricetum*. The most abundant species are:

<i>Adonis vernalis</i>	1	<i>Centaurea micranthos</i>	1
<i>Carex humilis</i>	1	<i>Serratula radiata</i>	1
<i>Teucrium chamaedrys</i>	1	<i>Coronilla varia</i>	1
<i>Teucrium montanum</i>	1	<i>Medicago falcata</i>	1
<i>Stipa Lessingiana</i>	1	<i>Cephalaria radiata</i>	1
<i>Salvia nutans</i>	1	<i>Dorycnium herbaceum</i>	1
<i>Salvia nemorosa</i>	1	<i>Potentilla arenaria</i>	1
<i>Salvia transsilvanica</i>	1	<i>Asparagus officinalis</i>	1
<i>Salvia austriaca</i>	1	<i>Veronica orchidea</i>	1
<i>Salvia nutans</i> × <i>nemorosa</i>	1	<i>Asperula galioides</i>	1
<i>Astragalus austriacus</i>	1	<i>Nonnea pulla</i>	1
<i>Astragalus monspessulanum</i>	1	<i>Falcaria Rivinii</i>	1
<i>Astragalus Péterfii</i>	1	<i>Fragaria collina</i>	1
<i>Festuca pseudovina</i>	1	<i>Thymus Marchallianus</i>	1
<i>Andropogon Ischaemum</i>	2		
<i>Poa pratensis</i> ssp. <i>angustifolia</i>	1	Ruderal plants:	
<i>Koeleria gracilis</i>	1	<i>Convolvulus arvensis</i>	
<i>Ajuga chamaeypytis</i>	1	<i>Lepidium draba</i>	
<i>Ajuga Lazmanii</i>	1	<i>Plantago media</i>	
<i>Muscari tenuiflorum</i>	1	<i>Euphorbia cyparissias</i>	
<i>Campanula sibirica</i>	1	<i>Cychorium Intybus</i>	
<i>Achillea collina</i>	1	<i>Senecio Jacobaea</i>	
<i>Scorzonera hispanica</i>	1	<i>Echium vulgare</i>	
<i>Artemisia campestris</i>	1		

In the higher parts of the reservation the slope is —40°, the soil is bad, the vegetation becomes discontinuous, dominated by tall forbs. In the early summer I noted:

<i>Euphorbia Gerardiana</i>	2	<i>Artemisia campestris</i>	1
<i>Salvia nutans</i>	2	<i>Cephalaria radiata</i>	1
<i>Astragalus Péterfii</i>	2	<i>Brassica elongata</i>	1
<i>Andropogon Ischaemum</i>	1	<i>Eryngium campestre</i>	1
<i>Stipa Lessingiana</i>	1	<i>Centaurea spinulosa</i>	1
<i>Koeleria gracilis et hybrid</i>	1	<i>Onobrychis arenaria</i>	1

<i>Muscari tenuiflorum</i>	1	<i>Thesium intermedium</i>	1
<i>Triticum repens</i>	1	<i>Hieracium pilosella</i>	1
		<i>H. brachiatum</i>	1
		<i>Vinca herbacea</i>	1
Smaller are:		<i>Viola hirta</i>	
<i>Thymus Marchallianus</i>	1	<i>Fragaria collina</i>	
<i>Potentilla arenaria</i>	2		



Astragalus Péterfii in the reservation of Suat.
Fot. Al Borza.

The meadow on the N—W and S—W slopes has a dense vegetation with mesophytic elements, viz:

<i>Chrysanthemum</i>		<i>Anthyllis vulneraria</i>	1
<i>leucanthemum</i>	1	<i>Stipa pulcherrima</i>	1
<i>Filipendula hexapetala</i>	1	<i>St. capillata</i>	1
<i>Festuca ovina</i>	1	<i>Salvia nemorosa</i>	1
<i>Coronilla varia</i>	1	<i>S. austriaca</i>	1
<i>Dorycnium herbaceum</i>	2	<i>Asperula galioides</i>	1
<i>Trifolium montanum</i>	1	<i>Astragalus monspessulanus</i>	1
<i>Tr. pratense</i>	1	<i>Leontodon autumnalis</i>	1
<i>Onobrychis sativa</i>	1	There appers also:	
<i>Galium verum</i>	1	<i>Crataegus monogyna.</i>	
<i>Plantago media</i>	2	<i>Rosa-bushed</i>	
<i>Briza media</i>	1		

and the time is not far when forest-vegetation will overrun this meadow.

In the south-western corner of the reservation in excavated places the endemic *Astragalus Péterfii* occurs in pure „Bestand“ alone, covering several square-meters. It is the first occupant on slipped places, glissing territories at Suat .