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On agro-industrial assessment of territorial lands of Tartar region (on the example of Borsunlu village)

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Annotation: *Due to the climatic features of Azerbaijan, its soil is subject to severe erosion. Thus, eroded (washed, loosened, loosened, etc.) soils are often found in the country. This is explained by the fact that, as is clear from the morphological description of the section in the study area, the color of the soil here is brown in the upper layer, light brown in the middle layer, and straw in the last layer. The structure is heavy clayey in the upper layer, medium clayey in the middle layer and in the last layer. Roots and rhizomes, insect tracts, rust spots are found in new derivatives and fruits. These soils are boiled under the influence of 10% hydrochloric acid (HCl). Hygroscopic moisture is less moisture throughout the profile. The transitions in the genetic layers are clear and gradual.It should be noted that in general, erosion processes lead to erosion and destruction of the topsoil. According to the results of laboratory analysis of soil samples on different soil types from different experimental areas, the actual soil fertility determined for the suitability of different types of agricultural crops, a number of types of agricultural culture. grapes and clover-cheese.This article presents the results of a comparative analysis of the degree of erosion of the land cover formed in the territory of the Tartar region of the Republic of Azerbaijan using aerospace images and studied.*

Key words: *Soil-forming rocks, soil granulometric composition, physicochemical properties, soil mineralogical composition, soil profile, genetic layers, parent rock, erosion process,*

INTRODUCTION

With the adoption of the Law on Land Reform, which is the basis of agrarian reform, on August 2, 1996, large-scale field research in the Republic was accelerated. Amendments to the Land Code of the Republic of Azerbaijan, the Law of the Republic of Azerbaijan “On State Land Cadastre, Land Monitoring and Land Management”, the Decree of the President of the Republic of Azerbaijan No. 116 of June 24, 2009 “On Ensuring the Activities of the State Committee for Property Issues” Prepared in accordance with the Decree No. 516 of May 4, 2015 and the requirements of other normative legal acts.

Place of research: Land research is carried out by the Cadastre and Land Management Project-Research Center subordinated to the Real Estate Cadastre and Address Registry Service under the State Committee for Property Affairs of the Republic of Azerbaijan.

The purpose of the study: to establish an electronic land registration system in the Republic, regardless of the type of ownership, in accordance with the requirements of the "State Program of socio-economic development of the regions of the Republic of Azerbaijan in 2014-2018", to improve the fertility, restoration, protection and use of agricultural lands is one of the issues currently on the agenda. By the Decree of the President of the Republic of Azerbaijan No. 818 dated March 7, 2016 "On additional measures in the field of regulation of land relations in the Republic of Azerbaijan", a number of tasks were set before the State Committee for Property Affairs of the Republic of Azerbaijan.

Course of the study: These include the creation of an electronic land cadastre information system and the compilation of a digital cadastral map by conducting electronic registration and mapping of state, municipal and privately owned lands.

For this purpose, in December 2017, land survey was conducted in the territory of Borsunlu village Administrative Territorial District of Tartar region. The research was conducted in an area of 2786 hectares. The area is divided into the following natural farms.

Research methodology

During the study, 111 sections were excavated in the area and morphological features were described by genetic layers. Soil samples were taken from the excavated sections and analyzed in the Center's laboratory by the following methods.

1. Hygroscopic moisture - by thermal method

2. Granulometric composition - by Kaczynski's pipette method

3. General humus - by the method of Tyurin

4. Total nitrogen - By calculation

5. Carbonate - With a calcimeter device

6. Absorbed Ca and Mg - by Ivanov method

7. Absorbed Na - by Hedroyts method

8. pH water suspension - with pH meter

Thus, based on the results of field research and laboratory analysis, a soil and salinity map was compiled on a topographic basis, and a report on them was written. Archival materials were used in compiling the soil and salinity map and writing the report.

Professor RH Mammadov's scale was used to determine the granulometric composition.

Natural conditions

Geographical position. Borsunlu village Administrative Territorial District of Tartar region consists of 2 parts.

Part I: It is bordered on the north by the lands of Goranboy region, on the east by the lands of Sarov village Administrative Territorial District, on the southeast by the lands of Demirchiler village Administrative Territorial District, and on the south and southwest by the lands of the State Land Fund (SLF).

Part II: It is bordered by the Inja River in the north and the lands of the Red Beards (Agdara region) village in the south.

Relief: Relief, as a structure of the earth's surface, is directly involved in the formation of land cover as a factor in soil formation. It plays a major role in changing chemical and biological processes, hydrothermal regime and microclimate. Thus, the distribution of solar energy and atmospheric sediments is directly related to relief. The relief of Borsunlu village Administrative Territorial District consists of mountains and plains.

Climate: Tartar region is located in the north-western part of the Karabakh plain. The climate of the area is mainly temperate-hot semi-desert and dry steppe climate with dry winters. This type of climate is characterized by low humidity, mild winters and dry and hot summers.

The average annual temperature of the weather the temperature is 13.9oc. The winter is mild, so the average monthly temperature of January, which is the coldest month of the year, is 2.0oc, and the average annual temperature of the soil surface is 12-15oc. The average temperature in January is 2oc, in July 32oc. The average relative humidity was 68%, ranging from 55 to 77% during the year. The annual amount of precipitation is 363 mm. 1000-1100 mm of possible evaporation from the surface cover per year (Table 1).

Table 1.Average monthly and annual information on climate indicators.

The name of the meteor. stations	Climate indicators	Months												
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	illik
TERTER	Average air temperature, ^{0}C	2.0	3.6	7.0	12.6	18.2	22.7	25.9	25.4	20.9	15.3	9.0	4.4	13.9
	Average relative humidity, in%	1	4	8	16	23	29	32	31	24	16	9	5	16
	Precipitation, in mm	75	72	73	68	67	60	55	56	66	72	77	76	68

	Possible evaporation, in mm	16	24	31	37	45	51	27	18	30	35	30	16	363
	The average temperature of the soil surface is ^{0}C	34	38	52	71	103	137	169	166	107	71	44	35	1027

Vegetation. Vegetation is a key factor in the process of soil formation and the formation of soil cover. The increase in soil fertility with the formation of organic matter depends on the density of vegetation. Maintaining normal soil moisture, reducing the washing effect of water, preventing the formation and development of the erosion process are closely related to vegetation.

In the area we studied, grain, alfalfa, sorghum, blackthorn, ephemeral, etc. spread. The sown areas of the area are used for grain, cotton, alfalfa.

Soil-forming rocks. Soil-forming rocks affect the granulometric composition, chemical and mineralogical composition of the soil, causing the formation of soil profile and genetic layers. The chemical composition of the parent rock plays an important role in the process of soil formation. The richer the parent rock, the better the quality of the soil formed on it.

Thus, the areas we studied consist of mountains and plains, and the soils are formed on deluvial and proluvial sediments.

Ground cover. According to the results of field research and laboratory analysis, the following soil types and subtypes are widespread in the area.

I Gray-brown soils

II Carbonated meadow - brown soils

I Gray-brown soils

Gray-brown soils are spread in different parts of Borsunlu village PPP and make up ha or% of the total area.

These soils are divided into the following types according to their granulometric composition, soil layer thickness, surface stonyness and skeleton:

1. Heavy clayey, medium-thick, gray-brown with weak stones on the surface
2. Heavy clayey, loose, gray-brown with weak stones on the surface
3. Medium clayey, medium thick, gray-brown with weak stones on the surface
4. Gray-brown with medium clay, thin, weak skeleton

To get acquainted with the characteristic morphological features of the studied area, we give a description of section 55 excavated in the area:

0-15cm - brown, topavari, heavy clayey, less kip, roots and rhizomes, boiling, less wet, the transition is clear.

15-35 cm - light brown, small topavari, medium clayey, kip, insect tracts, boils, less moisture, the transition is gradual.

35-68 cm - straw, indistinguishable, medium clayey, kip, rust spots, boils, less wet.

It is clear from the morphological description of the section that the color of these soils is brown in the upper layer, light brown in the middle layer, and straw in the last layer. The structure is heavy clayey in the upper layer, medium clayey in the middle layer and in the last layer. Roots and rhizomes, insect tracts, rust spots are found in new derivatives and fruits. These soils are boiled under the influence of 10% hydrochloric acid (HCl). Hygroscopic moisture is less moisture throughout the profile. The transitions in the genetic layers are clear and gradual.

According to the results of laboratory analysis, the granulometric composition of gray-brown soils is heavy and medium clayey. Thus, the amount of physical clay in these soils is 37.12-42.12% in the upper layers, 36.16-42.12% in the profile (Table 2). The hygroscopic humidity of the main components varies between 3.6-4.3%. The amount of total humus is 3.05-3.54% in the upper layers, and 1.58-3.54% in the 1-meter layer. According to the total humus, the amount of total nitrogen in the profile is 0.14-0.26%. The amount of carbonate is 1.71-6.84%. The pH in the water suspension is 7.50-7.78 units, which indicates that the soil is alkaline. (Table 3). The total amount of absorbed bases in gray-brown soils is 17.20-24.25 mg. The amount of Ca cation is 65.11-66.85% of the total absorbed bases, Mg cation is 31.98-33.95%, and Na cation is 0.78-1.37% (Table 4).

Table 2 I Granulometric composition of gray-brown soils(absolutely on dry land, in%)

Cut №	Depth in cm	Particle size in mm, quantity in%						In% of physical clay
		1-0.25	0.25-0.05	0.05-0.01	0.01-0.05	0.005-0.001	<0.001	<0.01
1	2	3	4	5	6	7	8	9
1. Heavy clayey, medium-thick, gray-brown with weak stones on the surface								
55	0-15	1.24	39.92	18.52	17.32	14.56	8.44	40.32
	15-35	2.25	41.59	17.44	16.96	13.96	7.80	38.72
	35-68	2.58	44.38	16.88	15.08	14.52	6.56	36.16
1. Heavy clayey, thin, gray-brown with weak stones on the surface								
9	0-12	1.88	39.52	18.24	16.52	15.52	8.32	40.36
	12-25	1.75	37.01	19.16	18.48	14.08	9.52	42.08
	25-38	2.16	40.64	17.88	16.56	15.12	7.64	39.32
23	0-11	1.75	36.57	19.56	18.08	15.28	8.76	42.12
	11-22	1.98	40.54	17.24	16.92	16.04	7.28	40.24
	22-35	2.24	39.24	18.64	17.88	15.56	6.44	39.88
31	0-13	1.95	39.57	18.24	17.32	14.28	8.64	40.24
	13-24	2.14	41.42	17.28	16.44	15.16	7.56	39.16
	24-37	2.38	42.82	16.52	15.36	14.88	8.04	38.28
1. Medium clayey, medium thick, gray-brown with weak stones on the surface								
37	0-16	2.26	40.66	17.44	16.12	15.64	7.88	39.64
	16-35	2.39	40.37	18.72	17.08	14.88	6.56	38.52
	35-72	2.51	42.81	16.80	15.60	14.36	7.92	37.88
1. Gray-brown with medium clay, thin, weak skeleton								
78	0-11	2.44	41.48	17.44	16.36	14.16	8.12	38.64

	11-24	2.56	43.28	16.88	15.72	13.92	7.64	37.28
	24-38	2.35	40.77	17.52	16.88	16.04	6.44	39.36
86	0-13	2.54	43.82	16.52	15.08	14.40	7.64	37.12
	13-25	2.48	41.32	17.92	16.24	13.92	8.12	38.28
	25-35	2.62	45.58	15.64	14.88	14.76	6.52	36.16
105	0-9	2.30	39.38	18.44	17.32	14.32	8.24	39.88
	9-18	2.42	41.46	17.36	16.28	15.16	7.32	38.76
	18-33	2.53	43.43	16.88	15.04	14.04	8.08	37.16

Table 3. I The main components of gray-brown soils.(absolutely on dry land, in%)

Cut №	Depth in cm	Hiqros-kopik moisture	Total		CO_2	To CO2 according to Ca CO3	pH su suspension at the age of
			Humus	Azot			
1	2	3	4	5	6	7	8
1. Heavy clayey, medium-thick, gray-brown with weak stones on the surface							
55	0-15	4.1	3.16	0.24	1.32	2.99	7.66
	15-35	3.9	2.50	0.20	1.50	3.42	7.69
	35-68	3.7	1.74	0.15	2.44	5.56	7.78
2. Heavy clay, gray, gray-brown with weak stones on the surface							
9	0-12	4.2	3.54	0.26	0.94	2.14	7.58
	12-25	4.1	3.05	0.23	0.75	1.71	7.50
	25-38	4.0	2.72	0.21	1.32	2.99	7.61
23	0-11	4.3	3.32	0.25	1.13	2.57	7.60
	11-22	4.1	2.94	0.22	0.94	2.14	7.55
	22-35	4.0	2.23	0.18	2.07	4.70	7.74
31	0-13	4.1	3.48	0.26	0.75	1.71	7.56
	13-24	3.8	3.10	0.23	0.94	2.14	7.61
	24-37	3.7	2.01	0.16	2.26	5.13	7.72
3. Medium clayey, medium thick, gray-brown with weak stones on the surface							
37	0-16	3.8	3.26	0.24	0.94	2.14	7.55
	16-35	3.7	2.56	0.20	1.13	2.57	7.60
	35-72	3.6	1.96	0.16	2.63	5.99	7.75
4. Gray-brown with medium clay, thin, weak skeleton							
78	0-11	3.9	3.05	0.23	1.50	3.42	7.67
	11-24	3.6	2.67	0.21	1.88	4.28	7.72
	24-38	4.0	1.58	0.14	3.01	6.84	7.79
86	0-13	3.8	3.32	0.25	0.75	1.71	7.54
	13-25	3.9	2.88	0.22	0.94	2.14	7.58

	25-35	3.7	2.56	0.20	1.88	4.28	7.73
105	0-9	4.0	3.21	0.24	0.75	1.71	7.55
	9-18	3.9	2.99	0.23	0.94	2.14	7.61
	18-33	3.6	1.69	0.14	2.07	4.70	7.70

Table 4 I The amount of bases absorbed in the gray-brown soils (in% of absolute dry soil)

Cut №	Depth in cm	Absorbed bases, in mg.ekv			Swallowed of the basics in total mg.ekv	Swallowed of the basics in total mg.ekv		
		Ca	Mg	Na		Ca	Mg	Na
1	2	3	4	5	6	7	8	9
1. Heavy clayey, medium-thick, gray-brown with weak stones on the surface								
55	0-15	14.50	7.00	0.20	21.70	66.82	32.76	0.92
	15-35	16.00	8.00	0.25	24.25	65.98	32.99	1.03
2. 2. Heavy clay, gray, gray-brown with weak stones on the surface								
9	0-12	12.00	6.00	0.20	18.20	65.94	32.97	1.10
	12-25	12.50	6.00	0.15	18.65	67.03	32.18	0.80
23	0-11	13.00	6.50	0.25	19.75	65.83	32.92	1.27
	11-22	12.50	6.50	0.20	19.20	65.11	33.86	1.04
31	0-13	12.50	6.50	0.15	19.15	65.78	33.95	0.78
	13-24	1.00	7.00	0.20	21.20	66.04	33.02	0.94
3. Medium clayey, medium thick, gray-brown with weak stones on the surface								
37	0-16	12.50	6.50	0.20	19.20	65.11	33.88	1.04
	16-35	11.50	5.50	0.20	17.20	66.86	31.98	1.16
4. Orta gillicəli, yuxa, zəif skeletli boz-qəhvəyi								
78	0-11	15.50	7.50	0.20	23.20	66.81	32.33	0.86
	11-24	12.50	6.00	0.20	18.70	66.85	32.09	1.07
86	0-13	12.50	6.50	0.15	19.15	65.78	33.95	0.78
	13-25	13.00	6.50	0.20	19.70	65.99	33.00	1.02
105	0-9	13.00	6.50	0.20	19.70	65.99	33.00	1.02
	9-18	12.00	6.00	0.25	18.25	65.76	32.88	1.37

II Carbonate meadow-brown soils

Carbonated meadow-brown soils are spread in different parts of Borsunlu village PPP and make up ha or% of the total area.

These soils are divided into the following types according to the granulometric composition and thickness of the soil layer:

5. Light clay, thick carbonate meadow - brown soils
6. Heavy clayey, thick carbonate meadow - brown soils

In order to get acquainted with the characteristic morphological features of the studied area, we give the description of the section No. 3 excavated in the field of Borsunlu village PES:

0-23 cm - brown, topavari, heavy clayey, less kip, roots and rhizomes, boils, less wet, the transition is clear.
23-48 cm - light brown, small clump, heavy clay, low kip, insect road arı, boils, less moisture, the transition is gradual.
48-88 cm - light brown, granular, light clay, soft, white eyes, boiling, wet.
88-115 cm - straw, fine-grained, lightly clayey, soft, rust spots, boils, wet.
115-162 cm - straw, indistinguishable, light clay, soft, rust spots, boiling, wet.

It is clear from the morphological description of the section that the color of these soils is brown in the upper layer, light brown and straw in the middle layers, and straw in the last layer. The structure is not selected in the top layer, in the middle layer, in the top layer, and in the last layer. The granulometric composition is light clay in the upper and middle layers, and heavy clay in the last layer. The consistency is kip on the top layer, less kip and soft in the middle layers, and soft on the last layer. Roots and rhizomes, insect tracts, white spots and rust spots are found in new derivatives and nutrients. These soils are boiled under the influence of 10% hydrochloric acid (HCl). Hygroscopic humidity is low humidity in the top layer, less moisture and humidity in the middle layers, and moisture in the last layer. The transitions in the genetic layers are clear and gradual.

According to the results of laboratory analysis, the granulometric composition of carbonate meadow-brown soils is light clay and heavy clay.

Thus, the amount of physical clay in these soils is 49.52-50.28% in the upper layers, and 48.32-53.72% in the profile (Table 5). The hygroscopic humidity of the main components varies between 4.8-5.3%. The amount of total humus is 1.69-2.01% in the upper layers, and 0.76-2.01% in the 1-meter layer.

According to the total humus, the total nitrogen content in the profile is 0.09-0.16%. The amount of carbonate is 7.27-11.12%. The pH in the water suspension is 8.15-8.24 units, which indicates that the soil is alkaline. (Table 6). The total amount of absorbed bases in carbonate meadow-brown soils is 25.55-40.30 mg. The amount of Ca cation is 63.73-65.84%, Mg cation is 32.03-34.32%, and Na cation is 1.75-2.22% of the total absorbed bases (Table 7).

Table 5. II Granulometric composition of carbonate meadow-brown soils(absolutely on dry land, in%)

Cut №	Depth cm	Particle size in mm, quantity in%						In% of physical clay
		1-0.25	0.25-0.05	0.05-0.01	0.01-0.05	0.005-0.001	<0.001	<0.01
1	2	3	4	5	6	7	8	9
5. Light clay, thick carbonate meadow - brown								
16	0-21	0.97	26.23	22.64	21.52	18.88	9.76	50.16
	21-48	0.88	24.36	23.52	22.96	17.96	10.32	51.24

	48-88	1.05	26.63	22.44	21.04	19.04	9.80	49.88
	88-110	0.76	23.64	23.36	22.08	18.64	11.52	52.24
	110-115	1.19	29.01	21.48	20.04	19.04	9.24	48.32
47	0-21	1.08	26.84	22.56	21.52	18.56	9.44	49.52
	21-47	0.94	24.74	23.08	20.76	19.24	11.24	51.24
	47-85	1.00	23.76	21.88	20.96	18.76	10.64	50.36
	85-107	0.86	23.62	22.64	21.64	19.36	11.88	52.88
	107-150	0.70	21.32	24.64	22.54	18.72	12.08	53.34
97	0-21	0.91	26.29	22.52	21.60	18.92	9.76	50.28
	21-45	0.85	23.83	23.16	22.04	19.04	11.08	52.16
	45-85	0.76	25.32	22.60	21.92	18.96	10.44	51.32
	85-108	1.09	27.99	21.36	20.92	18.76	9.88	49.56
	108-155	0.65	21.87	23.76	22.48	19.16	12.08	53.72
6. Heavy clayey, thick carbonate meadow - brown								
3	0-23	1.19	26.81	22.48	21.80	18.16	9.56	49.52
	23-48	1.21	27.27	23.16	22.36	17.28	8.72	48.36
	48-88	0.86	23.70	24.20	20.84	19.16	11.24	51.24
	88-115	0.96	25.00	23.88	21.44	18.64	10.08	50.16
	115-162	0.75	21.89	25.08	20.72	19.32	12.24	52.28
41	0-22	1.08	26.84	22.56	21.52	18.56	9.44	49.52
	22-46	0.94	24.74	23.08	20.76	19.24	11.24	51.24
	46-90	1.00	26.76	21.88	20.96	18.76	10.64	50.36
	90-115	0.86	23.62	22.64	21.64	19.36	11.88	52.88
	115-162	0.70	21.32	24.64	22.54	18.72	12.08	53.34

Table 6. II The main components of carbonate meadow-brown soils.(absolutely on dry land, in%)

Cut №	Depth cm	Hiqros-kopik moisture	General		CO_2	To CO_2 according to $Ca\ CO_3$	pH in water suspension
			Humus	Nitrogen			
1	2	3	4	5	6	7	8
1. Light clay, thick carbonate meadow - brown							
16	0-21	5.1	1.69	0.14	3.20	7.27	8.15
	21-48	5.2	1.20	0.11	3.57	8.12	8.16
	48-88	5.0	0.76	0.09	3.95	8.98	8.19
	88-110	5.1			4.32	9.83	8.21
	110-115	4.9			4.70	10.69	8.24
47	0-21	5.1	2.01	0.16	3.57	8.12	8.16
	21-47	5.0	1.41	0.13	3.38	7.70	8.15
	47-85	5.2	0.82	0.09	3.95	8.98	8.19
	85-107	4.9			4.51	10.26	8.20

	107-150	5.0			4.70	10.69	8.24
97	0-21	5.1	1.85	0.15	3.57	8.12	8.15
	21-45	5.0	1.31	0.12	3.38	7.70	8.16
	45-85	5.2	0.76	0.09	3.76	8.55	8.21
	85-108	5.0			4.14	9.41	8.22
	108-155	5.2			4.70	10.69	8.24
2. Heavy clayey, thick carbonate meadow - brown							
3	0-23	4.8	1.80	0.15	3.57	8.12	8.16
	23-48	4.9	1.25	0.12	3.95	8.98	8.19
	48-88	5.0	0.82	0.09	4.32	9.83	8.21
	88-115	5.1			4.51	10.26	8.22
	115-162	5.0			4.89	11.12	8.24
41	0-22	5.0	1.80	0.15	3.76	8.55	8.18
	22-46	5.2	1.41	0.13	3.95	8.98	8.19
	46-90	5.1	0.76	0.09	3.57	8.12	8.17
	90-115	5.3			4.32	9.83	8.21
	115-162	5.2			4.70	10.69	8.23

Table 7. II The amount of bases absorbed in carbonate meadow-brown soils (in% of absolute dry soil)

Cut №	Depth sm	Absorbed bases, in mg.ekv			Udulmuş Swallowed of the basics in total mg.ekv	Udulmuş əsaslar From the sum of the won bases, %-with		
		Ca	Mg	Na		Ca	Mg	Na
1	2	3	4	5	6	7	8	9
5. Light clay, thick carbonate meadow - brown								
16	0-21	18.50	9.50	0.50	28.50	64.92	33.34	1.75
	21-48	23.00	11.50	0.70	35.20	65.34	32.67	1.99
47	0-21	20.50	10.50	0.65	31.65	64.77	33.18	2.05
	21-47	19.50	10.00	0.55	30.05	64.90	33.28	1.83
97	0-21	19.50	10.50	0.60	30.60	63.73	34.32	1.96
	21-45	21.50	11.00	0.60	33.10	64.96	33.24	1.81
6 Heavy clayey, thick carbonate meadow - brown.								
3	0-23	26.00	13.50	0.80	40.30	64.52	33.50	1.99
	23-48	25.00	12.50	0.85	38.35	65.19	32.60	2.22
41	0-22	16.50	8.50	0.55	25.55	64.58	33.27	2.15
	22-46	18.50	9.00	0.60	28.10	65.84	32.03	2.14

CONCLUSIONS:

It should be noted that in general, erosion processes lead to erosion and destruction of the topsoil.

According to the results of laboratory analysis of soil samples on different soil types from different experimental areas, the actual soil fertility determined for the suitability of different types of agricultural crops, a number of types of agricultural culture. grapes and clover-cheese.

This article presents the results of a comparative analysis of the degree of erosion of the land cover formed in the territory of the Tartar region of the Republic of Azerbaijan using aerospace images and studied.

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