

**SOI: 1.1/TAS**

**DOI: 10.15863/TAS**

**Scopus ASJC: 1000**

**ISSN 2308-4944 (print)**

**ISSN 2409-0085 (online)**

**№ 12 (116) 2022**

# **Teoretičeskaâ i prikladnaâ nauka**

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# **Theoretical & Applied Science**



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**Philadelphia, USA**

**Teoretičkaâ i prikladnaâ  
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**Theoretical & Applied  
Science**

**12 (116)**

**2022**

# International Scientific Journal

## Theoretical & Applied Science

Founder: **International Academy of Theoretical & Applied Sciences**

Published since 2013 year. Issued Monthly.

International scientific journal «Theoretical & Applied Science», registered in France, and indexed more than 45 international scientific bases.

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ISJ Theoretical & Applied Science, 12 (116), 1128.  
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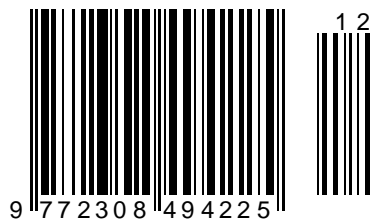
**Impact Factor ICV = 6.630**

**Impact Factor ISI = 0.829**  
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ISSN 2308-4944



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IBI (India) = 4.260  
OAJI (USA) = 0.350

SOI: [1.1/TAS](#) DOI: [10.15863/TAS](#)

### International Scientific Journal Theoretical & Applied Science

p-ISSN: 2308-4944 (print) e-ISSN: 2409-0085 (online)

Year: 2022 Issue: 12 Volume: 116

Published: 12.12.2022 <http://T-Science.org>

Issue

Article



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## PRODUCTION OF LEATHER GOODS, ACCESSORIES AND FITTINGS ON THE BASIS OF TOPS TO MEET THE DEMAND OF THE POPULATION

**Abstract:** In the article, the authors analyze the role of quality as a tool for promoting the philosophy of quality in the production of competitive and in-demand products at light industry enterprises located in the regions of the Southern Federal District and the North Caucasus Federal District. At the same time, the authors absolutely reasonably confirm the possibility of such an implementation. If innovative centers are implemented, saturated with universal and multifunctional equipment, creating the prerequisites for the production of the entire range of leather goods, namely: bags, gloves and accessories, which is especially important for children, the demand for which in the regions of the Southern Federal District and the North Caucasus Federal District is quite high. And the use of software will provoke a significant reduction in the cost of its production and provide it with a steady demand in domestic markets with unstable demand.

**Key words:** quality, preferences, demand, competitiveness, market, profit, demand, buyer, manufacturer, financial stability, sustainable TEP, priority, assortment policy, paradigm, economic policy.

**Language:** English

**Citation:** Barybina, P. D., Tikhonov, A. A., Prokhorov, V. T., & Volkova, G. Y. (2022). Production of leather goods, accessories and fittings on the basis of TOPs to meet the demand of the population. *ISJ Theoretical & Applied Science*, 12 (116), 401-446.

**Soi:** <http://s-o-i.org/1.1/TAS-12-116-32> **Doi:**  <https://dx.doi.org/10.15863/TAS.2022.12.116.32>

**Scopus ASCC:** 2000.

### Introduction

**UDC 685.74:519.34**

Today, the market for leather goods always reflects a wide range of requirements, providing a variety of choices. One of the main tasks solved by

any enterprise in this industry is to increase the competitiveness of its products and plan a rational assortment that meets the requirements of customers.

As for Russia, according to experts, the Russian leather and haberdashery market is firmly stuck at an early stage of its development. Domestic

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manufacturers have not learned how to develop their own design, there are problems with marketing. Even large Russian manufacturers, who are not shy about their trademark, prefer to sell their products in several "branded" stores or by establishing mutual exchange with "branded" stores of other factories. European leather goods are mainly represented by products from Italy, Germany and Spain. But importers today occupy only 60% of the Russian market.

The purpose of this dissertation is to design a collection of women's bags based on the analysis of the compositional solution of analogue samples.

To achieve this goal, the following tasks were solved in the work:

- study of the history of the creation of leather goods;
- analysis of collections of well-known brands and mass-market brands in leather and haberdashery products;
- determination of the main requirements and preferences of consumers in relation to artistic and constructive features of the appearance of women's bags;
- selection of the optimal solution for basic models based on the analysis of the compositional solution of analogue samples;
- development of a collection of women's bags.



**Figure 1- Backpack bag**

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The descendant of today's bag appeared in the distant times of the primitive communal system. Already primitive people had the need to carry various objects, while freeing both hands. The first bags were made from the skins of dead animals, many ropes or branches intertwined with each other, which were then hung on a stick. The stick could be put on the shoulder and thus carry the burden. Primitive people used bags to carry food, flint, and other essentials. On the lands where modern Germany is located today, during excavations, archaeologists unearthed a bag, the period of which dates back to 2500 BC. The ancient bag was hung with many dog teeth. Also on the Simalun Glacier, in the distant Alpine mountains, archaeologists have found the remains of a primitive man, whose age is from 4.5 to 5.5 thousand years. Not

far from his remains, scientists discovered an object very similar to a backpack bag: a leather base was stretched over a V-shaped structure made of a pair of hazel sticks connected at the bottom by horizontal strips (Figure 1). The features of such an unusual design made it possible to rigidly fix the bag-backpack on the back of a person.

Society developed rapidly and with the advent of commodity-money relations, a person has an urgent need to constantly carry money with him. In ancient Rome, money was carried in special pockets, which were then called sinuses. At the stronger sex, the sinuses were sewn to clothes and hidden in the bends of the toga. Dear ladies, such pockets were located in the most hidden places under the lush cassocks of skirts.



Figure 2 - Wallet - coin

During a detailed study and detailed analysis of the paintings of the ancient Egyptian pyramids, scientists found an unusual fresco depicting a pharaoh

holding a bag in his hands. The bag had the shape of a rectangle embroidered with gold. Society inevitably developed and progressed until it reached class



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division. Now the bag showed the social status of its owner.

Women from the upper castes of society were not burdened with heavy burdens - after all, servants specially designed for hard work did it for them. The bags of ordinary girls were made in the form of bundles or bundles. African girls' bags were of an ambiguous nature. They endowed this item with mystical properties, using the bag as a powerful amulet against evil spirits and storing magic spells in it. At a later stage in the formation of ancient society, the so-called saddlebags earned great popularity. They were rectangular bags that were attached to the horse's saddle. Most often they were sewn from animal skin or special carpet fabric. The Indian tribes carried their personal belongings in backpacks very similar to the accessory found next to the remains of a primitive man in the Alps.

The advent of the eleventh century in medieval society was marked by the widespread use of purses. The first purses of the Middle Ages were quite primitive and looked like fabric bags tightened with a leather cord. Such a handbag-purse was hung on the belt of outerwear. Another name for a wallet is a coin box (fr. Laumonier) (Figure 2). A belt bag was an integral part of the clothes of medieval money changers and merchants. Cash coins of China and Japan were made with holes so that they could be conveniently worn on a leather cord tied to outerwear. European costumes were characterized by the presence of special pouches designed for carrying tobacco. The status of the owner of the pouch was determined by the material from which it was made: goat or calf skin, linen cloth, brocade material, suede leather, natural velvet.



Figure 3- Wallet in Ancient Rus'

With the advent of the fourteenth century, the original function of the bag began to fade into the background, when its aesthetic function began to play a more important role. There are women's and men's bags. Women's handbags were distinguished by bright and eye-catching colors. The form is a bag, in such bags they began to carry mirrors, prayer books, smelling salts, dice, card decks (Figure 4). They were made, as a rule, from velvet, then embroidered with gold and silver threads, beads, expensive stones. Such

handbags were hung on the belt of outerwear with the help of an elegant chain or lace. Such an unusual belt bag was referred to as "omonier". The quality and finish of the bag depended on the status of the owner of the bag. The higher the lady occupied a position in society, the more expensive and more beautiful was the decoration of her bag: gold, silver, precious stones, natural silks, sea pearls. The simplest girls had "omoniers" made of ordinary canvas fabrics.

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Figure 4- Omonier bag

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For representatives of the stronger sex, bags were embroidered with the symbols of family coats of arms and elements of heraldic ornament. Already in the sixteenth century, hunters had bags made of animal skin or canvas with several compartments inside, which had long straps, which made it possible to carry them over the shoulder. The advent of the seventeenth century was marked by the return of pockets sewn onto clothes. This allowed the men to

abandon the "omoniers". For the first time, the pocket was fixed on the pants of Louis XIV himself. Military officers fell in love with the so-called "dash bag", which was intended for storing and transporting carbine cartridges (Figure 5). Outside, such a bag was covered with cloth and had a monogram or a distinctive coat of arms.



**Figure 5- "Bag-bag"**

Handbags for wearing on the wrist have become fashionable for women. The armies of European countries have acquired backpacks made of leather and canvas. They performed the only important function for the soldiers - to free their hands for the possibility of effective combat. Musketeer bags were hung on a massive belt and worn over the shoulder.

In Japan, the so-called "furoshiki", which means "bath carpet", has gained immense popularity. This is nothing more than a square-shaped fabric in which personal items were wrapped and thus transferred

(Figure 6). A visit to the bath obligated the inhabitants of the Land of the Rising Sun to come to this institution dressed in a traditional attire - a kimono, which was brought with them as a change of clothes. At the end of the bathing ceremony, the samurai took off his wet kimono and carefully wrapped it in a cloth rug to take it home. Over the years, the Japanese began to use such furoshiki rugs as gift wrapping, carrying things, and storing personal items. Furoshiki is used for its intended purpose in Japan to this day.

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**Figure 6- "furoshiki"**

The eighteenth century refers to the birth of a new trend in the fashion world - neoclassicism. The year 1790 is considered to be the date of birth of the world's first women's handbag with a carrying handle. The Marquise de Pompadour, by chance, became the trendsetter of a new fashion trend (Figure 7). It was at this time that a handbag was born, which had a trapezoid shape, made of textiles and closed with a silk cord. They were bags with a round bottom, the neck of which was tightened with braid. Along with the pompadour, hidden pockets that were sewn into skirts come into fashion. Such handbags were richly decorated with beads, beads, lace elements, hand embroidery. The handbag has become a necessary accessory for a European lady. The flirtatious beauties of the time used handbags to store love letters, snuffs,

Everything now fit in the handbags: powder, fan, perfume, ball book, love letters, lorgnette, theater glasses. Since that time, a rectangular handbag similar to an envelope has come into fashion. Inside there could be pocket compartments for various little things. Active, energetic young ladies of the 18th century become owners of travel bags - special suitcases (handbags, caskets) with many devices for small items (Figure 8).

With the advent of the nineteenth century, the sizes of handbags increased somewhat and their shapes diversified. The interior space has acquired several compartments for storing various items at once. For the first time, a frame-type lock appears on a women's handbag. Such fashionable and new in those days, ladies' accessories began to be called - "reticule" (Figure 9).

Gradually there was a division of ladies' accessories according to their purpose. That is, specific handbags began to appear in order to go for a walk with her, take her with her to a gala event, to a love meeting, to go to the theater and on other special occasions. Products were decorated with sea pearls, precious stones, hand embroidery, decorative ribbons. In the same century, army backpacks underwent modernization. They received lightweight materials for the manufacture of the base, which had the best effect on their mobile characteristics and incredible practicality. The messenger bag is gaining immense popularity (Figure 10). The postman's bag had an unusual square design, as well as a pair of handles - one short, the other long - to be able to carry the bag both in hands and on the shoulder.

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Figure 7 - Pompadour lace handbags

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Figure 8 - Travel bag



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**Figure 9 - "reticule"**



**Figure 10 - Messenger bag**

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The middle of the 1850s was marked by the world "railway building". By that time, more than five thousand kilometers of a full-fledged railway track had already been laid in the world. In connection with this fact, people got a unique opportunity to travel almost freely, moving around the world by means of

the railway. And, as a result, all those same people had an urgent need to transport personal belongings in bags of a more advanced and more spacious design. A new era in the production of luggage bags has begun. Bags for carrying luggage from Louis Vuitton were widely used at that time (Figure 11).



**Figure 11 - Louis Vuitton Luggage Bag**

A newfangled travel accessory is the so-called bag. It becomes equally popular, both among men and among lovely ladies. At first, carpet cloth was used as

a material for its manufacture, a little later - animal skin (Figure 12).



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**Figure 12 - Bag**

The First World War made its own adjustments to the design and functionality of bags. Pouches were used to store and transport ammunition for weapons (Figure 13). She was wearing a belt. Girls from a simple working class used tabloid bags, which were

worn on special shoulder straps. Men representing the business society of that time fell in love with briefcases with many pockets and compartments for documents and paper money (Figure 14).



**Figure 13 - Bags for storing and transporting ammunition for weapons**

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**Figure 14 - Portfolio of A.V. Kolchak 1915**

A significant event of that time in the 1920s was the premiere of a new Broadway musical called Runnin Wild. The song "Charleston" was performed in it, which later became a real hit. The actresses performing the song were dressed in beautiful dresses,

decorated with spectacular fringes, which also adorned ladies' handbags. It was these handbags that became popular all over the world and were called "Charleston handbags" (Figure 15).



**Figure 15 - "Charleston handbags"**

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The familiar zipper appeared on handbags only from 1923.

Men's wardrobe has replenished with such an important and necessary accessory, especially in a business environment, as a purse. It could be worn on the wrist (Figure 16).



**Figure 16 - Men's bag 1930**

The forties of the twentieth century were marked by the appearance of unusual Walborg Poodle bags (Figure 17). Large-sized bags in the shape of squares have become incredibly fashionable. Synthetic

materials began to be used for the production of bags. Simple working girls used inexpensive city bags made of cheap materials.



**Figure 17 - Walborg Poodle bags**

In the 1950s and 60s, clutches, minaudières and pochettes gained immense popularity. Handbags with

short handles and a trapezoid-shaped bottom were also fashionable (Figure 18).

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**Figure 18 - Bags 1950-60s**

The time of hippies and rock and roll has made its amendments to the fashion for bags. Loose-fitting bags made of simple materials have come into fashion. They were decorated with ethnic ornaments, psychedelic motifs and floral prints. The seventies brought sports style to the peak of popularity in world fashion. Miuccia Prada created the famous Pacone nylon backpack collection. 1980 - present, this period of time is remembered for the creation of bags of various shapes and sizes, using prints and decorations from expensive stones. Among men, mail carriers and handbags were popular. Nothing fundamentally new was invented, and fashion designers conducted experiments using models of past years, changing materials, finishing methods and decor.

The range of leather haberdashery is divided into subgroups:

- toilet items;
  - accessories for storage of documents and money;
  - travel accessories.
- Toiletries include bags.  
All women's bags are classified:  
by design:
- rigid;
  - semi-rigid;
  - soft.
- clasp type:
- with a frame lock;
  - with a zipper;
  - with Velcro fastener;
  - with a fastener on the button;
  - with magnetic fastener;
  - with a spring fastener;

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- without fastener.
- by appointment:
- everyday;
- weekends;
- theatrical (small size).

Within these groups, bags can differ in type of design (smart, business and official), seasonality (autumn-winter and spring-summer). The widest range of women's bags. They are made from various types of natural, artificial and synthetic leathers, fabrics and other materials in accordance with fashion

trends, with locks of various designs and without them, simple and complex shapes, of varying stiffness. Embroidery, lace, weaving, ornaments, decorative stitching, etc. are used in the decoration of bags.

The color range of materials is diverse: from black to various shades of gray. Brown tones, soft golden and green hues, various shades of blue and red are also fashionable.

Figure 19 shows the most famous types of women's bags, although the list is endless.



Messenger bag



Waist bag



Shopper bag



Tote bag

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Hobo bag



Sacvoyage



Diplomat



Dome bag



Bucket bag



Tablet bag

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clutch



Pouch

**Figure 19 - Types of women's bags**

Postman's bag - is a universal model of a square or rectangular shape with a flap and a long shoulder strap. It resembles a briefcase and can have a magnetic closure or buckle straps, internal sections and pockets on the outside. The size also varies: from small to roomy, which will fit books, a laptop and leave room for other items. Belt bag - has a flat or square shape, a convenient bag to carry on the belt.

Shopper is a reliable roomy bag for shopping. Thanks to the convenient length of the handles, it frees up the hands, providing more than a visual inspection during the purchase. You can touch the product you like, find the price tag, pay attention to the quality. This bag can be worn on the shoulder or elbow. The model has a fairly roomy dimensions, so it fits a variety of purchases well.

Tote is a shopping bag. It is quite roomy, has a flat or square shape, often resembles a package. For ease of wearing, in addition to short handles, designers add a long shoulder strap to the model. However, there are also models in which the length of the handles allows the sock on the elbow. Usually such styles are concise, comfortable, bags are fastened with a zipper, button or do not have a fastener at all.

Hobo - characterized by a soft and baggy shape in the form of a month and the presence of one handle. This style does not provide for the carrying of documents and the strict organization of the inside, but if desired, you can organize the space in it by adding an organizer. The handle of the hobo bag is meant to be carried over the shoulder.

A bag is a shape and design that was originally a budget version of a travel bag. Today it is a capacious structural model with short handles. Functionality, volume and nothing superfluous, it is quite harmonious in a strict and businesslike manner and is intended for those who know how to create creativity even in the most familiar bows.

The diplomat is perhaps the most strict bag. Today, you can meet such a model in a business image more often among men. The fair sex tends to be more attractive models. In fact, a diplomat is a bag-case that has clear shapes, right angles, and one carrying handle. The model is fastened with special locks, and in some cases with a lock with a cipher. This is a classic model with strict functionality. It has medium and large dimensions.

Bag-dome - a model in the form of a dome with two short handles for carrying in hands. It has a rigid shape, a flat bottom and a rounded top. Thanks to the frame, even when fully loaded, it does not change shape and looks neat. The bag is convenient because it can be carried not only in the hands, but also on the elbow.

A bag-bag is a kind of alternative to backpacks, only a more feminine model. Outwardly, this product is square in shape with a stable flat bottom, which has a handle of a convenient length. The difference of the style is the method of fastening: instead of a zipper, the bag closes with a drawstring decorated with different limiters and trims.

Bag-tablet - which is worn on the shoulder, thanks to the presence of a wide adjustable strap. This is an alternative to shoulder bags, although it is characterized by strict lines and a frame of medium rigidity.

A clutch is a handbag, which, first of all, carries a decorative load. In the classic version, the clutch has no handles, so it is worn under the arm or in the hands. In some cases, for the convenience of carrying the bag is complemented by a chain, strap.

A pouch is a handbag made of silk or satin, which can be small or medium in size, containing the necessary beauty arsenal of a modern lady. These accessories are worn on the wrist.

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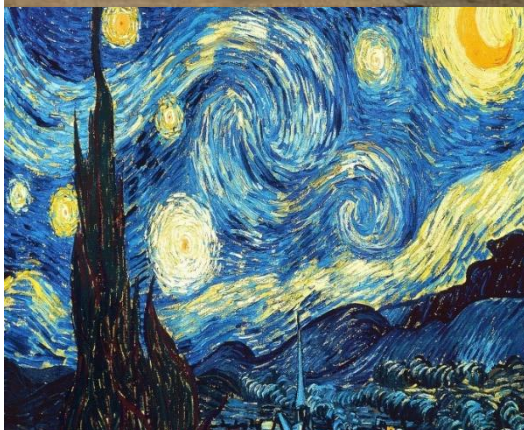
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The development of fashion collections is considered to be a creative process, for which the creator needs to find a muse and get inspiration. The process of transforming an idea into a design occurs after choosing a source of inspiration. The source of inspiration is an object or phenomenon of the reality surrounding it, chosen by the designer for further creative work. Almost any object, person or experience can serve as a source of inspiration. Among the most frequently used are art, design objects, architecture, nature, historical costume, etc. The transformation of a creative source into a sketch is possible thanks to the designer's associative thinking, which manifests itself in the transformation of subject, abstract and psychological associations caused by sources of inspiration into graphic searches for solutions to shoe or clothing models.

A creative approach to the transformation of the original source does not involve copying it, but an

associative rethinking, which gives an endless wealth of ideas. Modernity and professionalism in the development of new models is based on such a creative method, the main goal of which is only to convey a light, intricate memory of the source within the new form. In general, creative work on new models of shoes and clothes, which implies the presence of a source, is very common and, therefore, promising. Let's turn to the collections of well-known brands and mass-market brands. Art, as a source of inspiration, is used by designers to convey the spirit of the time, mood, and recreate experienced moments of the past.

A striking example of the use of works of fine art is the ANTE KOVAC collection "MRS VAN GOGH" of the spring-summer season, Figure 21 (Pabla Picasso's painting "Girl on the Ball", Van Gogh's painting "Starry Night", Van Gogh's painting "Portrait").





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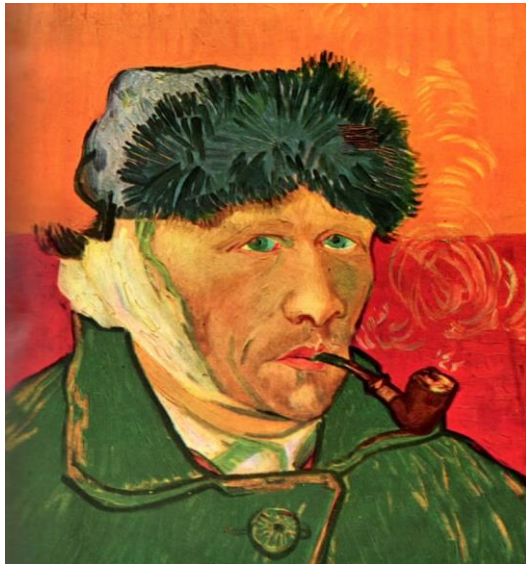


Figure 20 - Using works of fine art as a creative source - ANTE KOVAC collection "MRS VAN GOGH"

ANTE KOVAC regularly resort to such a source of inspiration as maestro Pabla Picasso. Figure 21 shows the new collection of bags "Picasso". The new

collection of bags "Picasso" combines several ideas in one concept: here are the works of the great artist, framed by the design ideas of the fashion designer.



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Picture 21 - ANTE KOVAC new collection of bags "Picasso"

Paula Cademartori are unusual small bags with a geometric pattern of interesting color combinations, their geometric shapes, decorated with a clasp in the shape of the Greek letter  $\pi$ . Paula Cademartori, when

creating her collection, used the nature of Brazil, the atmosphere of the Brazilian carnival as a creative source, the models are shown in Figure 22.



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**Figure 22 - Paula Cademartori's new collection, creative source - the nature of Brazil and the atmosphere of the Brazilian carnival**

Architecture - the art and science of building, designing buildings and structures, as well as the very set of buildings and structures that create a spatial environment for human life and activity, allows you

to develop the shaping of products, find new design solutions, combinations or proportional articulations. A clear example of the use of architectural structures as a source of inspiration in the development of a

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collection of bags is demonstrated by the brands Chanel and Christian Dior (Figure 23).



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**Figure 23 - Chanel and Christian Dior brands.**

Choosing a source of inspiration from the world of animals and plants, designers receive a wide range of elements, textures, color combinations, which are further transformed into elements of leather and

haberdashery and footwear, for example, the collection of bags "Temi" from the brand "Braccialini" or Louis Vuitton (figure 24).



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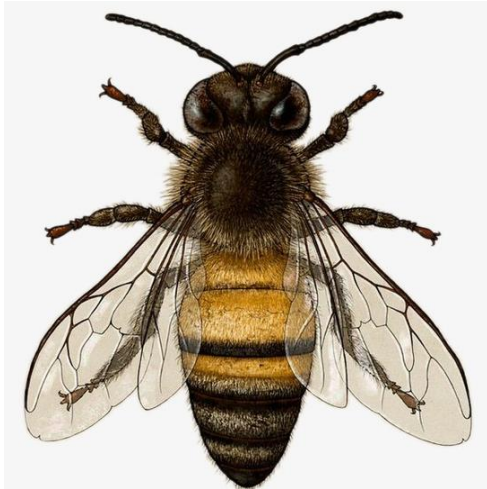
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**Figure 24. Bags created on the basis of the creative source "Animals and Plants"**

Historical costume is an inexhaustible source of inspiration for designers. A historical costume is a ready-made integral image that has absorbed the history, religion and culture of the people. Each element of the costume was formed over the centuries

and had its purpose and meaning. The transformation of the iconic elements of the historical costume into a new form of modern costume allows you to revive the cultural heritage of the people. Figure 25 shows bags inspired by historical costume.



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Figure 25. Bags based on historical costume as a source of inspiration

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Choosing a source of inspiration - precious stones and minerals that have a beautiful appearance and at the same time are quite rare, and, as a result, expensive. They are widely used for the production

jewelry, collected in collections designers convey unique textures, elements of color combinations that transform into bag details or product decor (Figure 26).



**Figure 26. Bags inspired by gems and minerals**

Thus, it is obvious that the process of stylization and transformation of a creative source into a model forms the general appearance of products and determines the “recognizability” of a creative source in the developed collections. The general concept of modern fashion comes down to the freedom of individual expression. This is manifested in all the main characteristics that determine the design of the form, in the use of various materials, textures and color combinations. The given examples allow us to conclude that in the framework of these studies, the term "collection" should be understood as a series of bag models united by a common idea (the author's concept) in relation to the materials used, colors, shapes, style solutions, etc.

Collections are formed taking into account seasonality (as a rule, spring-summer and autumn-winter); age of consumers (for youth, women and men of a certain age category, etc.) and purpose (everyday, sports, etc.). In the conditions of the modern market, well-known brands and mass-market brands present two collections a year: autumn-winter and spring-summer. Some companies also produce off-season and capsule collections to create a unique product and update the range more frequently. In general, the production of collections can be represented as a circular scheme. Market analysis is carried out by marketers, whose task is to find answers to the questions of what to produce, for whom and in what volume. To solve the set tasks, marketers, together

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with analysts, analyze consumer preferences, sales results of past collections, they collect information about new trends in terms of success in the light industry market, about collections of competitors, their achievements or failures. As a result of studying the fashion trends of modern women's bags and analyzing the compositional solution of analogue samples, a model of an everyday bag with two handles was chosen for the development of sketches. A casual bag must meet functional requirements, be made of high-quality and affordable materials, have comfortable and durable handles, and also have a closed functional volume. As a result of studying the fashion trends of modern women's bags and analyzing the compositional solution of analogue samples, a model of an everyday bag with two handles was chosen for the development of sketches. A casual bag must meet functional requirements, be made of high-quality and affordable materials, have comfortable and durable handles, and also have a closed functional volume. As a result of studying the fashion trends of modern women's bags and analyzing the compositional solution of analogue samples, a model of an everyday bag with two handles was chosen for the development of sketches. A casual bag must meet functional requirements, be made of high-quality and affordable materials, have comfortable and durable handles, and also have a closed functional volume.

Such a bag should be durable, easy to use and have a pleasant appearance. Based on these requirements, sketches of bags were developed, presented in Figures 27 - 36.

From the presented sketches, based on a survey of consumer preferences (table 1), a bag model was chosen to build the design in accordance with Figure 36. Women's everyday bag, semi-rigid design, stitched method has a large functional volume and closes with a zipper. The bag consists of two walls, a bottom and two handles and decorative straps on the front and back walls.

The shape of the bag is designed so that the details of the bag provide good stacking when cutting. The design of the bag has a symmetrical shape, the cut of the details allows you to create and combine different color combinations and textures of materials.

Based on the analysis of analogue models, a basic model and a structurally unified series of models have been developed. The simplicity of the design will reduce the labor intensity and material consumption of the product, which further leads to an increase in labor productivity. The technical sketch of the model and modeling of the body of the bag are shown in Figures 38 - 44.

The figures show models of a structurally unified series. Variety is achieved through additional overhead parts, decorative stitching, perforations, and accessories used. When developing a structurally unified series, it is necessary to take into account the structural and technological continuity, and the

possibility of manufacturing on the same technological stream.

The shape distinguishes between flat and voluminous bags. For bulk bags, all three sizes are indicated, and for flat bags, D and V. When developing a model, additional dimensions are often set, which are necessary for design. These include the length of the upper or lower part of the bag with a trapezoidal silhouette, the height of the valve, the outer pocket, etc. The dimensions of the parts necessary for the manufacture of patterns are determined taking into account their better stackability when cutting. Materials and accessories. According to the materials used, bags are divided into three main groups: made of genuine leather; made of artificial leather and synthetic materials; from fabric.

Various fabrics (cotton, silk, artificial and synthetic fibers) and film materials are used as lining for bags. The lining materials are cardboard, paper, polyurethane foam. For bags, both functional and decorative fittings are used. According to their intended purpose, accessories are divided into the following types: for closing products - locks, buttons, fasteners, zippers, etc.; for fastening and connecting parts - rivets, handle holders, pins, paper clips, etc. ; to protect products from rapid wear - corners, bulges, linings, inserts, edging, etc. ; for decoration (decorative fittings) - various linings.

Methods for connecting parts. The assembly of the main outer parts of the bags is characterized by the manufacturing method, the fastening method, the type of processing of the outer edges of the parts, the type of seam, and additional parts included in the seam. When assembling parts of products, two main methods are used - reversible and non-reversible. The reversible method consists in the fact that the main parts of the body of the product are folded with the front sides and fastened on the wrong side, followed by turning the fastened body inside out. The non-reversible method is characterized by the fact that the main parts of the body of the product are folded with the wrong sides and fastened along the front side.

The reversible method is simple and productive, since in most cases it does not require additional processing of the edges of the parts. The edges of the connected body parts are located inside the bag and are closed with a lining. In the manufacture of products without lining, the internal seams are edged. The eversion method determines the use of such a material on which there are no creases and dents in the process of eversion of the product. It is impossible to connect rigid parts using the reversible method, since the knot from such parts cannot be turned out. The non-reversible method is more laborious if preliminary or subsequent processing of the visible edges of the product is necessary, however, for the manufacture of products from rigid materials, as well as for connecting some part designs, the non-

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reversible method is the only possible one. For example,

With the non-reversible method, two types of processing of the outer edges of the product and individual parts are possible: bending and trimming with subsequent finishing. Folded edge processing is the most complex technological process that ensures high quality of the product. Distinguish between one- and two-sided bending. With one-sided bending, only one of the two parts to be joined has a bending allowance. The edges of the part with an allowance are bent in two ways: the first is a one-sided external bend, in which the edge of the part with a bend allowance is folded onto the cut edge of another part and stitched; the second is a one-sided internal bend, in which the edge of the part with an allowance is bent and fastened to another part. The first method is more often used when connecting the main body parts, the second - when connecting additional parts. With double-sided bending, the edges of both parts have a bending allowance. In this case, the edges of the parts are folded and connected.

The body of the developed model consists of two composite walls, the bottom. The initial part for construction is the bottom, its dimensions determine the dimensions of the lower part of the wall. To build the bottom, a rectangle is first drawn, whose sides are equal to the length of the product, and the width of the product, taking into account allowances. The corners of the rectangle are fastened with a radius (Figure 46).

Next, a wall is built by drawing a rectangle, the height of the rectangle is equal to the height of the product, respectively, the width of the rectangle is equal to the width of the product (Figures 46 - 48). The construction of the inner and outer coquettes is shown in Figures 49 - 50. The handles are made from the material of the top, the main dimensions are the length and width, plus the processing allowance (Figure 51).

Today, one of the main components of a person's wardrobe is leather goods. The bag and its size can tell a lot. First of all, the lifestyle of the owner, then how much he is guided by fashion trends, depending on the style in which the bag is made, you can even understand the character and preferences of the owner. Leaving the house, a person plans his day and from here selects an accessory that can satisfy his need for carrying things he needs during the day. Depending on the plans, a bag is selected, it can be a small handbag or a huge traveler's backpack. At present, there are a large number of leather accessories on the market, they are beautiful, multifunctional and satisfy the needs of any person. But progress goes on and needs change and grow, hence the constant desire for something new and interesting. This problem can be

solved by improving the quality of work and the level of staff qualifications, increasing labor productivity, monitoring current trends and market proposals. We need to offer quality.

At the moment, bags - suitcases of a rigid design are gaining popularity on the catwalk, so the development of fashionable bags of a rigid design for everyday life, as if descended from a fashion show, is relevant. The main task of the fashion designer is to make these bags wearable and comfortable, capable of accommodating everything the girls need, with whom they can go to work and walk, go to a restaurant immediately after a working day and be in trend.

The proposed collection of women's handbags with a rigid design, the accent of which are designer handles, which are woven from genuine leather. The entire collection, consisting of 5 products and handbags - key rings, is made of genuine leather on professional equipment with the implementation of all technological and design solutions.

This study contributes to the study and implementation of technologies for the manufacture of leather goods, the acquisition of new skills, the development of creative thinking, the development of communication skills, the education of diligence, and responsibility. Allows you to get acquainted with the equipment in practice and study all the technological processes of manufacturing leather products, from ideas to finished products

The history of the development of creative women's bags

Historians say that the predecessor of women's bags is the usual pocket.

Roman citizens in the folds of their clothes had a special pocket where they put money.

In the era of Ancient Rus', the first women's bags, made in the form of a pocket, were called gourmets. They freely accommodated lollipops, small items, seeds. Men's accessories were called kalita and were used for more prosaic purposes - they carried money, and for travel they used cloth shoulder bags.

In Europe, bags came into use in the 11th century, at that time they were more like small purses, they were attached to the belt and were intended to carry coins that noble people used to distribute alms. These products were called coins. Already at that time, these handbags were of different shapes, made of various materials and tastefully decorated.

At the end of the 16th - beginning of the 17th centuries, entire collections of handbags - pouches were created. Handbags are shown in Figure 52.

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Figure 52 - Pouch bag

These handbags were attached to the belt with a cord, and walking was accompanied by the sound of coins.

In the 17th century, women began to decorate handbags with beads and glass beads. They were

made not only from leather, but also from silk and velvet. Women decorated bags with embroidery, knitted or wove handbags - pouches (Figure 53).



Figure 53 - Pouch bags

Handbags were decorated depending on the social status of the lady, the richer she was, the brighter and more expensive her accessory looked. The appearance of the product changed and the need to hide it under the skirt disappeared, on the contrary, they wanted to show their luxurious handbags to the whole world. At the beginning of the 19th century, the

handbag changed a lot, acquired new forms and designs, became refined and went on public display. It was then that she received the name that we know to this day - reticule (Figure 54). Ladies handbag in the form of a pouch, decorated with beads, on a long silk cord, which was hung on the arm.

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**Figure 54 - Ridicule**

Bags made of fabric and decorated with lace were called pompadour, in honor of the mistress of the French king Louis XV (Figure 55)



**Figure 55 - Pompadour bag**

With the advent of the railway, in the second half of the 19th century, it became necessary to transport a large number of things that a person needs far from home, it was then that a bag was invented, a travel bag. Later, suitcases began to be used on trains, as they had a rigid shape and well preserved things in their original form.

After the First World War, many women began to work, and bags became not only an ornament, but at the same time a practical item. Along with the industrial revolution came new methods and techniques for making handbags. Papier-mâché, aluminum alloys, steel, and polymers began to be widely used. The combination of these materials,

combined with new technologies, has led to the emergence of new types and shapes of bags. By the beginning of World War II, an envelope bag, which appeared in the 20s of the twentieth century, a folder bag, which came into use a little later, a “car bag”, suitcase bags and briefcase bags, were in use. At the turn of the 20th and 21st centuries, the assortment of bags became diverse, including special bags for phones, cameras and computers.

The main function of bags is to carry and store personal belongings and documents. They are designed to meet all the requirements of the consumer. Table 2 presents the definitions and terms approved by GOST 28455-90.

**Table 2. Definitions and terms of leather goods**

Terms	Definitions
1	2
Leather goods	Haberdashery product, the material of the outer surface of which is natural, artificial leather and other materials that carry utilitarian or aesthetic functions
Bag	Leather goods for carrying various items and filled in a vertical position
Lady's bag	Bag for women's personal items



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Casual bag	Women's bag used daily
fancy bag	Women's bag for special occasions
A bag for cosmetics	-
Men's bag	Bag for men's personal use items
youth bag	bag for personal use of girls or boys
Student bag	Bag designed for carrying textbooks and accessories on the shoulder
Child bag	Bag for children's personal items
Travel bag	-
Shopping Bag	Bag for household items and products
Sports bag	Bag for sportswear and sports equipment
Beach bag	Leather goods for carrying and storing various items, filled in a horizontal position

Products for carrying and storing objects can have any shape and size, relatively arbitrary, or the shape and size associated with the shape and size of the items put into them. The main types of products of the first group are bags, briefcases, knapsacks, folders, suitcases, wallets, purses, wallets (Figure 56).

The second group - various covers and cases. Bags are the most widespread type of leather goods in terms of arbitrary shape and size. Bags are household and special.

Special bags - perform industrial or professional functions, differ in special designs and materials used.

Household bags that perform utilitarian and aesthetic functions and are an addition to clothing, are used on a daily basis, are classified according to gender, age and purpose.

According to the type of design, bags are divided into elegant, business, official.

Bags are divided according to the seasons: spring-summer and autumn-winter. The largest group of leather goods are women's bags.

Women's elegant bags (theatrical) are distinguished by elegant design and decoration. They are characterized by small size, various decorations and decorative details. Women's everyday bags are designed to meet the requirements of consumers in the operation of products in the spring-summer and autumn-winter period.

Cosmetic bags are small in size and simple in design.

Since the group of women's bags is extensive, youth bags are often distinguished from it, a feature of which is an avant-garde style. Due to the variability of fashion, the design and design of youth bags are temporary, unstable.

Shopping bags have a simplified design, they are most often produced from synthetic materials with a washable lining.


Student bags are an assortment group that has replaced student briefcases in recent years. Bags for students have designs that are convenient for placing textbooks, notebooks, school supplies.

Men's bags are a practical product, made in a simple style.

#### Analysis of modern trends for leather goods

A well-chosen bag can make the whole look even if you are wearing simple trousers and a basic T-shirt. Therefore, this is why accessories of recent seasons are allowed more: bags are less and less subject to trends, setting their own fashion guidelines. Minimalistic and avant-garde, restrained and outrageous - and if there are key trends among fashionable clothes, then designers are not limited in bags and like to show everything at once. Decor in the form of stones, glass beads, feathers and fringes, appliqués and stripes, clutches made of smooth or textured leather, plastic toes and canvas shoppers are all the most relevant models (Table 3).

**Table 3. Fashion accessories trends for 2022-2023.**

Description	Example
1 Shopper bag	2 

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Cylinder bag



Crossbody bag



Bag



hat box bag



suitcase bag



Bucket bag



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Satchel bag



sources of inspiration

Sources of inspiration are objects or manifestations of the surrounding reality that the designer chooses for his creative activity.

They can be absolutely any objects, people and emotions caused by watching your favorite movies, reading books. Most often, seen objects of design, architectural structures, paintings are used.

Everything seen by the designer, thanks to his associative thinking, becomes a source of inspiration, which subsequently manifests itself in the form of graphic images of various models of leather products.

The interpretation of the original source includes not just its complete copying, but a revision of its unique features that serve to give rise to the idea, which is the main driving force of the creator. Consider the collections of famous world brands presented on the catwalks (Figure 58).

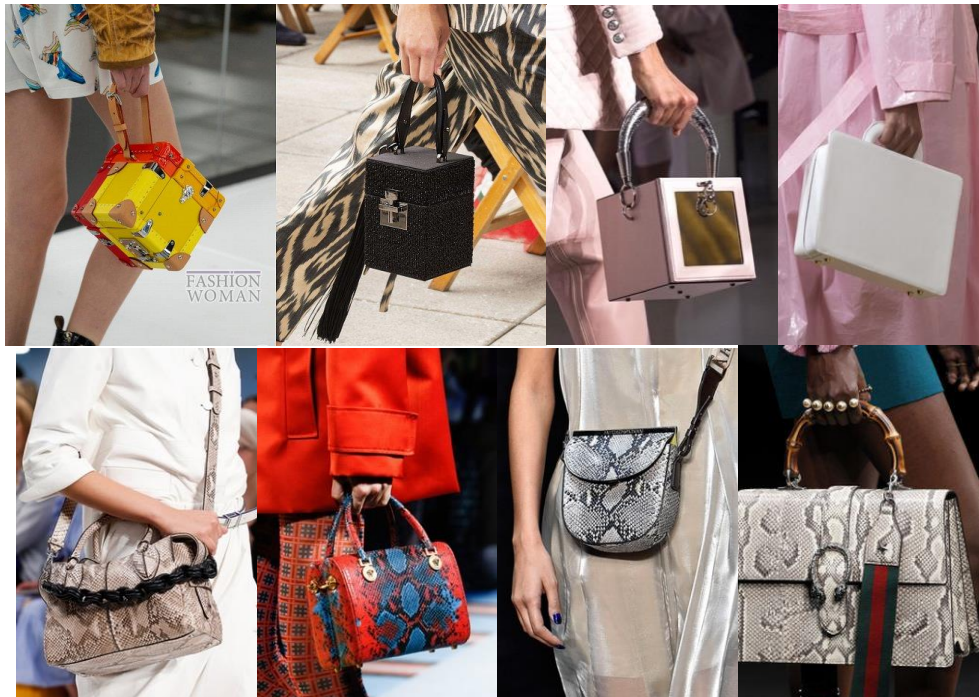


Figure 58 - Sources of inspiration

Based on the results of a study of various sources, one of the most fashionable and currently in demand forms was chosen. The main idea is bags with a rigid design in the form of a square, a round handle, which is usually the only one on the bag, clear lines and a strict silhouette that will be used in the creation of the collection.

The main center of the composition is the handles woven from leather strips, nude leather colors as the main color accent and snake print as an addition. All of the above is on the list of current trends for 2022-2023.

Decor elements in the collection are made in the form of small handbags-trinkets, invented by the author based on various catwalk shows and photos from the Internet. The color palette was selected based on fashionable colors according to Pantone magazine.

The concept of the designed collection is to combine the quality of genuine leather of the best grade, the practicality of use and the aesthetics of products that you can no longer forget just by looking at a glimpse.

Each model of the collection is unique - thought out to the smallest detail, starting from the outside,

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ending with the internal content in the form of a lining made of genuine leather and pockets that allow you to put everything you need in place, while being quickly accessible for use if necessary.

All this will allow the owner of an exclusive bag to feel self-confidence, in her taste and individuality.

The developed collection was called Daily Perfection - daily perfection.

The slogan of the collection: in everyday bustle, it is important to emphasize your perfection, this collection will help you with this.

Of the five models that were made, the most versatile was chosen.

When sewing the product, materials were used: genuine leather of two different colors, lining pig skin, auxiliary materials for sealing and shaping in the form of leatherboard and cardboard. A bright fragment of the product is a designer handle, made by weaving from strips of natural brown leather.

Figure 59 shows the finished model (photo) of the prototype bag "Handheld bag"

Figure 60 shows the finished collection of leather goods.



Figure 59 - Finished prototype model



Figure 60. Daily Perfection Collection

The model today is fashionable and in demand. This bag can be made of various materials, but in this case it is made of genuine leather with decorative elements in the form of braided handles and python

leather inserts. Thanks to this, this model is original and exclusive.

When creating bags, the term ergodesign will be more correct, as it more accurately reflects the essence

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of the issue under consideration: ergonomics and a bag, convenience and safety for a person.

When creating a product, an important factor is not only aesthetic parameters, but also its functionality. The combination of these two factors is ergodesign. The main principle of ergodesign in our case is the development and creation of only those products that are in demand by the consumer, based on their following features:

- active lifestyle (athletes, travelers, etc.);
- profession (businessmen, service workers, employees in production, etc.);
- hobbies (hunters, fishermen, members of various public organizations, clubs, societies and others).



**Figure 61 - Crossbody**

If a small handbag is not enough for your needs, you can consider the option of a doctor bag and briefcase, they are quite roomy, the briefcase has a laptop compartment, and the doctor bag has a rigid shape that allows you to protect your computer with a slight impact, plus other necessary things will fit in these bags. objects to man. These bags must be carried in the hand, as they are large in size and if they are loaded tightly enough, the weight of the product will be large and it will be more convenient to carry in the hand, the bags have an additional shoulder strap, but it is decorative and can only be used in rare cases when you need to get something out of the bag and you need to free your hands for quick access to the inside of the bag. It is not recommended to carry these bags on a

Bags are divided according to their purpose: first of all, for carrying personal belongings from home to work, a small cross-body bag with a long strap is suitable for such purposes, it is the strap that helps to properly distribute the load, if you carry a bag on one shoulder, try to change the position of the bag in over time, so that the load is distributed evenly, but it is better to throw the strap over your shoulder, so it will be easier and more convenient to carry the bag (Figure 61). This handbag meets the requirements of ergonomics and does not harm the health of the consumer, since its weight is minimal.

long strap for a long time, since the shoulders and back get very tired from an unevenly distributed load that constantly presses on one point, pain and even redness may appear at the site of pressure, plus a posture distortion may occur. At the same time, if there are items in the bag that are not recommended for impacts and even shaking, when worn on a long belt, the bag under its own weight will hit the thigh when walking, causing discomfort and creating shaking that is harmful to the laptop.

That is why it is better to wear these bags (Figure 62 - 65) not all the time, but only when necessary, when you need to transfer a large number of things and objects, for example, to a business meeting to carry folders with documents and a computer.

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**Figure 62 - Bag doctor bag**



**Figure 63 - Portfolio**

If you have a sedentary job and there are back pains after a working day, it is better to unload the back section and choose the appropriate option for carrying personal items, for example, a backpack bag with a shoulder strap, which will perfectly free your hands and evenly distribute the load on your back. But

the size of the backpack should not be large, it is more a comfortable bag than a huge tourist backpack loaded with a lot of necessary things, otherwise the backpack may not be beneficial, but harmful to health.



**Figure 64 - Backpack bag**

Rigid box bag with decorative python insert, unusual wicker handle and leather lining inside. This bag is not intended for constant wear to work, this bag is for going to the cinema or theater, restaurant. It has

a small size and it is impossible to overload it, only everything you need will fit in it, a phone, keys and a wallet, so it cannot harm a person, although it itself has a rigid shape.

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Figure 65 - Cube bag

Thus, the collection is fully consistent with ergonomics and does not harm the health of the consumer if the bags are used for their intended purpose. You and the bag are a single whole - this is exactly how you need to feel when you choose the bag of your dreams.

### Conclusion

As a result of the research, a designer collection of leather goods has been developed that corresponds to current trends. Emphasis is placed on the author's handiwork and exclusive and high-quality materials. When developing the collection, design and technological requirements for the manufacture of leather goods were taken into account. Genuine leather was chosen as the material used in the manufacture of products for the collection, since the material has an aesthetic appearance, is environmentally friendly compared to other materials. The source of inspiration for creating a new product is the transformation of the original source, which does not imply a complete copying of it, but a rethinking with the help of associations. To date, the development of new models is based on such a creative method, the main purpose of which is only to convey the memory of the source within the framework of a new form. In general, creative work on new models of leather goods, which implies the presence of a source, is very common and, therefore, promising.

The features of designing a collection of women's bags were considered based on the analysis of the compositional solution of samples - analogues. To achieve this goal, the following tasks were solved:

- Studied the history of the creation of leather goods;
- the analysis of collections of well-known brands and mass-market brands in leather and haberdashery products was carried out;

- the main requirements and preferences of consumers in relation to the artistic and constructive features of the appearance of women's bags are determined;

- the choice of the optimal solution for basic models based on the analysis of the compositional solution of analogue samples was carried out;

- developed a collection of women's bags.

Based on the analysis of analogue models, a basic model and a structurally unified series of models were developed. The simplicity of the design reduces the complexity and material consumption of the product, which provokes an increase in the productivity of their manufacture.

It should be noted that the presented range of leather goods and accessories will be in demand by consumers of the newly created TOP on the basis of the mining towns of the Rostov region and will expand the range of products for consumers in these regions, increase employment among the unemployed and improve their social standard of living. To revive the role and importance of a quality-oriented strategy, since only in this case, business leaders will subjectively and objectively be forced to improve their production using nanotechnologies, innovative processes and digital production so that competitive and import-substituting materials and products fully meet the needs of domestic consumers. At the same time, our assertion is substantiated that the consumption of domestic materials and products is regulated by the market.

Maintain the range of goods, regulating it with federal, regional and municipal orders;

Encourage price stability; increase consumer ability and gradually improve their quality. The implementation of these tasks will create a basis for the consumer to realize the need to pay for the benefits of quality materials and products, and the manufacturer to realize that improving the quality of

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materials and products cannot be associated only with rising prices, but also through technical innovations in digital production aimed at on the application of new technological and engineering solutions.

It is no less important to understand the role and significance of quality activity, that is, to what extent leaders penetrated into the essence of things, learned to manage things, change their properties (range), shape, forcing them to serve a person without significant damage to nature, for the benefit and in the name of a person.

Both political leaders and the government have recently begun to talk about the need for a competent industrial policy. However, if we carefully consider the normative, methodological documents on the structural restructuring of industry, then the thought arises whether we are stepping on the same rake that has been stepped on all the years of reforms.

What is the essence of economic reforms and the significance of industrial policy in them, which are theoretically substantiated and tested in practice by a number of developed countries?

This is the fight against inflation, the strengthening of the national currency and financial stabilization. This is a change in the forms of ownership in various sectors of the economy through the process of privatization. This is a structural restructuring of the economy under the conditions of market relations.

At the same time, structural adjustment must be placed at the basis of all these fundamental processes of economic reform. Both financial stabilization and privatization should be subject to the process of structural adjustment, since it is structural adjustment that determines the final result of reforms and the effectiveness of adapting various forms of production to civilized market relations.

The final result should also be taken as the basis for the structural restructuring of the economy. And these are products, services, their competitiveness in the domestic and world markets.

As for the process of structural adjustment, the position of the government is expressed by the following formulation: "the market itself will put everything in its place." With such a position towards structural adjustment, it is not surprising that in the national economic policy at that time there was no place for the words quality, competitiveness, priority.

This, unfortunately, is the reality of the reforms carried out today. In this regard, I would like to refer to well-known world experience.

A world-famous quality specialist E. Deming, who at one time was a scientific consultant to the Japanese government and led Japan out of the economic crisis, in his book "Out of the Crisis" says: "... managing paper money, not a long-term strategy for digital production - the path to the abyss.

Regarding whether the state should pursue an industrial policy, one can cite the statement of the

outstanding economist of the past, Adam Smith, who 200 years ago laid the foundations for the scientific analysis of the market economy. About the role of the state, he said: "... only it can, in the interests of the nation, limit the greed of monopolists, the adventurism of bankers and the egoism of merchants." It's like today is about us and about our situation in the economy.

What are the results of economic activity today, what are the achievements in this area? The growth of gold and foreign exchange reserves, the decline in inflation, the budget surplus and other financial and economic achievements. And what, is this the end result of public administration? And not the quantity and quality of goods and services sold in the domestic and foreign markets, and not the solvency of the population to purchase these goods and services? And, ultimately, not the quality of life of the population of the country???

Therefore, it is quite natural today that the task is set for all levels of the executive and legislative authorities - to improve the quality of life of Russian citizens.

In market conditions of management, an effective management system requires a rational organization of marketing activities, which largely determines the level of use of the means of production at the enterprise, the growth of labor productivity, the reduction of production costs, the increase in profits and profitability. This is due to the fact that marketing activity is not only the sale of finished shoes, but also the orientation of production to meet the effective demand of buyers and active work in the market to maintain and form demand for the company's products, and the organization of effective channels for the distribution and promotion of goods.

In a dynamically changing market environment, the performance of an enterprise, including a shoe one, largely depends on the effective results of the production, sales, financial and marketing policies of the enterprise itself, which creates the basis for bankruptcy protection and a stable position in the domestic market.

With the transition to a new economy, improving the quality and competitiveness of leather products has become a strategic task for all leather goods enterprises in the country and the region as a whole, it becomes necessary to take into account the laws and requirements of the market when working, master a new type of economic behavior, adapt all aspects of their activities to a changing situation, must take into account changes in consumer demand with upholding the interests of consumers before industry. To implement the strategy of competitive and in-demand products, issues related to the development of domestic light industry enterprises in the Southern Federal District and the North Caucasus Federal District were considered. As a result of the work carried out, favorable conditions for the



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implementation of the strategy were identified, namely:

- a large concentration of skilled labor;
- coordinated specialization of producers;
- a small number of local suppliers of high-quality raw materials, component materials;

We believe that for the production of competitive products by domestic manufacturers it is necessary:

increasing the investment attractiveness of the industry;

creation of conditions conducive to improving the provision of the industry with material and raw materials;

protection of the internal market from illegal circulation of goods;

export promotion;

legalization of preferential taxation of producers;

development of an interconnected system of supply and marketing, production, technology and innovation, pricing, financial, personnel policy and personnel management;

improving the quality and design of products;

development of a set of measures of regional importance aimed at improving the socio-economic situation by creating new jobs;

studying the life cycle of products and the use of advertising and media;

strengthening control and introduction of modern ISO quality management systems, development of a dealer and distribution network;

expanding the practice of leasing schemes;

with increased commercial risk and in conditions of uncertainty, it is advisable to use outsourcing.

A competitive assortment of the leather haberdashery industry has been developed, taking into account the factors affecting consumer demand: compliance with the main fashion trends, economic, social and climatic features of the regions of the Southern Federal District and the North Caucasus Federal District. Within the framework of the developed strategy, the production of competitive products will be organized using modern mechanized innovative technical processes, as well as to meet the demand of an elite consumer, using manual labor.

Based on the current situation in the economy of our country, in our opinion, an equally significant problem in the development of the regional consumer market is the lack of a full-fledged legal framework that ensures the functioning of the mechanism of state regulation of the consumer market in the regions. Based on this, it is the state and regional intervention that should correct the situation on the market of domestic light industry products in the regions, and thus there will be an opportunity for the development of competitive products.

From the analysis performed, we highlight the following trends in the development of the leather goods industry based on the TOP in the regions of the

Southern Federal District and the North Caucasus Federal District:

1. Due to the high level of migration of the able-bodied population of the Southern and North Caucasian Federal Districts to developing industries, the industries of our districts that we have named above can rightfully be called developing.

2. In the Southern and North Caucasian federal districts, close attention is justified to the issues of high-quality provision of the industry with qualified specialists employed in the field of light industry activities (a large number of specialized educational institutions for training personnel). An important factor is the increase in the investment priority of the industry, especially on the part of regional authorities, and the creation of conditions for increasing their competitiveness. It is necessary to impose high duties on imported finished products and low duties on imported basic and auxiliary materials and equipment, and it is also necessary to regulate the level of prices and tariffs that would guarantee the manufacturer and trade as a whole the reimbursement of costs and the accumulation of funds for the improvement and further development of production.

Thus, the prerequisites for the development of competitive production in our region are significant and relevant.

In conclusion, we propose a set of the following measures:

Creation of a regional program for the development and support of domestic producers in the Southern Federal District and the North Caucasus Federal District (loans, investments, leasing, outsourcing).

Development of a modern raw material base of the domestic industry.

Stimulation of the tax system for the modernization and reconstruction of existing light industry industries and the creation of new competitive industries.

Improvement of financial condition and re-equipment of 50% of fixed assets.

Taking measures to reduce the import of imported products into the region and improve the quality of products with bringing exports up to 35%, which will ensure the suppression of trade in contraband products.

Recognition from the Government of the Russian Federation of light industry as a priority among other industries and the adoption of a program for the "breakthrough" development of the industry for the period 2025–2030. and until 2035

To ensure doubling by 2025 of industrial production and output of products in demand.

The implementation of the planned measures will lead to covering the deficit for all types of products, increase labor mobility in the Southern Federal District and the North Caucasus Federal District and reduce negative processes in the labor

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market, as well as a stable balance of interests of workers, employers and regional and state authorities.

In our opinion, for the successful implementation of all the above measures within the framework of the created ASEZ, the interest of regional authorities in the development of light industry production, lower prices for components and energy costs, and, most importantly, convenient

transportation is most important. Thus, all this together will provide our TOP with a great future and stable positions both in the domestic and in the markets of near and far abroad. All that is needed is the coherence and interest of all participants in these regions, including the assistance of regional and municipal branches of government.

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SOI: [1.1/TAS](#) DOI: [10.15863/TAS](#)

### International Scientific Journal Theoretical & Applied Science

p-ISSN: 2308-4944 (print) e-ISSN: 2409-0085 (online)

Year: 2022 Issue: 12 Volume: 116

Published: 12.12.2022 <http://T-Science.org>

Issue

Article



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## THE ABILITY OF PANLOGISM TO CREATE PREREQUISITES FOR THE SUCCESSFUL DEVELOPMENT OF LIGHT INDUSTRY FOR THE PRODUCTION OF ITS DEMANDED PRODUCTS BY CONSUMERS OF RUSSIAN REGIONS

**Abstract:** *in the article, the authors motivate the manufacturer to recommend the market due to their motivation, managing quality, manufacturing priority products for the consumer, reconsider their concept of forming a market with demanded and competitive goods, taking into account their attractiveness. In addition, in the article, the authors formulated the role of the leader of the enterprise in ensuring the high-quality manufacture of comfortable, popular and competitive products, outlined the ways and types of his interaction with the enterprise team - one of the most important is to hear each other - and provoke the entire team in its interest to ensure the company receives stable TEP and guarantee its stable position.*

**Key words:** *quality, panlogism, preference, demand, competitiveness, market, profit, demand, buyer, manufacturer, financial stability, sustainable TEP, priority, assortment policy, paradigm, economic policy.*

**Language:** *English*

**Citation:** Barybina, P. D., Tikhonov, A. A., Prokhorov, V. T., & Volkova, G. Y. (2022). The ability of panlogism to create prerequisites for the successful development of light industry for the production of its demanded products by consumers of Russian regions. *ISJ Theoretical & Applied Science*, 12 (116), 447-469.

**Soi:** <http://s-o-i.org/1.1/TAS-12-116-33> **Doi:**  <https://dx.doi.org/10.15863/TAS.2022.12.116.33>

**Scopus ASCC:** 2000.

### Introduction

UDC 685.74:519.37

Rationality is the ability of a person, within the framework of systemic relations with the natural environment, to complete the animal (biological) form

of subordination to nature not only by the art of adaptation, but also of transformation.

Planning arose in the process of mastering by a person those advantages that rationality provided him. And here it is necessary to clearly dialectically oppose rationality and consciousness as specific

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characteristics of modern man. Intelligence is predominantly a biological attribute, consciousness is its specific historical development in the conditions of the social form of human life, a kind of way to realize the potential of intelligence. In this connection, the systemic use of the concepts of "consciousness" and "reasonableness" differs. "Reasonableness" is included in the composition of consciousness as a tool for building the latter. Intelligence singled out a person from the totality of biological species, consciousness allowed him to develop into a modern person and build his human, social structure of relations, thanks to the ability to foresee and plan, and by planning.

Planning is an attribute of activity, one of its qualitative features. It is twice qualitative: both as a qualitative sign of activity, and as a measure of measuring the level of perfection of activity. The art of planning shows the active side of homo sapiens. To a certain extent, this is a sign of the highest state of activity. Attempts to oppose planning and creativity are something else than a desire to limit the universality of planning, to simplify the nature of human intelligence. It is also wrong to oppose planning to freedom of competition. Both creativity and competition are ways of manifesting activity, therefore, all its attributes must be present in them. Another thing is that the general is realized through the special and therefore in its reality it is specific, concretized. S.V. Kovalevskaya ventured on an original solution to the problem of describing the rotation of a rigid body with a shifting center of gravity - aerobatics in mathematics, according to the Paris Academy of Sciences, accessible to her only by L. Euler and J. Lagrange, she planned her actions both objectively and in time, meeting the deadline. Even the ancestors of the current apologists for the fight against the planned economy, the pioneers of the development of the wealth of North American lands, the cowboys, who are considered to be free from everything, planned their actions within the limits of available knowledge.

At the beginning of the third millennium, the most urgent question is: how to optimize the organization and management of production development in the priority of consumer interests and environmental safety.

The underestimation of the strategic scope of planning reveals the flaws that are born from the understanding of rationality, and ultimately the defects of the rational ability of those behind the attacks on the universality of planning. In relation to planning, one can easily trace, firstly, the lack of panoramic thinking, and secondly, its ideological orientation towards the narrow format of utilitarianism as a perverted pragmatism.

The outstanding achievements of the classics of political economy should include exactly what scientists economists, who guard the interests of the

current heirs of the revolutionaries - the bourgeois of the eighteenth-nineteenth centuries, seek to carefully disguise:

- fundamental the position in the production of that labor that can be concretely measured in the product produced;
- development of the theory of value in connection with such work;
- freedom of the producer as a necessary condition for the development of production;
- the decisive factor in the development of production is labor productivity, and the improvement of labor productivity is due to the division of labor, which also facilitates the introduction of scientific and technological achievements into production;
- the goals of the economic movement are only partly within the development of production, the main goal is determined by the system the position of production itself in the life of man and society. Production is a tool for solving problems of social and personal development, therefore planning must be socially and culturally oriented.

Planning reveals the level of depth of knowledge of the economic process that requires management, and the degree of rationality of managerial actions. The latter needs a special explanation.

Intelligence, as a phenomenon, has a twofold interpretation. In the philosophy of the past and in the new century, "reasonableness" was understood and is understood as an independent phenomenon that realizes the identity of thinking and being, for example, in Hegel the expression of this was the absolute idea; or is considered as a unique ability of the subject - the highest level of the ideal ability to reflect reality. The characteristic of such a level is determined by the adequacy of reproduction by thinking of what is happening outside it.

Reasonableness is a guarantee of the possibility of obtaining an ideal copy of objective reality. The task of thinking, which has reasonableness, is to transform the possibility into a corresponding result. The process of cognition - reflection of reality by thinking is natural, therefore it can and should be planned. Here the main condition for obtaining a product is to match the actions to the nature of the object. There are many obstacles on the way to the truth, connected both with the peculiarity of the planned action and with the specifics of the thinking itself. Thinking is capable of knowing the truth, but it is also characterized by movement in a false direction, which may be a delusion, or may be deliberate in order to fit the result of the fulfillment of someone's interests, to be a consequence of moral dishonesty.

Human intelligence has its own special history, but it is absurd to understand it separately from biological evolution and the sociobiological continuation of natural history. Before human rationality appeared as the special intelligence of learned liberal economists, infected with the idea of

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reformism, it was itself a derivative product of labor activity, that is, the formation of economic reality.

The real history of the mind is built into the history of the development of what was eventually called the economy by a natural-historical process, therefore, socio-cultural progress, revealing the potential of human intelligence, must immanently belong to the economic movement. The concept of "superstructure" characterizes not some artificial constructive addition to the main structure, it helps to understand the architecture of a monolithic structure. No matter how you depict the first floor and do not call the second the first, you will not be able to get rid of their structural unity - the second will be considered above the first and the second will be, thanks to the first: there will be no first, there will be no second. But the first without the second is quite independently real.

Optimization in planning destroyed the system of organization of health care, education; forest fires became regular disasters, floods were added to them, significantly different from the usual and known for a long time. The authorities are trying to blame them on the "natural disorder" provoked by climate change, but few people already believe in such an explanation. The population migrates from the Far East, Eastern Siberia, Western Siberia is next, and some 50 years ago people actively went to these places to build, raise science and culture. BAM was built by the whole world, finances were limited, but they found money for social and cultural life, albeit on a modest scale.

Those who developed the plans understood from real experience the impossibility of implementing projects without something that serves the development of the individual, satisfies his cultural needs, and warms the soul. After all, people went to large construction sites from places inhabited and equipped. To the question: what's the matter? The answer is simple. At the described time of rise, with all the punctures and costs, the goal was universal - the well-being of the Fatherland. Of course, even at that time the benefits were not shared equally - there were both rich and poor, the main thing was that the goal seemed to be the same and the opportunity to make a career was equally put. They built and produced not for the pleasure of "golden paratroopers", they promoted the country and themselves along with it.

Capitalism, we repeat, by the 20th century completed its "classical" history and was forced to rebuild, refusing under compulsion what had once helped it quickly increase its advantages: the colonial system collapsed as a result of a long struggle for independence; wars with the aim of redistributing property became a dangerous business - they could return like a boomerang; had to accept the idea of peaceful coexistence; it was necessary to strengthen the social direction in economic policy; the question of the maximum load on the natural habitat arose sharply. There have already been different stages in

the history of capitalism: the primary accumulation of capital; revolutionary activity; monopolization of capital; concentration and dominance of finance capital.

Speculative thinking is a well-known phenomenon that arises in philosophical reflection or in the course of scientific discourse. Its epistemological nature is well studied - the systemic assessment of individual aspects of the subject of thinking and, as a result, the absolutization of the meaning of these aspects. Mental speculation falsely reflects objective reality, so it can be qualified as a cost in the production of the required knowledge. Very rarely has speculation been the product of artificially inducing the process of cognition in the wrong direction. The "scientific permissibility of speculation" (by liberal economists) has a completely different epistemological mechanism of education, indicating that there is nothing related to postulates, delimiting the scientific way of cognition from non-scientific ones, in their thinking. We must always clearly differentiate philosophical reflection, scientific thinking and non-scientific ways of knowing the world. The problematic nature of philosophical knowledge is logically compatible with the subjective costs of thinking. The falsifiability of philosophically identified problems is limited, since philosophical knowledge is conditionally standardized.

Scientific knowledge, on the other hand, must be subject either to strict verification or equally severe falsification. It does not reproduce in consciousness its attitude to the object (subject), it is, in content, a completely objectified process. Even the choice by the subject of thinking of a coordinate system, a reference point, etc. is regulated at all stages of cognition. When scientific knowledge is "enriched" by the "permissibility of speculations", then such an addition testifies to one thing - the desire to modernize the post-non-classical stage of the history of science with something that has nothing to do with the current time or with scientific history in general. Allowing speculation not as a cost, but as a scientific phenomenon in the knowledge of economic movement, innovator economists want to squeeze a subjective action in nature into the chain of objective reflection of the developing reality, sliding into solipsism in perspective. Scientific knowledge is objective, the characteristic of the scientific nature of knowledge begins with objectivity, if economic thinking strives to be scientific, it must filter knowledge on the basis of objectivity. "The admissibility of speculation" is tantamount to its legalization in scientific knowledge. This is nonsense for legal sciences, logic, ethics, aesthetics, cultural studies, a negative phenomenon for historical science, political science, and sociology. As a fact of objective reality, speculation undoubtedly exists, therefore, scientific - economic, political science, psychological, legal interest in it is justified, however, it is one thing

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Speculation is persistently tried to be presented as a necessary link in scientific thinking, and this is done in the interests of that minority that controls distribution, and does not produce a real product. Within the framework of artificially constructed relations in the superstructure of production, speculation has long been legally flourishing, but it is

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unnatural within the framework of the established system of production itself, where everyone, regardless of their position, is a participant and has the right to count on their legitimate share in the product produced. The order of distribution is determined mainly by property, and only then by the share of participation in the production of goods. The gap between the two realities - labor and property, formed in connection with the pattern of development of production and social superstructure, the direct creator of a real product and its real owner opens up a real opportunity to supplement the objectively natural reality, the conditionally existing, virtual or speculative reality. It is she who is considered as a way of movement to property.

Speculation is a roadmap to the capital that may be sufficient to start a real business. And in this version, speculation has a real meaning, it can be a conditional fact of scientific research. But under the dominance of financial, essentially speculative capital, speculation has become a steadily autonomous variety of activity, divorced from the production of a real product. Speculation in the market is an excessive form of intermediary activity. It has already become an obstacle to the development of production. And so it began to concentrate the costs of the social movement. By and large, speculation has matured, blossomed, and outgrown the limits of the right-protected reality.

The "specialist" displaces the individual from the goals of social development. Economists need a specialist, sharpened by the technology and organization of production, personal development for liberal economists seems to be transcendent for the purposes of production. Production requires for its development not a person, but a knowledgeable and able to work specialist. They build the functions of culture and education for the training of a specialist. You don't have to go far for arguments, there is no need to dive into the history of the United States, you just need to turn towards the modernization of domestic special education - secondary and higher, displacing from the programs everything that contributes to personality development in order to focus the process on training a specialist in the direction. The personal model of education has given way to a competent one.

Globalization of the economy is a policy that uses the objective trend of integration of national economies. This is clearly seen in the example of the WTO. The WTO, on the one hand, stimulates the planned form of managing economic movement, on the other hand, it strictly regulates the possibilities of planning the development of the economy on a national scale, subordinating national interests to global goals, the justification of which, from a scientific point of view, looks insufficient, politically biased. Meanwhile, having joined the WTO, the

country is forced to accept the conditions of this, to a large extent, political game.

National economic development projects are increasingly loaded and adjusted not in the national interest, which has to be put up with as the costs of globalization. At the same time, it should be borne in mind that there is no alternative to integration. Homo sapiens exists as a universal species. The earth is his common home, development is a common interest, synthesizing biological evolution and socio-cultural arrangement.

When planning, it is necessary to proceed from the dialectical requirement of a comprehensive objective analysis of reality, once and, the need to act together in the common interest, two. States have something to share, but you can't test history for strength, humanity has no other and never will. Dialectics has opened up to us the range of confrontation, both practical and theoretical. The struggle is reasonable only within the boundaries of unity, therefore, contradictions should be filtered through the need to obtain a common result that corresponds to the laws of motion of the human reality of being.

### Main part

Man began to realize his rationality and its advantages much later than homo sapiens became. The understanding of rationality, apparently, occurred under the influence of the development of economic activity, and specifically, in that historical period when the process of diversification of socially important labor began - productive labor significantly pressed gathering, those who tamed domestic animals stood out from among the hunters for products of purely natural origin animals and managed them, and farmers, who were the first to experience the design potential of intelligence.

It is extremely problematic even now to build the desired result in the conditions of the dominance of the natural order that prevailed long before your appearance, and in the initial period of the history of human activity it was almost a hopeless business. Nevertheless, it was then that what can be defined as proto-planning or arch-planning was born. The man turned on the reserves of his rationality.

In 2019, the growth of the world economy amounted to three percent, the EU economy added about 2 percent, and did not lag behind its Western neighbors and the Russian Federation. The indicators can be qualified as satisfactory, based on the conclusion of science that the basic indicator of social development in conditions of ecosystem tension caused by exploited technologies in industrial and agricultural production is the sustainability of growth, and not an absolute value.

A slowdown in the increase in production is perhaps undesirable within the framework of the present, existing being, but it is necessary as a



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temporary measure. It is more important for modern humanity to gain time, for nature to get hope that the global nature of the environmental problem can be dealt with without a global cataclysm. Both nature and humanity have reserves. Now it is important not to increase the pace of production development, but to have time in the "reserve time" to develop sparing technologies and rebuild production on them, especially materially and energy-consuming, with open cycles. The extent to which mankind turns out to be truly intelligent will depend on its fate. It looks like Homo sapiens is being tested for survival again, with the difference that this time he forced nature to test itself for viability. Climate change is already calling into question the advertised possibilities of technological progress to protect humans. Humanity as a whole does not yet feel this danger, but it already frightens the inhabitants of certain places, regions and continents; recently looked well.

Analysis of the situation is directly related to the Russian Federation. We also have to transition in a short time from the idea of the absoluteness of mass production and megalomania in the centers for the sale of goods to the relativity of subordinating the economy to the principle: "satisfy the needs of the buyer here and immediately." The manufacturer must know his buyer "in person", only then the production costs will acquire rational proportions and everyone will be satisfied: nature, producer, consumer. The functions of trade will also change, it will become an industry providing a direct connection between the consumer and the producer.

The market will be forced to invest in science in order to have a real picture of the state of the market, to know the trends of the current movement of interests, consumer purchasing power, to be ready to quickly provide goods routes from "porch to porch", to solve logistics problems on the ground in real time. The "consumer society" will gradually return to the "production society", and public consciousness will again be closely linked to consumption with participation in production. Fake labor will be reduced - a product of the virtual part of "production", fake workers will be legalized and will work for their own future.

Big science, through system analysis, is called upon to determine the optimal rates of economic growth on the scale of national, regional, continental and global progress, and not a phantom "world government" acting in narrowly accumulative interests.

At the beginning of the third millennium, the most urgent question is: how to optimize the organization and management of production development in the priority of consumer interests and environmental safety.

The underestimation of the strategic scope of planning reveals the flaws that are born from the understanding of rationality, and ultimately the

defects of the rational ability of those behind the attacks on the universality of planning. In relation to planning, one can easily trace:

firstly, the lack of panorama in thinking;

secondly, his ideological orientation towards the narrow format of utilitarianism as perverted pragmatism.

The ideological pluralism that replaced the communist ideology must be viewed critically. The right to work is not the same as guaranteed employment. With the right to work, you can remain unemployed and complaining has no legal meaning. Something similar is observed with ideological pluralism. The guaranteed right to adhere to the ideological concept that is closer to the values of your consciousness is blocked in the information society by ownership of the official and most significant sources of information in terms of resources. The Internet with its "toys" is portrayed as a competitive means of ideological monopoly, but in reality it is not. Ideological pluralism is fair to liken to a big river, for example, to the Don. A big river is not born, it is made to it as how small rivers and streams flow into it, traces of which are dissolved. Rostov is on the Don, by and large, not on the Don, but on the totality of water sources united in the Don. But all these sources will remain nameless in Rostov. To the question: what kind of river? The answer will be short: Don, and he will be on the map. In pluralism, as a rule, one thing dominates, reflecting the alignment of forces provided by economic interests and financial resources. Now the media, programs of general and vocational education, pop cultural practices induce the formation of a worldview in the direction of liberal values. At the same time, few people say that modern liberalism is not at all the democratic one, under the banner of which the Europeans stormed the strongholds of absolutism,

The founders of political economy as a science - A. Smith, D. Ricardo, D. Hume, J. Sismondi relied on the systemic importance of labor in any production system, they were the first to realize the increasing importance of the qualification component of labor in connection with the scientific and technical equipment of the industrial form of labor organization, in which the reasonableness of human status is manifested. Capital, in order to reveal its potential, had to grow with freedom of advancement, and the freedom of movement of capital had a prospect only in the conditions of freedom of the subject of labor, his social independence, formalized in legislation and guaranteed by a new type of state. They were socially oriented liberals, the concept of "people" for them had a specific - historical meaning of the totality of people whose lives were determined by the development of production. From science

The revolutionary bourgeoisie emphasized the value of fairness in distribution - remuneration in any form should be tied to the quantity and quality of

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labor, the place in the management hierarchy of production. It is no coincidence that A. Smith drew attention to the fact that the correlation between the growth of labor productivity and remuneration is violated everywhere. In the spirit of the time, the Scottish scholar explained this by the moral fall of the owners. J. Sismondi in the well-known work "New Principles of Political Economy" (1819) argued in favor of the regulation of economic competition and the balance between supply and demand, initiated social reforms as the laws of production development. Later, the classic of the 20th century, J. M. Keynes, was guided by his ideas.

The outstanding achievements of the classics of political economy should include exactly what scientists economists, who guard the interests of the current heirs of the revolutionaries - the bourgeois of the eighteenth-nineteenth centuries, seek to carefully disguise:

- the fundamental position in the production of that labor that can be concretely measured in the product produced;
- developing a theory of value in relation to such labor;
- freedom of the producer as a necessary condition for the development of production;
- the decisive factor in the development of production is labor productivity, and the improvement of labor productivity is due to the division of labor, which also facilitates the introduction of scientific and technological achievements into production;
- the goals of the economic movement are only partly within the development of production, the main goal is determined by the systemic position of production itself in the life of man and society. Production is a tool for solving problems of social and personal development, therefore, planning must be socially and culturally oriented.

It is curious that all the leading economists - theorists of the 18th - early 19th centuries were noted in the history of thought as philosophers. So far, no one has tried to explain this fact, apparently believing it to be insignificant. In vain. The combination of philosophy and economics in research turned out to be a tradition of the subsequent time - Proudhon, Dühring, Marx, Engels, Mill, Spencer, the list goes on. The essence of the explanation of this union is in the specifics of the epistemological and methodological purpose of philosophy and science. Philosophy focuses more on the discovery and definition of development problems, science - on ways to solve them. Hence the normativity of scientific knowledge. A. Smith and his contemporaries saw, first of all, the problems of the economic movement, that is, they showed their philosophical talents, then they took up their scientific understanding.

The need for planning in the economy was initially discussed exclusively in the context of its optimization, because planning was envisaged by the

rational nature of the organization of production. Planning was a phenomenal expression of management, and management was an attribute of production. In the titles of numerous studies by D. Ricardo, which served as material for his heirs - worthy and dubious, there is no word "planning", but the content of the works is built as a superstructure on the process of planning the corresponding actions of the economic order. The British economist D. Ricardo was especially interested in pre-planning - a set of calculated operations of thinking that preceded planning at the stage of determining substantive actions - choosing the direction and nature of participation, and when evaluating results.

Neither S. Smith, nor D. Ricardo, nor Sismondi opposed freedom of economic choice to planning, and planning was not considered as an action incompatible with economic freedom. They interpreted freedom within the framework of the political condition of life, that is, in the spirit of the ideological positions of the class, solving the historical task of changing the socio-political, economic and cultural system of social relations. It should be noted that a certain advancement was also characteristic of the methodological foundations of scientific research. They contained some limitations, but it is not difficult to see that these defects were actively overcome when it came to scientific calculations.

Unlike most of their descendants - the current academic economists, the classics of economic science sought to involve in economic analysis not so much mathematical methods and the narrow content of the concept as fundamental categories of economic science. Their talent built a theoretical basis for a science-specific analysis. In essence, the progress of scientific economic knowledge in the 20th century was a superstructure on this basis, and what turned out from above is more like the Leaning Tower of Pisa.

The intense discourse on the content of basic political economy concepts in the 19th century is not difficult to explain; the birth of something new in theory requires methodological advances. In order to understand what the mechanism of clock pendulums should be, Huygens had to independently supplement mathematical analysis in six directions. A. Smith, being a pioneer in economic theory, solved methodological problems and was unable to share the purchased labor with the spent labor. Error A, Smith was corrected by D. Ricardo, explaining that his predecessor did not notice that the cost of goods should also take into account the costs of production and operation of equipment. At the same time, D. Ricardo himself did not consider the cost of producing raw materials. Both Sismondi, and A. Smith, and D. Ricardo evaluated the value mainly by the ratio of things. The historically determined relations of people remained for them, as it were, on the sidelines. Hence the inconsistency in understanding the political essence of production relations, their class nature. For

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them, production was the stage on which the scenario of production unfolded as a relationship of partners. Some had capital, others knew how to make things. Everyone is part of the common cause. In such a combination, the political essence of the economy is reduced to the foundations of organization, development planning and distribution, that is, it is simplified to the level of special knowledge, moral responsibility and decency of participants. others knew how to do things. Everyone is part of the common cause. In such a combination, the political essence of the economy is reduced to the foundations of organization, development planning and distribution, that is, it is simplified to the level of special knowledge, moral responsibility and decency of participants. others knew how to do things. Everyone is part of the common cause. In such a combination, the political essence of the economy is reduced to the foundations of organization, development planning and distribution, that is, it is simplified to the level of special knowledge, moral responsibility and decency of participants.

What does the above have to do with the theory and practice of modern planning? Direct. The previous analysis serves as a basis for asserting that the effectiveness of the practical part of planning is directly dependent on the quality of theoretical understanding, which reflects the natural nature of the emergence and development of production. The quality of planning theory is determined by the methodology of its political and economic equipment. Planning reveals the level of depth of knowledge of the economic process that requires management, and the degree of rationality of managerial actions. The latter needs a special explanation. Intelligence, as a phenomenon, has a twofold interpretation. In the philosophy of the past tense and in the new century, "reasonableness" was understood and is understood as an independent phenomenon that realizes the identity of thinking and being, for example, in Hegel the expression of this was the absolute idea; or is considered as a unique ability of the subject - the highest level of the ideal ability to reflect reality. The characteristic of such a level is determined by the adequacy of reproduction by thinking of what is happening outside it.

Reasonableness is a guarantee of the possibility of obtaining an ideal copy of objective reality. The task of thinking, which has reasonableness, is to transform the possibility into a corresponding result. The process of cognition - reflection of reality by thinking is natural, therefore it can and should be planned. Here the main condition for obtaining a product is to match the actions to the nature of the object. There are many obstacles on the way to the truth, connected both with the peculiarity of the planned action and with the specifics of the thinking itself. Thinking is capable of knowing the truth, but it is also characterized by movement in a false direction,

which may be a delusion, or may be deliberate in order to fit the result of the fulfillment of someone's interests, to be a consequence of moral dishonesty.

Most of the vices in the search for correct solutions to economic problems have fundamental grounds, they are associated with a one-sided understanding of the functions of economic research, in particular, the sequestration of the political essence of economic science. Planning as a tool is considered on a utilitarian scale, which makes it possible to simplify the process, leaving out everything that is not directly related to production. The essence of the economic transformations in Russia in the 1990s and their continuation in the "zero years" of the 21st century was to remove responsibility for social development from the economy, which meant opposing the economy to social policy. Politics is the business of the state and its institutions, and the new owners should only deal with production. In addition to what was traditionally considered non-economic, added no less than what was also traditionally attributed to the economy. The new owners took all the addition out of the "staff", considering all this to support production, in other words, its infrastructure. Therefore, an oligarchic semblance of capitalism has grown in our country: taking possession of the most economically profitable property with the help of the state, outright robbery through raider seizures, inducing political activity with the help of its people in the state in the direction of objectification and legitimization of the "new economic policy".

Corruption is not abuse of office in one's own interests and not securing profitable economic projects for bribes. Corruption is the fusion of business and government. Such a rich country as the Russian Federation could not become poor in ten years due to irrational economic policy, miscalculations of the planning organization. Poverty did not come for economic reasons, it was the result of the usurpation of power by political clans that expressed the economic interests of those who illegally became the master of national wealth. According to clearly underestimated statistics, at least 71 percent of the resources are currently controlled by one million owners, and 140 million cannot even count on the remaining 29 percent, because the economic "reforms" that began in the 1990s continue.

Economic violence was carried out under political and ideological cover. The democratic reformers have carried out a giant scam, masking their actions with the need to decisively fight against the centralized planning model. Realizing that their own practice and theory were doomed to failure, the initiators of the collapse of the socialist image of the economic system were in a hurry to have time to use the created people of a great country and scatter around the world in the hope of finding shelter from its enemies.

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The "scholarship" of the reformers was so high that it did not prompt them the most elementary - the idea of socialism had long ago become a political program, including government parties, from a ghost in different parts of the world. Socialism attracts by the fact that it expresses in a concentrated way the logic of social progress and the meaning of the systemic position of production. The concreteness of socialism reflects the specificity of historical time and national history. In the socialist orientation and organization of production, the systemic principle of social life is crystallized - the dialectic of the individual and society.

Society is a form of the reality of human existence, but the very reality of human existence exists and develops only thanks to the three hypostases of the individual. Social history begins with the personality, it is its main subject of advancement, and in it is the goal of social progress. Production is called upon to be the economic basis of social practice, aimed at creating socio-cultural conditions for the comprehensiveness and harmony of the human personality.

The economic policy that determines the image and purpose of planning may be different, but all this political and economic diversity ultimately decomposes into two series of actions. The first row is formed by those programs that express private interests and are focused on the social benefits of representatives of these groups. Typical cases of such economic plans are the political programs of Trump in the United States and Macron in France. These programs are real, but not historical. They concentratedly reflect one side of production - stimulating its growth, but the other side is not defined - the final goal of the systemic status of production. The systemic place of production in social progress is camouflaged. We repeat: production is a way of personal development.

Expressed in terms of the genius of Hegel, economic planning is divided into "real" and "reasonable", aimed at creating conditions for personal satisfaction with their development, and "situational", that is, beneficial to those social groups that create this situation in their private, and not historical interests. Such a reality is possible, but it lacks "reasonableness" that reveals the logic of social progress. Here you can get temporary and private satisfaction, for which all other generations will have to pay handsomely.

Actual history will certainly carve out its proper path of movement through this kind of economic "obstructions". But the "tax" of historical logic on the illogicality of human economic activity is very high. When they say: "measure seven times, only then cut off," then, in comparison with the "tax" on the unreasonableness of economic policy, this ratio seems modest. There are calculations showing that for every year of the "bazaar" - criminal-arbitrary planning

practice - a country can pay with an eighteen-year restoration. The "loafers" of the 1990s did not defeat the planned economic development on a national scale. They turned out to be more active than the "masters" of the 1980s, confirming the old truth: history requires an active attitude towards itself. Naturally, that the difficult history of the Russian Empire and the USSR did not deserve the continuation described above. It was necessary to activate the economic status of Russia in a different way. Russia will have to spend a lot of effort and money to restore its international prestige. Politicians love to write about how bad Americans and NATO members deceived the first Presidents of the USSR and the Russian Federation. Analytical materials showing how Gorbachev and his company and Yeltsin and like-minded people deceived those in the world who looked with hope at the fate of socialism in the USSR and, not without reason, counted on an alliance with the new Russia, are much less common. how bad Americans and NATO deceived the first Presidents of the USSR and the Russian Federation. Analytical materials showing how Gorbachev and his company and Yeltsin and like-minded people deceived those in the world who looked with hope at the fate of socialism in the USSR and, not without reason, counted on an alliance with the new Russia, are much less common.

It would be interesting to go step by step mentally along the route of the "road map" of the reformers of the 1990s, if only to reason with their heirs, the current political liberals, who are not relenting after two decades. Follow how they were looking for a replacement for the previous practice of economic planning, completely ignoring not only national identity, which could somehow be explained, but also the specificity of the historical process. In search of a possible model, domestic engineers-economists went through states from all continents. And, nevertheless, it is still not clear what should happen after the "transition period" ends. What kind of economic order will we have to prepare for. The arrow is capable of taking us both to capitalism, however, here we are a century and a half late, and to socialism, which we seem to have renounced.

Despite the differences in particulars, economic reformers remain within the limits of a common goal - to clear the planning of economic construction from social aspects. If on the banners of the revolutionary bourgeoisie was written *liberte*, which gave the name to the liberals and demanded that the state grant civil liberties in full, then the liberals of the new generation

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want to gain freedom by eliminating the state from active complicity in the development of production through planning and control. They are trying to decentralize economic management, remove social responsibility from economic activity, forcing only the state to be socially responsible, while in every possible way preventing those actions of the state that lead to an increase in the social burden on economic profit. Essentially, liberal reformers are striving for a special freedom and privilege of their status within the state. Any objectively reflective analyst will see a clear historical illogicality: the founding liberals, who laid the foundation of the liberal ideology, clearly identified the main value of liberalism - equal freedom for all, as a necessary condition for social responsibility, and their successors in the 21st century are burning with the desire to be free enough not to bear responsibility for social progress. By and large, this is nothing more than a 180-degree turn to the model of social inequality. Social equality is built not only by the state as political subjects, but also by all other subjects of society. They are even more than the state, obliged by their social status to be responsible for the exercise of constitutional freedoms. It is easy to forgive redundancy in the liberal interpretation of the foundations of social relations for A. Smith, who is convinced of the system-forming status of morality, but after it became clear that morality has a historical form and is formed under the active influence of the economic basis, it is not a unitary entity - several varieties of morality, it is immoral to separate the economy from direct participation in socio-cultural improvement, positioning its progress as a self-promotion, to plan its cleansing from the socio-cultural burden. The idea of "infrastructure" is possible and expedient acquisition of science, but not in the case of economic movement. It is easy to forgive redundancy in the liberal interpretation of the foundations of social relations for A. Smith, who is convinced of the system-forming status of morality, but after it became clear that morality has a historical form and is formed under the active influence of the economic basis, it is not a unitary entity - several varieties of morality, it is immoral to separate the economy from direct participation in socio-cultural improvement, positioning its progress as a self-promotion, to plan its cleansing from the socio-cultural burden. The idea of "infrastructure" is possible and expedient acquisition of science, but not in the case of economic movement. It is easy to forgive redundancy in the liberal interpretation of the foundations of social relations for A. Smith, who is convinced of the system-forming status of morality, but after it became clear that morality has a historical form and is formed under the active influence of the economic basis, it is not a unitary entity - several varieties of morality, it is immoral to separate the economy from direct participation in socio-cultural improvement, positioning its progress as a self-

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Human intelligence has its own special history, but it is absurd to understand it separately from biological evolution and the sociobiological continuation of natural history. Before human rationality appeared as the special intelligence of learned liberal economists, infected with the idea of reformism, it was itself a derivative product of labor activity, that is, the formation of economic reality.

The real history of the mind is built into the history of the development of what was eventually called the economy by a natural-historical process, therefore, socio-cultural progress, revealing the potential of human intelligence, must immanently belong to the economic movement. The concept of "superstructure" characterizes not some artificial constructive addition to the main structure, it helps to understand the architecture of a monolithic structure. No matter how you depict the first floor and do not call the second the first, you will not be able to get rid of their structural unity - the second will be considered above the first and the second will be, thanks to the first: there will be no first, there will be no second. But the first without the second is quite independently real. Labor history has a natural beginning in the life of animals. It was in the animal world that nature "worked out" the model of human reality and "understood" that without achieving a sociocultural effect in such practice - psychological progress;

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Trying to be smarter than everyone else, liberal economists turned out to be both above science and above the achievements of philosophical understanding of the reality of human existence. In the interests of business, they decided to reconstruct the logical construction of the system of social life that has developed historically. Simplify the basic part of the social structure - to separate economic activity from socio-cultural, regardless of either the objectivity of relations or the pattern of development. To this end, the reformers came up with a new scheme - to close the socio-cultural sphere to the state.

The state does indeed have such a function, but it is not the only responsible social entity. Rationality and sociality are immanent signs of everything that constitutes social life. An attempt to get rid of "super economic" burdens, referring to the need to rationalize and optimize the structure of relations - to change the immediacy of relations to mediation; economic policy - we are taxes to the state, it fulfills the socio-cultural responsibility for us - a typically selfish move.

The goal here is obvious, and, unfortunately, it is not to make production more perfect, but to pay less for the right to produce, leaving yourself a larger margin. One example to illustrate: the first libraries, cultural institutions, in many places the schools of Siberia appeared only with the construction of the

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<b>GIF (Australia)</b>	<b>= 0.564</b>	<b>ESJI (KZ)</b>	<b>= 8.771</b>	<b>IBI (India)</b>	<b>= 4.260</b>
<b>JIF</b>	<b>= 1.500</b>	<b>SJIF (Morocco)</b>	<b>= 7.184</b>	<b>OAJI (USA)</b>	<b>= 0.350</b>

railway and with the help of the railway. Railway builders and railway managers considered such activities not an infrastructure burden, on the contrary, for them it was the messiah of a new mode of transport. Compare what Russia gained from the reform of railway management in the 1990s-2000s: in the 1990s alone, the length of railways in the Russian Federation decreased from 87,200 km to 86,000. roads, sections connecting settlements, formed on the sites of large developments of forest, peat, with the main course; stopped the maintenance of the socio-cultural arrangement of residents, including railway workers.

Thousands of settlements, millions of people have lost a stable way out of their places to regional and regional socio-cultural benefits. Planning unfolded exclusively in the direction of the transition to full cost accounting, which meant one thing - "optimization of the economy" by reducing costs, first of all, "non-production", which included the socio-cultural complex. In words - in speeches and publications - the leaders called for the mobilization of reserves to create sufficient conditions for the development of "human capital", as the main resource for the progress of production, in reality it turned out to be completely different. The bureaucracy did not deprive itself of the advantages of socio-cultural support. Full cost accounting in the Russian Federation during the period of complete transition to a new economy was presented in a planned context with the utmost simplicity: not so much to increase labor productivity through the scientific and technical equipment of production and the creation of socio-cultural conditions for the growth of human capital, but to "optimize" costs. Before the reforms of the 1990s, there was a long queue "for the driver", the reform reduced it and led to a shortage. There are many places, especially in Siberia, Transbaikalia and the Far East, where the railway service would be completely depopulated if people had other work. Railways are our main national mode of transport. Russia, the USSR grew with railways, built them actively, equipped them socio-culturally, thinking about people. A socially and culturally equipped people is the No. 1 value in the state, even Catherine the Great complained: I would be glad to build an enlightened society, but we do not yet have an enlightened people. Railroad construction was planned from the 1840s; Nicholas I personally presented himself as a domestic Hamlet - he solved the problem: "to be or not to be" for railways. The court dissuaded the emperor, convincing him that revolutionary evil spirits would roll along the railways from Europe and, in general, our climate makes railway construction unprofitable. Scientists and entrepreneurs, cultural figures actively advocated for the country's railway future. The destinies of economics and culture were combined in economic policy back then, revealing the dialectic of

interdependence in planning economic and socio-cultural interests. cultural figures actively advocated for the railway future of the country. The destinies of economics and culture were combined in economic policy back then, revealing the dialectic of interdependence in planning economic and socio-cultural interests. cultural figures actively advocated for the railway future of the country. The destinies of economics and culture were combined in economic policy back then, revealing the dialectic of interdependence in planning economic and socio-cultural interests.

The reforms in Russia in the 1990s were economic in motivation and purpose, but in essence they were political reforms. It was possible to redistribute state property among enterprising businessmen within 10 years only, relying on the full support and patronage of the state.

The result of the reforms turned out to be proportional to the new approaches to planning and management: the economy cannot recover in thirty years. The exception is the extractive industries, which have increased production, developing mainly deposits that have already been discovered earlier. In agriculture, they began to produce more grain, grain is an exported product. Construction was launched, but none of the chronic problems of the population has been resolved. The picture is consistent with the above analysis. Only export-oriented production is moving systematically. It is either owned by the oligarchs or under their real control. They are ready to provide the whole world with gas, but their population can not wait, especially away from the main pumping. The prices of gas and gasoline hurt those whom advertising ranks as the owners of energy resources. Statement: "Gazprom is a national treasure" irritates more and more Russians. Optimization in planning destroyed the system of organization of health care, education; forest fires became regular disasters, floods were added to them, significantly different from the usual and known for a long time. The authorities are trying to blame them on the "natural disorder" provoked by climate change, but few people already believe in such an explanation. The population migrates from the Far East, Eastern Siberia, Western Siberia is next, and some 50 years ago people actively went to these places to build, raise science and culture. BAM was built by the whole world, finances were limited, but they found money for social welfare, albeit on a modest scale. education; forest fires became regular disasters, floods were added to them, significantly different from the usual and known for a long time. The authorities are trying to blame them on the "natural disorder" provoked by climate change, but few people already believe in such an explanation. The population migrates from the Far East, Eastern Siberia, Western Siberia is next, and some 50 years ago people actively went to these places to build, raise science and culture. BAM was built by the whole

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Those who developed the plans understood from real experience the impossibility of implementing projects without something that serves the development of the individual, satisfies his cultural needs, and warms the soul. After all, people went to large construction sites from places inhabited and equipped. To the question: what's the matter? The answer is simple. At the described time of rise, with all the punctures and costs, the goal was universal - the well-being of the Fatherland. Of course, even at that time the benefits were not shared equally - there were both rich and poor, the main thing - the goal seemed to be the same and the opportunity to make a career was equally placed. They built and produced not for the pleasure of "golden paratroopers", they promoted the country and themselves along with it.

The liberal ideology of planning, which clearly dominates modern economic policy, reflects the objective state of a society that finds itself in a difficult situation of development, when the previous understanding of the political and socio-economic perspective, either could not overcome the emerging crisis, or, having realized its creative potential, required a change. In both cases, it was not without the participation of opposition forces claiming the right to resolve social contradictions.

The growth of globalization also affected the implementation of political and economic changes in domestic reality. Their foreign comrades-in-arms helped our "messianaries" to direct public consciousness onto the path of liberal ideology, but the essence of what happened in the 1990s was not conditioned from outside. A foreign policy conspiracy undoubtedly took place. It is evidenced by the collapse

in energy prices of obviously artificial origin, and numerous promises of assistance that turned out to be false, and a demonstration of sympathy for changes and a willingness to share the accumulated ideological experience. In the late 1980s and the beginning of the new decade, the world was still two polar. In general, we never considered our competitors to be enemies. For us, they were adversaries. And suddenly the enemy appeared as a friend, ready to help in every possible way.

A metamorphosis in relation should have made one think: why such grace? The answer lay on the surface. New relations were offered for a change in the political and economic course, the beginning of which was supposed to be a radical methodological break. Gorbachev's "new political thinking" found objectification in "perestroika", which blurred the contours of the social guidelines for development. We went out of our way, instead of once again repairing it, as it was in much more difficult conditions. Suffice it to recall the NEP: socialist industrialization; higher education reforms that made it one of the best in the world; creation of optimal conditions for the development of science, mobilization of scientific and technical resources, which made it possible to prevent the third world war; the initiative to use atomic energy for peaceful purposes; space exploration program and much more. It was necessary not to "patch holes" in what had outlived its time, but on the previous methodological and socially oriented platform, to develop new options for socialist construction.

Capitalism, we repeat, by the 20th century completed its "classical" history and was forced to rebuild, refusing under compulsion what had once helped it quickly increase its advantages: the colonial system collapsed as a result of a long struggle for independence; wars with the aim of redistributing property became a dangerous business - they could return like a boomerang; had to accept the idea of peaceful coexistence; it was necessary to strengthen the social direction in economic policy; the question of the maximum load on the natural habitat arose sharply. There have already been different stages in the history of capitalism: the primary accumulation of capital; revolutionary activity; monopolization of capital; concentration and dominance of finance capital. Biogenetic law operates in nature, according to which representatives of a more perfect species in the process of their uterine development in an accelerated mode repeat the main stages of biological evolution. Thus, nature links the course of evolution, ensuring continuity and strengthening the strength of evolution. Something similar can be conditionally singled out in social history. At the turn of the 20th and 21st centuries, trying to become a capitalist is quite realistic, but it is very doubtful to become capitalism, to fit into the system of capitalism that has been formed for centuries as a socio-economic entity. The composition was formed, and the locomotives,



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The capitalist perspective of the Russian Federation was enjoyed exclusively by domestic liberals, who were blinded and stupefied by hatred for communist ideals. To them, even twenty years later, it seems that capitalism, and not communism, is the bright future of mankind. The metaphysical nature of liberal thinking is manifested in the desire to strengthen the positions of linearity of thinking in ideology, stop historical development at the level of the bourgeois organization of social relations, wrest the capitalist turn from the spiral of social progress and declare that at this stage the nature of the development of society has changed radically - the historical spiral straightened and became forever

rectilinear movement. One could agree and accept their understanding as an option, if liberal reflection had an internal systemic form.

The liberal approach to the planning of economic activity, tearing the solution of economic problems out of the systemic nature of social relations, opposing the economy to socio-cultural improvement, leaves no grounds for compromise with the adherents of the liberal course.

A critical analysis of the liberal planning methodology provides sufficient material for a number of fundamental conclusions.

First of all, it should be noted the desire of liberals of the 21st century to methodologically simplify knowledge and social construction, including planning, and economic development. Actively involving the mathematical apparatus in economic science, turning to IT technologies everywhere, academic economists do not activate their own methodological resources of economic science. In comparison with what A. Smith, D. Ricardo, K. Marx, J. Mil, G. Spencer introduced into the methodology of economic knowledge and transformation, the methodological acquisitions of the 20th century look more like a deep depression of philosophical and scientific reflection. A small part of modern researchers continues to look for ways to advance in the direction of the dialectical and systematic approaches, being aware of the limited possibilities of the mathematical apparatus. Mathematics for economic research is an auxiliary part of the methodological equipment of the search for a solution to the problems of development identified by research experience. It is not even able to formulate the problem, its capabilities help to quantify the state of the movement of economic processes. Mathematical modeling is effective in terms of developing possible prospects for spontaneous and constructed processes, but it has never been "political mathematics", unlike political economy.

We must heed the warning of K. Jaskers about the fundamental difference between the desire for simplicity of scientific thinking and simplification as a search for a way out of a complex scientific situation, sequestering its content. Simplicity is the path to true understanding, and simplification is a movement away from it under the guise of scientific similarity. A direct confirmation of this conclusion is the recognition in economic studies and projects of the "admissibility of speculation." Speculative thinking is a well-known phenomenon that arises in philosophical reflection or in the course of scientific discourse. Its epistemological nature is well studied - the systemic assessment of individual aspects of the subject of thinking and, as a result, the absolutization of the meaning of these aspects. Mental speculation falsely reflects objective reality, so it can be qualified as a cost in the production of the required knowledge. Very rarely has speculation been the product of artificially

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inducing the process of cognition in the wrong direction. The “scientific admissibility of speculation” (by liberal economists) has a completely different epistemological mechanism of education, indicating that there is nothing related to postulates, delimiting the scientific way of cognition from non-scientific ones, in their thinking. We must always clearly differentiate philosophical reflection, scientific thinking and non-scientific ways of knowing the world. The problematic nature of philosophical knowledge is logically compatible with the subjective costs of thinking. The falsifiability of philosophically identified problems is limited, since philosophical knowledge is conventionally standardized. The “scientific admissibility of speculation” (by liberal economists) has a completely different epistemological mechanism of education, indicating that there is nothing related to postulates, delimiting the scientific way of cognition from non-scientific ones, in their thinking. We must always clearly differentiate philosophical reflection, scientific thinking and non-scientific ways of knowing the world. The problematic nature of philosophical knowledge is logically compatible with the subjective costs of thinking. The falsifiability of philosophically identified problems is limited, since philosophical knowledge is conventionally standardized. The “scientific admissibility of speculation” (by liberal economists) has a completely different epistemological mechanism of education, indicating that there is nothing related to postulates, delimiting the scientific way of cognition from non-scientific ones, in their thinking. We must always clearly differentiate philosophical reflection, scientific thinking and non-scientific ways of knowing the world. The problematic nature of philosophical knowledge is logically compatible with the subjective costs of thinking. The falsifiability of philosophically identified problems is limited, since philosophical knowledge is conventionally standardized. scientific thinking and non-scientific ways of knowing the world. The problematic nature of philosophical knowledge is logically compatible with the subjective costs of thinking. The falsifiability of philosophically identified problems is limited, since philosophical knowledge is conventionally standardized.

Scientific knowledge, on the other hand, must be subject either to strict verification or equally severe falsification. It does not reproduce in consciousness its attitude to the object (subject), it is, in content, a completely objectified process. Even the choice by the subject of thinking of a coordinate system, a reference point, etc. is regulated at all stages of cognition. When

scientific knowledge is “enriched” by the “permissibility of speculations”, then such an addition testifies to one thing - the desire to modernize the post-non-classical stage of the history of science with something that has nothing to do with the current time or with scientific history in general. Allowing speculation not as a cost, but as a scientific phenomenon in the knowledge of economic movement, innovator economists want to squeeze a subjective action in nature into the chain of objective reflection of the developing reality, sliding into solipsism in perspective. Scientific knowledge is objective, the characteristic of the scientific nature of knowledge begins with objectivity, if economic thinking strives to be scientific, it must filter knowledge on the basis of objectivity. “The admissibility of speculation” is tantamount to its legalization in scientific knowledge. This is nonsense for legal sciences, logic, ethics, aesthetics, cultural studies, a negative phenomenon for historical science, political science, and sociology. As a fact of objective reality, speculation undoubtedly exists, therefore, scientific - economic, political science, psychological, legal interest in it is justified, however, it is one thing for science to pay attention to a fact, and quite another - the desire to substantiate the regularity of speculation's system belonging to economic science as a necessary condition its development. Scientific knowledge is objective, the characteristic of the scientific nature of knowledge begins with objectivity, if economic thinking strives to be scientific, it must filter knowledge on the basis of objectivity. “The admissibility of speculation” is tantamount to its legalization in scientific knowledge. This is nonsense for legal sciences, logic, ethics, aesthetics, cultural studies, a negative phenomenon for historical science, political science, and sociology. As a fact of objective reality, speculation undoubtedly exists, therefore, scientific - economic, political science, psychological, legal interest in it is justified, however, it is one thing for science to pay attention to a fact, and quite another - the desire to substantiate the regularity of speculation's system belonging to economic science as a necessary condition its development. Scientific knowledge is objective, the characteristic of the scientific nature of knowledge begins with objectivity, if economic thinking strives to be scientific, it must filter knowledge on the basis of objectivity. “The admissibility of speculation” is tantamount to its legalization in scientific knowledge. This is nonsense for legal sciences, logic, ethics, aesthetics, cultural studies, a negative phenomenon for historical science, political science, and sociology. As a fact of objective reality, speculation undoubtedly exists, therefore, scientific - economic, political science, psychological, legal interest in it is justified, however, it is one thing for science to pay attention to a fact, and quite another - the desire to substantiate the regularity of speculation's system belonging to economic science as

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"Speculation", by definition (omitting its philosophical interpretation as "contemplation, speculation",) is "calculation, intent, based on something, using something for selfish interests." Therefore, law enforcement agencies should deal with speculation, it would be nice for them to pay attention to speculative manipulations, those who are looking for justification for speculative actions in economic and political sciences. Political liberals, for example, make little secret of their desire for terrorists to bring into action those who are called the political opposition, then terrorism would be easily put an end to. So the United States and its partners have officially recognized the Taliban as an opposition political movement, that is, legalized, next in line are Al-Qaeda and ISIS, organizations banned in the Russian Federation. Speculators in economic science are no less dangerous in the context of social progress than advocates of terrorists. It's just that the effects of their negative impact on economic and socio-cultural development are not so psychologically resonant, besides, they have grown into the existing corruption scheme and look to many.

The promotion of economics, as follows from the above, is not accidental. It is primitive, manipulative, controlled, it is not held by the "anchors" of the requirements for objectivity and essential reflection of reality by scientific knowledge. Scientific knowledge opens up facts in order to understand the pattern of their existence, while economics describes the structure of facts in a scientific way.

The second main conclusion is no less obvious: on the platform of methodological simplification of scientific analysis, curtailment of the systemic approach and rejection of the dialectical way of thinking in favor of methodological anarchism and borrowing, liberal economic theory systematically lowers the epistemological and sociological status of the concept of "planning". The task here is as follows: it is necessary to simplify the concept to such a content that its scope of use opens up the possibility of a

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purely digital solution of all problems according to the program for optimizing the economic component. Planning must be a technically carried out action, free from social policy. The main obstacle on the way is the growing demand of social progress for the effectiveness of economic construction.

Liberals hide the growing contradiction of economics to everyone else. The day is not far off when mathematics will present its accounts to the liberal economists. Economists, mercilessly exploiting mathematics, do not give the expected results either in the development of production management or in mathematics itself, but in fact they devalue the value of mathematical analysis with their extremely low productivity. Another "lifeline" for economics was promised by political strategists who spoke in favor of the "digital economy", replacing the concept of "economy" with the concept of "production". Manufacturing will go digital. The economy has emerged, formed, and will continue to develop as a basic social instrument of social progress, which, in turn, has been and will remain the main factor in the development of people. The economy must have a human face. All other characteristics of her are derived from her humanitarian vector. That's just in the liberal - economic dimension, economic planning is consistently moving away from the satisfaction of personal development needs. It would not be so, it would not make sense to "teach speculation." Speculation is persistently tried to be presented as a necessary link in scientific thinking, and this is done in the interests of that minority that controls distribution, and does not produce a real product. Within the framework of artificially constructed relations in the superstructure of production, speculation has long been legally flourishing, but it is unnatural within the framework of the established system of production itself, where everyone, regardless of their position, is a participant and has the right to count on their legitimate share in the product produced. The order of distribution is determined mainly by property, and only then by the share of participation in the production of goods. The gap between the two realities - labor and property, the direct creator of the real product and its real owner, formed in connection with the regularity of the development of production and the social superstructure, opens up a real opportunity to supplement the objectively regular reality, the conditionally existing, virtual or speculative reality. It is she who is considered as a way of movement to property. the direct creator of a real product and its real owner opens up a real opportunity to supplement the objectively natural reality, the conditionally existing, virtual or speculative reality. It is she who is considered as a way of movement to property. the direct creator of a real product and its real owner opens up a real opportunity to supplement the objectively natural reality, the conditionally existing,

virtual or speculative reality. It is she who is considered as a way of movement to property.

Speculation is a roadmap to the capital that may be sufficient to start a real business. And in this version, speculation has a real meaning, it can be a conditional fact of scientific research. But under the dominance of financial, essentially speculative capital, speculation has become a steadily autonomous variety of activity, divorced from the production of a real product. Speculation in the market is an excessive form of intermediary activity. It has already become an obstacle to the development of production. And so it began to concentrate the costs of the social movement. By and large, speculation has matured, blossomed, and outgrown the limits of the right-protected reality.

It is a typical phenomenon of that form of reality that slows down progress, having squandered the rationality of its action, and is subject to denial. However, everything will remain the same, because speculation has a reliable "roof" that protects it from political control, financial capital on a transnational scale. So, historical logic requires that the planning of economic activity be carried out in a systematic form of expression, create optimal conditions for socio-cultural development and be stably oriented towards humanitarian results. Economic planning is conditioned by the solution of socio-cultural problems, therefore, economic planning models should be complicated, not simplified. An economic analysis of the situation prior to planning should be based on special scientific research and be conceptual. Deepening the epistemological and methodological equipment of economic reflection involves the active use of the requirements of dialectical thinking - the comprehensiveness of the involvement of historical dialectics and sufficient completeness of the analysis of the relevance of the involvement of historical dialectics, as well as the advantages of a systematic approach. Domestic specialists should keep in mind that foreign researchers also criticize liberal innovations, opposing them with an objective analysis of production development trends. We have something to be interested in. Let us take, for illustration, the reasoning of the authoritative American specialist J. Galbraith. In his famous book *The New Industrial Society*, he critically traced the history of the contemporary industrial system of the 20th century, which subjugated the formation of social relations and the human personality itself.

J. Galbraith compared the development of industrial systems according to two significantly different scenarios - planned, which liberal economists identify with socialist management, and market, regulated through competition. The last liberals always cite as an example, as the ideal embodiment of economic freedom. Based on the experience of the economic history of the two-thirds of the twentieth century, which included both the rise

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and the "great depression", peacetime and wartime, the American scientist showed that economic progress does not contradict the planned activities of the state. Thanks to the analysis of economic processes in the format of social and personal changes. J. Galbraith convincingly demonstrated the limitations of the liberal concept of economic freedom.

The conclusions of J. Galbraith are relevant for a correct understanding of what happened at the end of the 20th century and the early decades of the 21st century in Russian society, on the one hand, and for an adequate assessment of the futility in the scientific and practical aspects of the ideas of domestic liberals who turned into conservatives. The industrial system is dangerous because of the high level of its organization; it is increasingly turning into a gigantic mechanism, acting according to its own order, functionally engulfing the individual, subordinating his freedom to his organization. The industrial order, which is so important and beneficial for the development of production, becomes a trap for the progress of the individual, leads to a one-sided development of the individual - the formation of a technical man. The "specialist" displaces the individual from the goals of social development. Economists need a specialist sharpened by the technology and organization of production, personal development to liberal economists seems to be transcendent for the purposes of production. Production requires for its development not a person, but a knowledgeable and able to work specialist. They build the functions of culture and education for the training of a specialist. You don't have to go far for arguments, there is no need to dive into the history of the United States, you just need to turn towards the modernization of domestic special education - secondary and higher, displacing from the programs everything that contributes to personality development in order to focus the process on training a specialist in the direction. The personal model of education has given way to a competent one. The United States experienced this reform back in the 1960s and, according to J. Galbraith, disappointed in the idea of coaching education for specialty training. Both in the field of foreign and domestic economic policy, J. Galbraith wrote, everything that is considered - and not without reason - as an automatically accepted or taken on faith position of people now called the "establishment" is being questioned. These mindsets need political leadership... This process of reassessment of tasks has arisen because the idea of liberal reform is no longer quoted. In the past, liberals have acted as economic liberals; reform meant economic reform. The goal of this reform was invariably repeated in hundreds of programs, speeches and manifestos. Production must rise; income must rise; income distribution should be improved; unemployment must be reduced. For decades, the program of liberal reformism has boiled

down to this. Even the ten biblical commandments are less known and, of course, to a much lesser extent put into practice than these requirements ... The role of a liberal reformer does not require effort, it is not associated with any fierce disputes, scandalous strife, no one has to be persuaded and persuaded. It is only required to stand still and bow when the Gross National Product increases again. At the end of his book, J. Galbraith concludes: "The progress we are talking about at the present time (recall that the book was published in 1967) will be much more difficult to measure than the progress that is associated with the percentage of growth in gross national product or with unemployment rate. This is because the tasks which the industrial system sets itself are so narrow that they lend themselves to precise statistical measurement. But life is complicated. The definition of the concept of the prosperity of society should be the subject of discussion. We would like to complete the study of the methodology of production development planning by listing the monographs of J. Galbraith: "American Capitalism" (1952), "The Great Crash" (1955), "Affluent Society" (1958), "The Time of Liberalism" (1960). .), "New Industrial Society" (1967). It seemed that the author found a name for modern society, perhaps it was so, but when J. Galbraith revealed the essence of the "new industrial society", he realized that this society, despite its novelty, was outdated. What the future society should be, the scientist did not know, so he carefully defined the emerging society as a "prosperous society", emphasizing the general importance of the social and humanitarian goals of managing economic processes. J. Galbraith corrected the status of economic science with the dynamics of welfare in society. As wealth grows, the role of economic research changes. When people are malnourished, poorly dressed, have no decent housing, and die of disease, those that contribute to the improvement of material living conditions turn out to be the first priority, economic ways to increase incomes must be sought - "the ways of saving the soul are most diligently sought by people with a full stomach." With a high level of income, problems other than physiological arise, and society is obliged to help its citizens solve them. The benefits of a comprehensive change analysis are significant, argued J. Galbraith. "Great as well - and growing over time - are the benefits of an analysis of change that goes beyond economics. This is due to the fact that with the rise of the people's well-being, economics becomes less and less capable of a reliable basis for judgments on social problems and guidance in matters of public policy.

J. Galbraith generally adhered to the "general line" of the modern interpretation of the subject and functions of economic science in the West. He delimited scientific economic research from political problems, the belief that their solution goes beyond the competence of economic science, is the

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prerogative of the authorities themselves. How fair his position is, we will not judge. We only recall:

firstly, there was a post-war period of clear success in capitalist construction, economic science was not relevant to an expanded interpretation of the subject of its research, to be political economy, to explain economic inconsistencies with political relations;

secondly, we note that J. Galbraith felt very uncomfortable, realizing that, like the liberals, limiting economic analysis to a simple study of the dynamics of the economic characteristics of production, he drives himself into a dead end. To understand the system requires a systematic approach.

Globalization of the economy is a policy that uses the objective trend of integration of national economies. This is clearly seen in the example of the WTO. The WTO, on the one hand, stimulates the planned form of managing economic movement, on the other hand, it strictly regulates the possibilities of planning the development of the economy on a national scale, subordinating national interests to global goals, the justification of which, from a scientific point of view, looks insufficient, politically biased. Meanwhile, having joined the WTO, the country is forced to accept the conditions of this, to a large extent, political game.

National economic development projects are increasingly loaded and adjusted not in the national interest, which has to be put up with as the costs of globalization. At the same time, it should be borne in mind that there is no alternative to integration. Homo sapiens exists as a universal species. The earth is his common home, development is a common interest, synthesizing biological evolution and socio-cultural arrangement.

When planning, it is necessary to proceed from the dialectical requirement of a comprehensive objective analysis of reality, once and the need to act together in the common interest, two. States have something to share, but you can't test history for strength, humanity has no other and never will. Dialectics has opened up to us the range of confrontation, both practical and theoretical. The struggle is reasonable only within the boundaries of unity, therefore, contradictions should be filtered through the need to obtain a common result that corresponds to the laws of motion of the human reality of being.

Scientific knowledge comes with costs. The scientist's understanding of what is happening does not always occur in the form of true knowledge; delusion is a natural movement of any knowledge, it is important to have a critical attitude here. A scientist should not believe, he should doubt. J. Galbraith is an honest scientist, aware of the limitations of his scientific potential, he logically addresses the discussion, sees a way out of deadlocks and dubious judgments in scientific disputes.

K. Marx was careful about the mistakes of those who served science, believing that not politicians, but scientists are called upon to determine the paths of economic development. Politicians should create political conditions for solving economic problems, following the recommendations of scientists. J. Galbraith is absolutely right when he talks about the complication of social development and the need, in connection with this, to consider economic knowledge and planning in a new, broad socio-cultural format. An American scientist with a similar methodological attitude fell out of favor with domestic reformers - liberals at the end of the last century, when the time of economic reforms was compressed, then there was already a train of vices of their actions. The idol of our liberals turned out to be Soros, a typical financial and political speculator. Speculators with no ideas found a speculator with ideas.

The 21st century has sharpened the scientific, philosophical and practical interest in competition. The scale, content, forms and significance of competition have put it among the global problems of human development with one important clarification: it is not humanity itself that benefits from achievements in the competitive struggle, but individual subjects of human activity, starting with the personality of the performer and manager, and up to those states in whose interests they work. Therefore, the organization of effective participation in competition should be considered as a leading indicator of professional competence, spiritual maturity and political consciousness, bearing in mind, of course, economic policy.

A special place in this struggle, there is no other way to call it, is occupied by the mood of self-consciousness, the system-forming factor of which is professional culture. If human capital determines the growth of production, then the quality of education lays the foundation of human capital. Competences are not effective on their own, they are valid when they are formed as the needs of an individual, developed diversified and in harmony with their own, national and universal interests.

The formula for the harmony of the interests of the individual is extremely simple. It was discovered 2500 years ago by Confucius, and clarified by I. Kant, giving a rational look "the other person should not be a means for you." Summing up the thoughts of our great ancestors, let's say: the only reliable effective means of sustainable development of all manifestations of human life will be the achievement of mutually interested coexistence of people. With regard to the production in general and consumer goods, in particular, the conclusion is even more simplified to the creation of technical, economic and humanitarian (sociocultural and psychological) conditions in a particular production, aimed at a high-quality, popular and affordable product. The organization of production can be considered

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reasonable only if it is subordinated to a single goal - the satisfaction of the consumer's needs.

Where are the reasons for such an anomaly, in what? Is this due to objective factors, whose resistance we have not yet been given to overcome, or are the braking forces still of inertial nature, inherited from us, introduced in the course of modernization and we are able to deal with them, and not with the consumer on the market? What are our reserves?

Answers to the questions posed must be sought in system analysis, which requires an appeal to scientific and philosophical theory. One should not be afraid of the tension of thought-creation. The well-known naturalist D. Dan, following Charles Darwin, analyzed the meaning of competition and came to the conclusion that competition in the struggle for existence is not limited to greater and better adaptation to circumstances, it strengthens the nervous system and develops the brain. So let's start with philosophical reflection.

In economics and politics, many phenomena are known that contradict the nature and functions of these spheres of public life. Practical development does not always coincide with historical logic. History, contrary to its rational basis, the history of the implementation of the activities of a reasonable person, often drives the reflection of the mind into a dead end. In this connection, a problem arises: if the history of the sociocultural activity of a "reasonable person" should be at least no less reasonable and logical than the individual mind of a person subject to chance incomparably more than the socialized mind of mankind, then how to explain the existence of social anomalies, a kind of "jams"?

They are historical blind alleys from which we must regularly get out, or the product of the costs of underdevelopment of the organization of social relations and management, including here a limited knowledge of historical patterns. In other words, we have before us the riddle of history and should we determine where to look for the keys to its solution - in consciousness or in objective reality? What exactly to focus on? We don't have an answer that could be adequately substantiated. Moreover, it seems to us that it would be more legitimate to study the nature of this problem in parallel - both in social life and in public consciousness.

The rationality of the history of human activity could not but lay a logically expressed pattern, but the absence of extralogical processes in real history would look as if the script of history was written by someone in advance and the one who invented it continues to orchestrate the course of the historical movement. N.G. Chernyshevsky compared history with Nevsky Prospekt, laid on a ruler. He did this to emphasize that historical consistency requires a specific awareness. History is comparable to the order of movement in the physical space of being, but it is located in it non-linearly.

There are no straight lines in nature - they are conditional and exist as intervals-segments of movement. The same is true in the development of society, it is reasonable to the extent of historical concreteness. And each historical concreteness carries in itself something new, as well as unresolved or limitedly resolved problems, left as a legacy to the passing generations. Historical logic stumbles upon the imperfection of historical concreteness and will be better understood as a sequence of concrete historical rationalities built from the contradictions of the rationality of human activity, in fact, the relative logic of that historical specificity that accompanies the historical ascent of the socialized Homo sapiens.

The 20th century confirmed the idea of historical materialism in its Marxist interpretation. The development of social life is based on the movement of material production, the connecting element of which was originally a rationally active person. Human history grew out of labor, but the current state of labor became possible only at the stage of homo sapiens, which means the following: production serves as the basis of social progress when it finds its expression in human rationality. To be a real force, production must correspond to the needs of people, needs must be manifested in thoughts, thoughts capture feelings, become convictions.

The improvement of production is due to the transformation of science into a direct productive force, technical progress, but the productivity and quality of productive activity depend no less on the moral factor - the attitude of a person to work. In this light, the Japanese mentality, developed by the original economic policy, linking the interests of owners and employees, is indicative. Its core is a national tradition dating back to the history of Confucianism. Confucius taught: "When running a state ... constant attention to business and sincerity in relation to people, moderation in spending and love for the people are necessary. And it is no less important to encourage people to work ...".

In Japan, China and other countries of the East, one can find examples of moral disorder, but they do not so much testify to a sociocultural reorientation in a national format, but to the historical costs of developing a national culture. There, the vast majority of the population continues to listen to the words and reasoning of teachers. "Wealth and nobility, explained Confucius, are the subject of human desires, but a noble husband does not use them if they have been obtained illegally ..." How can a noble husband bear such a high name if he has lost his philanthropy? A noble husband does not part with humanity for an hour, it will certainly be with him: both in trouble and in worldly fuss.

To maintain the prestige of the company in Japan, the key phenomenon of the social form of life is actively used - the family, family traditions, accumulating the power of morality. The company is

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run by a family. Each member of the family, traditionally associated with the history of production, perceives the company and their work through the prism of family tradition, removing the burden of alienation of labor, inevitable in the conditions of exploitation. Exploitation itself is draped in a form of social partnership. The essential contradictions of bourgeois production remain, but the form of their perception by consciousness changes. In modern Russia, the term "exploitation" is not used to characterize production, which is not surprising given the existing practical attitude to national culture, especially education, which is officially aimed at the development of competencies by policy.

### Conclusion

Today, scientific, philosophical and practical interests in competition have become aggravated. The scale, content, forms and significance of competition have put it among the global problems of human development with one important clarification: it is not humanity itself that benefits from achievements in the competitive struggle, but individual subjects of human activity, starting with the personality of the performer and manager, and up to those states in whose interests they work. Therefore, the organization of effective participation in competition should be considered as a leading indicator of professional competence, spiritual maturity and political consciousness, bearing in mind, of course, economic policy.

With regard to the production in general and consumer goods, in particular, the conclusion is even more simplified to the creation in a specific production of technical, economic and humanitarian conditions aimed at a high-quality, popular and affordable product. The organization of production can be considered reasonable only if it is subordinated to a single goal - the satisfaction of the consumer's needs. Unfortunately, our modern organization of the economy opposes the producer and the consumer, turning them into opponents, instead of stimulating them to act as a single team.

Where are the reasons for such an anomaly, in what? Is this due to objective factors, whose resistance we have not yet been given to overcome, or are the braking forces still of inertial nature, inherited from us, introduced in the course of modernization and we are able to deal with them, and not with the consumer on the market? What are our reserves?

Answers to the questions posed must be sought in system analysis, which requires an appeal to scientific and philosophical theory.

In economics and politics, many phenomena are known that contradict the nature and functions of these spheres of public life. Practical development does not always coincide with historical logic. History, contrary to its rational basis - the history of the implementation of the activities of a reasonable person, often drives the reflection of the mind into a

dead end. In this connection, a problem arises: if the history of the sociocultural activity of a "reasonable person" should be at least no less reasonable and logical than the individual mind of a person subject to chance incomparably more than the socialized mind of mankind, then how to explain the existence of social anomalies, a kind of "jams"?

The quality of production and the quality of the product of production depend on the technical conditions - technology, technical means, organization of production, professional qualifications of organizers and performers and attitude to work. The last two components form the content of the concept of "subjective factor" or "human capital". Based on the achievements of the scientific and technological revolution, entrepreneurs are trying to minimize the complicity of the "subjective factor" due to its volatility. Without advertising, the "subjective factor" refers to the conditions of uncertainty and risk.

The problem here is that all attempts to limit the presence in production and, mainly, in its technological component of the subjective factor, inevitably lead to the absolutization of the technical component. It becomes a total means of increasing labor productivity, production safety and profitability. Thus, the management of the organization of production development is delegated to artificial intelligence, built on the laws and rules of formal logic, expressing one of the aspects of development - conservatism.

The original law, and, in essence, the principle of this logic is the law of identity. The subject and the subject, their relationship are recognized as immutable. Movement is reduced to its relative moment - rest. Peace replaces movement and with it change as the essence of any movement.

Starting with handicraft labor and the guild form of its organization, the quality of the goods pushed all other signs of production into the background. As long as the division of labor had a shop form, and inside the shop everyone produced the goods up to the final commodity form and fully guaranteed the quality with his brand, the quality of production and the quality of the goods remained in the unity of existence, and the problem of the quality of the goods was simplified, reduced to the observance of the technological standard of production. Production was a way of life support for the manufacturer, so the relevance of the quality of the product was removed by the specifics of its relationship to production.

On the market, the goods were of high quality, one should only be afraid of counterfeiting, which did not have the current scale and was resolutely suppressed by both the state and self-regulation of trade. For mass production, which was the main consequence of the industrial revolution, the problem of the producer's interest as a commodity was not noted among socially significant ones. It undoubtedly



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existed, but the nature of production did not allow it to leave the sphere of private consciousness and materialize in the product range.

The inclusion of a person as a factor in the production of the quality of goods enhances the influence of the subject of labor on the quality of production and the quality of the goods produced. As a result, the burden on the management process increases.

Management is subject to the solution of the problem of sustainable production of a quality product. As in any task, here you need:

- clearly define what "quality" is?
- understand what is specific to the quality of the goods?
- to understand how the "quality" of commodity production and its mass character are

connected, to trace the mechanism of interaction of qualitative changes with quantitative.

- reveal the systemic situation of the problem quality of mass production in the context of a developing economy.

Only after receiving answers to the above questions, we will be able to productively explore the problem: "How realistic is our desire to give the mass producer the need for the quality of the product result", in other words, "is it possible to sufficiently motivate the receipt of a quality product from within mass production?". So far, unfortunately, quality management is carried out by bringing into production ideas developed not in it, but in the "pure" theory of management.

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ICV (Poland) = 6.630  
PIF (India) = 1.940  
IBI (India) = 4.260  
OAJI (USA) = 0.350

SOI: [1.1/TAS](#) DOI: [10.15863/TAS](#)

### International Scientific Journal Theoretical & Applied Science

p-ISSN: 2308-4944 (print) e-ISSN: 2409-0085 (online)

Year: 2022 Issue: 12 Volume: 116

Published: 13.12.2022 <http://T-Science.org>

Issue

Article



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## GLAZED CERAMICS OF UZBEKISTAN OF THE XXI CENTURY: INDIVIDUALITY AND TRADITION

**Abstract:** *Ceramics of Uzbekistan is one of the most ancient types of artistic craft. According to the technique of execution, it is divided into unglazed and glazed ceramics.*

*From the point of view of the artistic solution, glazed ceramics is of the greatest interest, which has gone through a difficult historical path of development and has survived to this day in the products of the masters of the main schools of Uzbekistan. The change in the social conditions of existence of traditional crafts naturally led to certain transformations, which were reflected in the character of Uzbek ceramics. And here the problem of tradition and innovation is most acute and relevant.*

**Key words:** *ceramics, school, craftsmen, region, originality, tradition, innovation, technique, glaze, ornament.*

**Language:** *English*

**Citation:** *Surayyo, A. (2022). Glazed Ceramics of Uzbekistan of the XXI Century: Individuality and Tradition. ISJ Theoretical & Applied Science, 12 (116), 470-473.*

**Soi:** <http://s-o-i.org/1.1/TAS-12-116-34> **Doi:**  <https://dx.doi.org/10.15863/TAS.2022.12.116.34>  
**Scopus ASCC:** 1200.

### Introduction

Ceramics of Uzbekistan one of the most ancient kinds of art craft. On the technician of execution it shares on not glaze ceramics. From the point of view of the art decision the greatest interest is represented glaze by ceramics which has taken place a difficult historical way of development and Denau, Khiva and Tashkent has reached up to now in products of masters of Gizhduvana, Urguta, Rishtan, Andizhan. Here again the problem of tradition and innovations costs most sharply and actually. Change of social conditions of an existing of traditional crafts has naturally led to the certain transformations reflected in character of the Uzbek ceramics. Process of transition of traditional art crafts of sphere utilitarian in area of the souvenir manufacture, begun in the middle of the XX-th century, in the beginning of this century has been continued. Many traditional forms of products have disappeared. The leader has now the form plate, keeping good space for a decor and not lost utilitarian appointment. At the same time, has development experimental search of new ornamental decisions. The problem of preservation and creative interpretation of traditions in modern practice of masters of the Uzbek

ceramics is mentioned in a number of publications domestic researchers – A.Khakimov (1), K.Akilova (2), E.Gjul (3), and also the author of present article (4). At the same time actively developing creativity of masters modern ceramics does this aspect of research more and more topical and claimed.

### Methodology

The basic schools glazed ceramics of Uzbekistan have developed in a XIX-th century. On style of decorating, plastic and technological features it is possible to allocate three basic ceramic schools: northeast — Fergana, central — Buharo-Samarkand and southwest — Khorezm. Depending on character of glaze of a product of these schools differ on colour. The blue ceramics is presented by the Fergana and Khorezm schools where it is used alkaline, ichkor watering, and the Buharo-Samarkand centres are known yellowy-brown, the ceramics here again more uses lead glaze. In the middle of the XX-th century on markets of many Samarkand, Shahrishabza, Kattakurgana, Rishtana, Kokand, Dzhizak, Khiva, Urgench it was possible to buy various ceramic glazed ware or the painted clay penny whistles-toys.

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By the end of 1960th years in the general development of national ceramics of Uzbekistan the unfavourable tendency of disappearance of some the unique centres began to be observed. In many respects it has been connected with the social and economic reasons. Unfortunately, by this time traditions of ceramics of Samarkand, Kattakurgana, Shahrisjabza, Kitaba, Denau, Tashkent are in many respects lost, some centres do not function at all, only rare museum samples testify to development of this craft in the past. In 1960-80 it was narrowed not only sphere of realisation of products of national masters-keramis - became also working potters much less. Many known masters have died, others, without having found pupils or support and material maintenance, have thrown become unprofitable craft. Products of national masters did not maintain a competition to industrial products from porcelain, metal or plastic. Traditional ceramics of Samarkand (U.Dzhurakulov, S.Rakova, A.Muhtarov) and Tashkent (M. Rakhimov) in essence to the middle 1970 – 80th years has been completely rethought. Has arisen absolutely new on the Samarkand school of a small terracotta plasticity. Creation of the Tashkent experimentally-creative industrial complex of applied art (since 1984 of a name of M.Rakhimov), letting out experimentally-unique, small-scale both limited production and become by the centre of new monumental architectural and landscape ceramics, did not become a basis of the further consecutive development of traditional Tashkent pottery.

With finding of independence the situation with glazed ceramics began to change in a positive side. Thanks to the governmental decisions the status of the national master, a number ceramists Uzbekistan have been strengthened have received a high rank of academicians of Academy of Arts of Uzbekistan. Among them the master from Tashkent Akbar Rakhimov, from Rishtana – Sharafiddin Jusupov, from Gizhduvana – Alisher Narzullaev, from Samarkand – Sharif Azimov. Nevertheless, for various reasons, it was not possible to keep a number of the known centres in the past of traditional glazed ceramics. So, today practically it is not possible to restore tradition Shakhrisabs ceramics. The representative of the seventh generation of masters-ceramists from Shahrisabza Rustam Muzafarov studies in craft, however its products are far from quality of traditional products of this centre. With leaving life of Umara Dzhurakulova has left in a non-existence and the Samarkand glazed ceramics. The school of a terracotta toy of Samarkand created anew represents absolutely other, based truth on a folklore material, but by the nature is an individually-author's art. In Denau a situation more pitiable – there still works master Zuhur Rasulov, but it at respectable age, and and continuers of its craft is not present pupils. It was not possible to revive in a due measure and tradition of glazed ceramics of Bajsuna though from

UNESCO Representation in Uzbekistan in this direction it has been made much – the workshop and the furnace for roasting of products of local master I.Eshankulova is restored, the grant is allocated and training of its grandson, but the further development this project is carried out has not received.

Stabler situation in Andizhan where continues to work ceramist as Mirzabahrom Abduvahobov. Last years there were many continuers of tradition Richtan ceramics, but the technology and an ornamental aesthetics of their products leaves much to be desired. Most fruitfully, keeping high traditions of ceramics of Rishtana, all some masters here work – among them it is possible to allocate Sharofiddina Jusupova and Bahtiera Nazirova. The tradition Gurumsaray ceramics consistently is developed by Vahobzhon Buvaev – the pupil of known master Masuda Turapova. Alternation of generations of masters, has rather without serious consequences occurred in Gizhduvane and Urgute. In Gizhduvane traditions of Ibodulo Narzullaeva have been picked up by his sons Alisher and Abdullo. In Urgute potter's art of Mahkama Ablakulova is developed by his son Numon Ablakulov. In Khiva traditions of local ceramics are continued by children of known Khivan potters - Odilbek Matchanov from village Madyr and Bahodir Atadzhanov from the next village Kattabag.

All aforementioned the master and the centres represent that direction in modern ceramics which it is possible to name authentic, that is keeping lines of local school, its technology and an ornament. It is characteristic that all of them hereditary masters and were trained only within the limits of system master-student "usto-shogird" (an exception son Sharafiddina Jusupova - Firdaus having the higher art education makes and in which works the author's beginning leaves on the foreground). Updating here occurs an evolutionary way – technological traditions remain former (clay, tools, processing receptions, dyes. Glaze etc.), and changes only a decor. But also here updating occurs not on the basis of introduction of absolutely new motives (these are rare examples), and only new combination already known, traditional for the given school or the centre of patterns.

Other, innovative direction in modern glazed ceramics is represented by the Tashkent masters Akbar Rakhimov and his son Alisher Rahimov, continuing traditions of the founder of this style of Muhita Rakhimov. In the early sixties M.Rakhimov who was engaged in restoration Kuchan of antique ceramics (1st-2<sup>nd</sup> century DC) and glazed ceramics of Afrasiab (IX-XI centuries) On the basis of reconstruction of old samples has created new display exhibits. This tradition has laid down in a basis of its subsequent creative activity when the samples of ceramics concerning by other historical periods began to be exposed to author's arrangement. So, as objects of creative interpretation samples Temurid ceramics have been used. Subsequently this direction has been

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continued and enriched in creativity of his son Akbara and grandson Alisher Rahimov combining traditional technologies and new ornamental experiments. In the same channel of innovative searches young ceramist from Bukhara Abdurahid Karimov reconstructing traditions Afrasiab and sine-blue ceramics of Bukhara of a XVII-th century and presenting them as author's products today works. These masters keep traditional technology, but bring author's innovations in decorating of products, using a twiddle of the various historical periods more freely. It is remarkable that all have the higher art education on a speciality ceramics and are in essence professional artists.

### Results and discussion

Thus, today a situation in glazed ceramics of Uzbekistan from the point of view of preservation in it of authentic layers and occurrence of innovative searches it is possible to allocate two streams. It, first, the traditional glazed ceramics based in basic on the local local traditions of schools and the centres – here it is possible to carry masters of Rishtana, Andizhan, Gurumsaraja, Urguta, Gizhduvana and Khiva. Known innovations in the field of construction of an ornamental decor for creativity of masters of these centres also are marked, but adherence to traditional receptions and forms here remains, and innovations have been connected basically with change in treatment of separate elements of an ornament and forms of products. That is in regions the local tradition has more value and traditions develop evolutionarily (probably, a little more dynamical looks some masters Rishana who are more openly using innovations in a twiddle is Rustam Usmanov, Firdaus Jusupov, Alisher and Bahtier Nazirovy, but all of them remain in the tideway of traditions Rishan ceramics).

And, secondly, it is products of the innovative plan in which the individually-creative initiative of masters-ceramists is more actively shown, the spectrum of used receptions and ornamental patterns without their coordination with certain local tradition extends. It is possible to carry Akbara mentioned above masters to this direction and Alisher Rakhimov from Tashkent and Abdurahida Karimova from Bukhara.

As a whole in the course of adaptation of the Uzbek ceramics to conditions of market economy many the guarding moments. In search of a commodity market many masters are arranged under undemanding tastes of tourists that quite often leads to loss of soil traditions and features of style. Not less the challenge is connected with an apprenticeship. The old system "usto-shogird" has got now the simplified, deformed form. If before the master took pupils, lead up them to certain standard, accepted examinations and gave the blessing, as some kind of the diploma about formation now such practice, unfortunately, is not present. Without having possibility to get longer education, young masters, having passed accelerated, two-three monthly course, start to market in the markets poor-quality production in the art relation. As a result we come up against a situation when the market spoils traditional system of preparation of high quality masters- ceramists, conducts to decline of the general level of ceramics of the glorified centre. Leading masters who do high-quality products, aspire to sell them at the price corresponding to quality while their pupils give the production cheap. Line production has captivated salons, galleries, the markets of the tourist centres of Bukhara, Samarkand, Tashkent. Young generation ceramists, being guided by the market and the customer, aspire to adjust accelerated so – less qualitative manufacture, on the other hand – among them remains comprehension of necessity of following to primordial traditions.

### Conclusion

Today in development of national ceramics actual there is a problem of preservation of its original nature, a primordial twiddle and in this sense of cleanliness of is art-shaped structure of ceramics of Uzbekistan. Despite problems of creative and organizational character, nevertheless the positive shifts which have occurred during independence, are obvious. The social status of the national master-ceramists has immeasurably grown, interest to traditions of ceramics has considerably increased in the Uzbekistan and behind its limits, many of masters have visited creative business trips in other countries, began to hold the personal exhibitions abroad.

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SOI: [1.1/TAS](#) DOI: [10.15863/TAS](#)

### International Scientific Journal Theoretical & Applied Science

p-ISSN: 2308-4944 (print) e-ISSN: 2409-0085 (online)

Year: 2022 Issue: 12 Volume: 116

Published: 14.12.2022 <http://T-Science.org>

Issue

Article



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## CURRENT ASPECTS OF VEHICLE COLLISION INVESTIGATION

**Abstract:** In the article, the author analyzes the process of collision of vehicles according to typical situations of their occurrence, on the basis of which he subdivides them into types. At the same time, this study focuses on the actions of the investigator in the investigation of each type of them. To consolidate the features of the investigation of a collision of vehicles, the author gives some examples.

**Key words:** vehicle, vehicle collision, vehicle investigation, collision site, rear collision, head collision, corner collision, side collision.

**Language:** English

**Citation:** Akmatova, A. T. (2022). Current aspects of vehicle collision investigation. *ISJ Theoretical & Applied Science*, 12 (116), 474-476.

**Soi:** <http://s-o-i.org/1.1/TAS-12-116-35> **Doi:**  <https://dx.doi.org/10.15863/TAS.2022.12.116.35>

**Scopus ASCC:** 3308.

### Introduction

A collision of vehicles can occur in the following typical situations: rear collision - a collision with the rear of a stopped car; oncoming collision - when cars, following exactly towards each other, hit the front parts; angular collision - the impact of one car on the corner of another, when the length of the touching surfaces of cars on impact is more than 15 cm; side collision - collision of cars with the sides when the length of the touching surfaces of cars is less than 15 cm; cross collision when cars collide at right angles. Based on the damage analysis, the type of collision is determined, which indicates the relative position of the cars at the time of the collision. Before the collision, each car was moving in its own direction relative to each other [1].

After a collision, cars can move and turn into positions (in which they will be at a complete stop) that have nothing similar to their position in a collision. The position at the time of the incident indicates which car was turning in front of the other or which car really hit the other [2]. In a rear-end collision, there are the following features: after such a collision, cars can stop in a locked state if it happened in motion, or bounce off each other if one of the cars was standing; one car will have damage in the back,

the other in the front; the traces of damage on one car will coincide with the damage of the other.

An oncoming collision rarely occurs, as drivers tend to dodge an oncoming impact, but they still occur and have their own characteristics: in such collisions, cars stop at the collision site or bounce off an equal distance if their weight and speed were the same [3]; with unequal weight and speed, lighter or moving with at a lower speed, it will be thrown back from the collision site; cars do not rotate during such a collision, and the debris occupies a small area of the road. Here the main question to find out is on which side (lane) of the road the collision occurred.

The place of collision in this case is determined by the location of the cars and by the traces of wheel slip before and after impact, taking into account the listed features. Angular collision is the most common accident and has its own characteristics: in such a collision after impact, cars usually rotate, leaving tire tracks; in a collision, the left corners rotate counterclockwise and the cars bounce off each other [4]; in contact with the right corners - clockwise; the spread of damaged items from the vehicle depends on the area of contact, the mass of cars, speed and condition of the road surface. In such a collision, the investigator must find out: on which side of the centerline of the road the collision occurred, since

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debris, remnants of glass, spilled oil and dirt can spread over a relatively large area, and this is another characteristic feature of an angular collision [5].

However, the location of the collision can be determined approximately if the investigator remembers that in such a collision, each car moves from the collision site to its side of the road. A side collision, like an angular one, is the most common and requires careful investigation and knowledge of the features, which include the following: in a side collision, damage to cars is usually insignificant and cars are stopped by drivers themselves; in a collision, cars do not rotate; reliable facts indicating the place of the collision are pieces of crumbled dirt (fallen off from the wings), glass fragments and tire slip marks; the nature of scratches and dents in the sides of the body, their direction may indicate the direction of cars; in such a collision, cars do not move to the opposite side of the road and the presence of both cars on one or another lane indicates that which one of them was the accident.

A cross collision is characterized by the following: braking marks will indicate the direction of movement; one car will have dents from the front, the other from the side; tire slip marks after a collision will reflect the force and speed of moving cars.

When considering this collision, the investigator needs to decide which of the collided cars drove first to the intersection. In this case, there are three following options: 1) both go to the intersection at a constant speed (without braking); 2) one goes to the intersection at a constant speed, and the other brakes; 3) both go to the intersection and brake [6].

For the first case, it is necessary to measure the distance from the place (point) of the collision to the lines limiting the intersection; this will allow determining the speed of cars in the future, based on the speed, it will be possible to determine the time it took for each car to travel from the intersection border to the collision site [7].

The time will indicate which car went to the intersection earlier and which one later. In the second case, the determination of the braking speed and its length from the intersection border to the collision site indicates who drove first to the intersection.

In the third case, when both cars were in a braked state before the collision, the length of the braking distance will indicate the speed and who was the first to enter the intersection.

Depending on the location of the road section, traffic intensity, road and weather conditions, several vehicles may participate in an accident. In such cases, one car may engage in a side or other type of collision with other cars, after which it will leave the centerline on the other side of the roadway and collide with an oncoming car. In such accidents, three or more cars may be involved in a collision at the same time. The main task in this case is the analysis of traces of sliding, dents, moving parts from one car to another

and the establishment of cars corresponding to these traces [8].

Here you need to be guided by the following. Slip marks are represented by parts of rubber left on the road as a result of tire wear and the friction of their treadmill on the road surface. These tracks, depending on the tire design, load, tread pattern, will vary both in width and in print, which will allow them to be identified with the tires of cars that were not involved in an accident.

If the tire slip marks of one car intersect the tracks of another (overlap marks), then it is necessary to carefully examine the places where the tracks intersect, which will allow the investigator to determine which slip marks appeared later, since later tracks look more clearly than those left earlier. Knowing which of the intersecting tracks appeared later and from which car, the investigator can establish the sequence of movement of cars in a collision.

Similarly, the investigator can examine the damage on the car. When several vehicles collide, there are also several collision lines – one for each pair of cars. Any later damage will be located near the early ones, while distorting the traces of early damage by deforming and moving the metal in the places of dents. The transfer of paint gives the investigator the opportunity to determine which car was involved in a particular collision. To do this, you should carefully examine the damage and scratches to determine the paint transferred from another car, make sketches of dents and scratches by measuring with a mark of the color of the detected paint transferred from another car and the location of the binding site. All this makes it possible to determine the sequence of car collisions [9].

Let's consider an example of an oncoming collision. The bodies of the preliminary investigation Ulitin N.N. was accused that on April 03, 2005, about 14 hours 15 minutes, driving a technically serviceable KAMAZ-5410 car, state number B 756 VN 16 Sh8, followed at a speed of 50 km/h from the direction of Yoshkar-Ola along the roadway of the Yoshkar-Ola highway. Volzhsk RME. On the road section between the "Volga Industrial Construction Plant" and JSC "Volga Meat Processing Plant" Ulitin N.N. I saw a Ford-Taunus car, state number 008 SV 12 shz, driven by the driver Mnatsakanyan A.K., with passengers Kulmyakov V.A., Chirkov A.S., Karpov D.A. and Martirosyan A.M., moving towards him from the direction of Volzhsk RME, at a distance of 73 m. the car. Ulitin N.N. having found an obstacle in the lane of his movement, in violation of clause 10.1. Part 2 of the Traffic Rules, "if there is a danger to traffic that the driver is able to detect, he must take possible measures to reduce the speed until his vehicle stops," grossly violating the traffic rules, he used a left-turn maneuver into the oncoming traffic lane, acting thoughtlessly, anticipating the possibility of socially dangerous actions, but without sufficient grounds for



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that, he confidently counted on preventing these consequences, crossed the solid line of marking 1.1 of the Rules of the Road, which separate traffic flows of opposite directions and designates the boundaries of traffic lanes in dangerous places on roads to which entry is prohibited, grossly violating clause 9.7 of the traffic Regulations "If the carriageway is divided into lanes by marking lines, the movement of vehicles must be carried out strictly along the designated lanes", violating clause 1.3 of the traffic Regulations "Road users they must comply with the requirements of the rules, signs and markings", on the oncoming traffic lane to which the Ford car under the control of A.K. Mnatsakanyan returned at the same moment., as a result, a collision of vehicles occurred, which caused a traffic accident, during which the driver of the Ford car Mnatsakanyan A.K., the passengers of his car Chirkov A.S. and Kulmyakov V.A. died from injuries that caused serious harm to health, Martirosyan A.M. received injuries that caused serious harm to health, Karpov D.A, received injuries that caused harm to health of moderate severity.

Thus, according to the indictment, N.N. Ulitin, by his careless actions, driving a car, violating traffic rules, committed a traffic accident that caused serious harm to human health by negligence, as well as the death of two or more persons.

Thus, the court found that N.N. Ulitin, not having the technical ability to prevent a collision by emergency braking, trying to prevent a traffic accident, being in a state of extreme necessity arising from the actions of A.K. Mnatsakanyan, forcibly, violating paragraph 10.1 of the traffic regulations, began to change the direction of movement of his car with oncoming traffic for him a traffic lane, hoping that a Ford car will pass through its lane and there will be no collision. Further, the court states that Ulitin N.N. having forcibly violated the requirements of paragraph 10.1 of the traffic regulations, he could not prevent the occurrence of socially dangerous consequences in the form of the death of three people and causing serious and moderate harm to human health exceeded the limits of extreme necessity [10].

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## Impact Factor:

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ICV (Poland) = 6.630  
PIF (India) = 1.940  
IBI (India) = 4.260  
OAJI (USA) = 0.350

SOI: [1.1/TAS](#) DOI: [10.15863/TAS](#)

### International Scientific Journal Theoretical & Applied Science

p-ISSN: 2308-4944 (print) e-ISSN: 2409-0085 (online)

Year: 2022 Issue: 12 Volume: 116

Published: 14.12.2022 <http://T-Science.org>

Issue

Article



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## ABOUT SOME ISSUES OF INVESTIGATION OF ROAD ACCIDENTS COMMITTED IN THE DARK

**Abstract:** The article examines the issues of investigation of road accidents, the improvement of which largely depends on a clear understanding of the most typical conditions and circumstances in which violations of road safety rules most often occur. The forensic characteristics of road accidents resulting from criminal violations of safety rules can be of great help here. The author notes the peculiarities of the investigation of road accidents committed at night, which are characterized by greater severity of consequences, especially when hitting pedestrians and overturning.

**Key words:** a traffic accident, an investigation, an accident committed at night, the situation of the accident, the circumstances of the accident.

**Language:** English

**Citation:** Akmatova, A. T. (2022). About some issues of investigation of road accidents committed in the dark. *ISJ Theoretical & Applied Science*, 12 (116), 477-479.

**Soi:** <http://s-o-i.org/1.1/TAS-12-116-36> **Doi:**  <https://dx.doi.org/10.15863/TAS.2022.12.116.36>

**Scopus ASCC:** 3308.

### Introduction

A traffic accident is a failure to comply with the usual rules of the road for the movement of vehicles on the carriageway, as a result of which factors threatening human life arise [1]. The occurrence of emergency situations on the roadway, first of all, leads to an increase in the number of vehicles, unsatisfactory condition of roads, the use of old technically defective vehicles, indiscipline of persons driving vehicles, including the use of alcoholic beverages, narcotic drugs, psychotropic and other intoxicating substances by the driver, as well as other confluences of conditions [2]. The number of accidents is increasing every year, the serious consequences of accidents are increasing. For this reason, ensuring road safety has long been one of the priority policy directions not only of our state, but also of the entire world community.

The key types of accidents are [3]:

- collision of vehicles with an obstacle;
- collision of vehicles with each other;
- piloting (overturning) of vehicles;

- hitting vehicles on a person, including those traveling by bicycle;

- hitting vehicles on a domestic or wild animal.

At the same time, any traffic accident is accompanied by a change in the material situation - damage and destruction of vehicles, tracological traces, traces of substances and materials. The process of their occurrence is subject to the objective laws of nature (physics, mechanics, chemistry), and therefore their presence, mutual disposition and changes that have occurred with them can form the actual basis for the reconstruction of the mechanism of the event.

For an objective and professional investigation of motor vehicle crimes, the investigator must have the basics of special knowledge in the field of road traffic, the functioning and arrangement of motor transport. The specifics of the mechanism of a motor vehicle accident, the transience of the event and other factors cause difficulties in fixing and fixing traces of the event that occurred. All this requires the investigator to know the methods of investigation of the group of crimes under consideration and determines the relevance of the chosen topic of work.

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Forensic scientists have long drawn attention to the complexity of the mechanism of a traffic accident. It easily detects the initial state, the occurrence of danger in traffic and the final stage of the incident. Discrete stages of the development of an accident for the purposes of research can only be conditionally distinguished as simultaneous events. In fact, each stage – the moment of the development of the accident mechanism – is simultaneously a necessary consequence of the preceding event and the cause of the subsequent phenomenon, inextricably linked with the preceding link in the chain of the dynamic process in a road accident.

Successful investigation of road traffic accidents, improvement of the activities of the preliminary investigation bodies largely depend on a clear understanding of the most typical conditions and circumstances in which violations of road safety rules most often occur [4]. The forensic characteristics of road accidents resulting from criminal violations of safety rules can be of great help here.

The peculiarity of the investigation of road accidents committed at night is that they are characterized by a greater severity of consequences, especially when hitting pedestrians and overturning [5].

The specific features of the investigation are that:

- assaults are committed in the presence of a small number of witnesses, eyewitnesses and other persons or in their absence;
- makes it difficult to inspect the scene of the accident and the vehicle;
- it is difficult to find and fix traces of the vehicle (braking, skidding, etc.) and physical evidence;
- limitation of the possibility of using photo-video and other forensic means;
- the possibilities of examining the victim's corpse and his clothes are limited.

Due to these specific features, the investigator has to devote more time to examining the scene of the accident, the vehicle, searching and collecting material evidence and studying the road situation associated with limited visibility and lack of additional lighting [6].

Being at the scene of the incident, it is necessary to find out [7]:

- the general situation and visibility of the road section of the accident (presence or absence of road lighting);
- all interference to and near the scene of the accident for both the driver, pedestrian and other road users;
- in what light did the driver follow on this section of the road before the incident;
- visibility from the cab of the car, who committed an accident, in the low beam and high beam mode;

- is the headlight light adjusted correctly and does it meet the requirements of the vehicle design and road accidents;

- were all the lighting fixtures in good condition and were there any additional ones that could interfere with the driver;

- from witnesses, eyewitnesses, victims, drivers and others to find out at what speed the car or pedestrian was following;

- inspection with special attention to the places of damage to the vehicle, their measurements, search for physical evidence (paint, fabric, hair, blood, etc.);

- when examining the cab of the car – in what position are the switches of lighting devices and the position of the gear lever;

- what is the visibility of this road section from the pedestrian exit point to the roadway;

- whether there is a horizontal marking on the road.

Clarification of the circumstances will help the investigator to establish [8]:

- firstly, could the driver receive the necessary information about obstacles appearing in the field of view in a timely manner;

- secondly, could the driver easily distinguish the road and its direction;

- thirdly, whether the driver and pedestrian could freely navigate in the current situation and take timely measures to prevent the incident and its consequences.

Driving at night adds difficulties to the driver, it is noted that "... when driving at night, fatigue occurs faster ... from 2 to 5 in the morning, a person is the weakest physically and therefore ... between 2 and 4 in the morning, muscle strength, memory, attention, thinking, reaction decrease in a person, which leads to an increase in the number of errors and accidents" [9].

The investigator needs to present the reasons that affect the commission of an accident at night:

- physiological features of human vision – a decrease in the effectiveness of visual perception by the driver and other road users;

- lack or poor quality of road lighting;

- production of road signs without reflective coatings;

- absence of road signs on dangerous road sections;

- absence or indistinctness of horizontal marking and so on.

Taking into account the reasons that caused the accident, it should be borne in mind that visibility at night is sharply reduced and therefore the driver's ability to take measures to prevent an accident and avoid serious consequences by reducing speed, taking measures to brake or detour one or another obstacle decreases.

The completeness and objectivity of the investigation of the incident at night depends entirely on how correctly the protocol of the inspection of the scene of the accident, the causes and circumstances of

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the accident are reflected, the situation and illuminated evidence are recorded, according to which the investigator will have to establish the mechanism of the incident and determine the guilt of the driver or pedestrian in violation of traffic Rules [10].

In conclusion to the considered chapter, we can say that the specific features of the investigation of types of accidents can be divided into two groups: general and individual. Common features are features inherent in all types of accidents. These include: search, collection and fixation of physical evidence, technical knowledge; knowledge and correct application.

The first feature is the ability of the investigator (inquirer) to correctly determine the boundaries of the search for material evidence of the incident.

The second feature – technical knowledge – is that the investigator must have basic concepts about

car models that affect traffic safety and so on. In technical malfunctions, first of all, the main ones should be highlighted. The main technical malfunctions include: brake malfunctions; breakdown of steering gear and drive parts; tire damage.

The third feature is the knowledge and correct application of Traffic Rules to a particular accident. The rules of the road as a by-law make it possible to establish the relationship between violations of traffic safety rules and the onset of certain harmful consequences. The absence of a causal link between the violation of traffic Rules and the ensuing consequences excludes criminal liability of the person who committed the accident.

The individual specific features discussed in this chapter allow us to more fully reproduce the accident and establish its causes and conditions.

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OAJI (USA) = 0.350

SOI: [1.1/TAS](#) DOI: [10.15863/TAS](#)

International Scientific Journal  
**Theoretical & Applied Science**

p-ISSN: 2308-4944 (print) e-ISSN: 2409-0085 (online)

Year: 2022 Issue: 12 Volume: 116

Published: 14.12.2022 <http://T-Science.org>

Issue

Article



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## SYNTHESIS AND CHARACTERISTICS OF CARBOXYMETHYLCHITOSAN FROM THE ARTEMIA PARTHENOGENETICA CYST OF THE ARAL SEA

**Abstract:** The article discusses the conditions for obtaining chitin from substandard cysts of *Artemia parthenogenetica* of the Aral Sea, according to the traditional scheme of sequential deproteinization, demineralization and decolorization of raw materials, followed by deacetylation of chitin to chitosan and the synthesis of carboxymethylchitosan. When obtaining chitosan based on chitin from *Artemia* cysts, a harsh deacetylation method was used using a 50% concentrated alkali solution, high temperature conditions (120-1300C) and a long processing time (5-6 hours). Further, carboxymethylchitosan was synthesized from the obtained chitosan. The results of the chemical composition of the feedstock (quality, substandard and crushed cysts), as well as the main qualitative characteristics of chitin and chitosan, including color, average molecular weight, solubility, content of residual mineral substances, etc., are summarized. The structures of chitin/chitosan and carboxymethylchitosan were characterized by spectroscopic methods, the degree of chitosan deacetylation and the degree of substitution of carboxymethylchitosan were calculated. Size exclusion liquid chromatography was used to study the polyelectrolyte properties, molecular weight parameters and polydispersity of chitosan and carboxymethylchitosan. In addition, surface morphology and thermal properties were analyzed by scanning electron microscopy, thermogravimetric analysis, and differential scanning calorimetry, respectively.

**Key words:** *Artemia parthenogenetica*, cysts, chitin, chitosan, carboxymethylchitosan, infrared spectroscopy, nuclear magnetic resonance spectroscopy, size exclusion liquid chromatography.

**Language:** Russian

**Citation:** Berdimbetova, G. E., Boymirzaev, A. S., & Karlibaeva, B. P. (2022). Synthesis and characteristics of carboxymethylchitosan from the *Artemia parthenogenetica* cyst of the Aral sea. *ISJ Theoretical & Applied Science*, 12 (116), 480-492.

**Soi:** <http://s-o-i.org/1.1/TAS-12-116-37> **Doi:**  <https://dx.doi.org/10.15863/TAS.2022.12.116.37>  
**Scopus ASCC:** 2500.

СИНТЕЗ И ХАРАКТЕРИСТИКА КАРБОКСИМЕТИЛХИТОЗАНА ИЗ ЦИСТЫ АРТЕМИА  
PARTHENOGENETICA АРАЛЬСКОГО МОРЯ

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**Аннотация:** В статье рассматриваются условия получения хитина из некондиционных цист *Artemia parthenogenetica* Аральского моря по традиционной схеме последовательного депротеинирования, деминерализации и деколоризации сырья, с последующим деацетилированием хитина до хитозана и синтеза карбоксиметилхитозана. При получении хитозана на основе хитина из цист Артемии использован жёсткий способ деацетилирования с применением 50% концентрированного раствора щелочи, высокого температурного режима (120-1300С) и продолжительного времени обработки (5-6ч.). Далее из полученного хитозана был синтезирован карбоксиметилхитозан. Обобщены результаты химического состава исходного сырья (качественных, некондиционных и измельченных цист), а также основные качественные характеристики хитина и хитозана, включающие цвет, среднюю молекулярную массу, растворимость, содержание остаточных минеральных веществ и т.д. Спектроскопическими методами охарактеризованы структуры хитин/хитозана и карбоксиметилхитозана, рассчитаны степень деацетилирования хитозана и степень замещения карбоксиметилхитозана. Эксклюзионной жидкостной хроматографией изучены полиэлектролитные свойства, молекулярно-массовые параметры и полидисперсность хитозана и карбоксиметилхитозана. Кроме того, морфология поверхности и тепловые свойства были проанализированы с помощью сканирующей электронной микроскопии, термогравиметрического анализа и дифференциальной сканирующей калориметрии соответственно.

**Ключевые слова:** *Artemia parthenogenetica*, цисты, хитин, хитозан, карбоксиметилхитозан, инфракрасная спектроскопия, эксклюзионная жидкостная хроматография, дифференциальная сканирующая калориметрия.

## Введение

Хитин и хитозан представляют собой сополимеры 2-ацетиамидо-2-дезоксид-Д-глюкозы (GlcNAc) и 2-амино-2-дезоксид-Д-глюкозы (GlcN) с β-D-(1→4) гликозидными связями. Хитин имеет высокую степень кристалличности и нерастворим в обычных растворителях. Он часто превращается в хитозан путем деацетилирования. Слово «хитозан» используется как для частично, так и для полностью N-деацетилированных хитинов. Из-за плохой растворимости хитозана (только в кислых водных растворах с pH ниже 6,5) его применение ограничено во многих областях, где растворимость является основным фактором. Растворимость хитозана можно улучшить путем деполимеризации и его химических модификаций [1]. Хитозан содержит реакционноспособные аминогруппы, первичные и вторичные спиртовые группы, которые могут быть объектом химической модификации в мягких условиях реакции для изменения его свойств [2]. Во многих научных исследованиях карбоксиметильные, карбоксиэтильные, карбоксибутильные группы синтезируют в качестве перспективных водорастворимых производных хитозана [1]. По сравнению с другими водорастворимыми производными хитозана, карбоксиметил-хитозан (КМХЗ) привлекает большое внимание и широко изучается благодаря простоте синтеза, растворимости в воде, амфолитному характеру и возможностям широкого спектра областей применения.

КМХЗ представляет собой привлекательный биосовместимый и биоразлагаемый полимер, который получают в результате реакции хитозана с монохлоруксусной кислотой в щелочных условиях. Благодаря своей антимикробной активности, пленко-образующей способности и способности взаимодействовать с различными

веществами, а также растворимости в широком диапазоне pH он используется в медицинской и фармацевтической областях, в основном для контролируемого высвобождения лекарств. Он также используется в тканевой инженерии и для повышения вязкости [3].

По сравнению с обычно используемым хитозаном, КМХЗ демонстрирует некоторые уникальные свойства, такие как способность к биоадгезии, растворимость и абсорбция, биоразлагаемость, нетоксичность конечных продуктов разложения и способность к замедленному высвобождению [4].

Целью данной работы является синтез хитозана и его производного КМХЗ на основе хитина из цист Артемии Аральского моря, определение их физико-химических и структурных характеристик. Для получения хитина из некондиционных цист артемии, собранных с побережья Аральского моря требовалось также провести очистку от минеральных примесей и подготовку исходного сырья для анализа его общего химического состава и выделения хитина.

## Материалы и методы

Для выделения качественного хитина были использованы некондиционные цисты артемии Аральского моря предварительно очищенные от примесей, обессоленные и измельченные на шаровой мельнице.

**Массовая доля влаги.** Массовая доля гигроскопической влаги в сырье была определена путем высушивания образцов при 100-105°C в течение 3 ч. до постоянной массы (согласно требованиям ГОСТа 23637) [5].

**Массовая доля белка в сырье** – по методу Кьелдаля (ГОСТ 13496.4-93.) [6].

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**Массовая доля жира** определена экстракционным методом в Соклете по обезжиренному остатку и ГОСТу 13496.15-97 (Методы определения содержания сырого жира) [7].

**Массовая доля минеральных** веществ была определена сжиганием органических веществ в муфельной печи при температуре 500-700<sup>0</sup> С в течение 5-6 часов до постоянной массы и ГОСТу 26226-95[8].

**Содержание азота в образцах хитозана** определяли по методу Дюма путем сжигания навески в кварцевой трубке за счет кислорода твердых окислителей в атмосфере двуокиси углерода [9].

### Методы получения хитина.

Для выделения хитина цисты необходимо предварительно очистить от песка согласно методам по определению остаточного количества песка в сырье Весниной и др. [10]. Далее промывая (обессоленная) и высушенная до влажности 9-10% циста была измельчена на шаровой мельнице. Полученная измельченная полидисперсная фракция цист была просеяна через сито с размером пор 125-130 мкм [11].

Хитин получали из цист Артемии Аральского моря путем модификации классического метода Б. В. Гайквата, Дж. М. Кохли и др. [12] по схеме ДПМК. На этапах депротеинизации (ДП), деминерализации (ДМ) и обесцвечивания внесены небольшие изменения в условия.

Для получения хитина из цисты Аральского Артемии сначала проводят ДП в 3,5% растворе NaOH, при соотношении 1:8, при температуре 100<sup>0</sup>С в течение 1 часа. Образовавшийся осадок отфильтровывают от щелочи и промывают дистиллированной водой до pH 7. Стадию ДМ проводили с 3,5% соляной кислотой, при соотношении 1:8, и комнатной температуре в течение 1 часа. Затем фильтруют и промывают до нейтральной реакции. В случае депигментации обработку 2-3% раствором H<sub>2</sub>O<sub>2</sub> проводили при комнатной температуре в течение 10-15 минут. Полученный хитин несколько раз промывали водой, затем этиловым спиртом, соотношение 1:6, в течение 15 минут. Полученный образец хитина сушили при комнатной температуре в течение 24 ч.

### Методы получения хитозана из хитина

Для получения хитозана на основе хитина из цист Артемии был выбран за основу метод В.В. Шикера и Е.С. Баташова с использованием «жесткого способа получения хитозана» [13-14], с некоторой модификацией условий, заключающейся в использовании 50% раствора гидроксида натрия, при соотношении 1:15 (вес/объем) и температуры 120-130<sup>0</sup>С, в течение 5ч. Выделенный хитозан, тщательно промыли водой до нейтральных значений pH. Для

обесцвечивания и удаления остатков липофильных примесей промывали ацетоном и экстрагировали 96% этиловым спиртом в течение 7-8 ч, при температуре 70-80<sup>0</sup>С. Полученный хитозан сушили при комнатной температуре в течение 24 ч.

Синтез КМХЗ проводили по методике, описанной в статье Н. Челикчи, С. Айхана Зибы и Мустафы Долаз [15]. Для получения КМХТ 1,5 г хитозана растворяли в 32,5 мл изопропилового спирта в течение 10 минут при комнатной температуре. Затем к суспензии последовательно прибавляли 11 мл 40%-ного NaOH и 35 мл изопропилового спирта при комнатной температуре и постоянном перемешивании в течение 30 минут. Далее в суспензию добавляли 7,5 г монохлоруксусной кислоты, повышали температуру раствора до 45<sup>0</sup>С и перемешивали в течение 3 часов. После этого раствор охлаждали до комнатной температуры и отфильтровали. После фильтрации раствора промывали 200 мл метанолом. Осадок с фильтровальной бумаги переносили в стакан вместимостью 200 мл, добавляли 100 мл метанола и 10 капель уксусной кислоты, стакан накрывали пленкой и перемешивали на магнитной мешалке в течение 14 часов при комнатной температуре. Затем раствор после 10-минутного отстаивания фильтровали и остаток промывали этиловым спиртом 3-4 раза.

### Инфракрасная спектроскопия (ИК)

ИК-спектроскопические исследования хитина, хитозана и КМХЗ проводили на ИК-спектрофотометре Perkin Elmer Spectrum 400 с ATR, в диапазоне частот от 4400 до 400 см<sup>-1</sup>, идентификацию полос поглощения осуществляли, основываясь на результатах работ [16]. Степень деацетилирования (СДА) хитозана определяли с помощью метода ИК. СДА хитозана рассчитывали на основе уравнения (1) по методу [17-18], в котором связывают полосы поглощения N-ацетил-D-глюкозамина связывают (A<sub>амид(I)</sub>), D-глюкозамина (A<sub>амид(II)</sub>) и со степенью СДА уравнением:

$$\text{СДА (\%)} = 100 - \left[ 31,92 * \left( \frac{A_{\text{амид(I)}}}{A_{\text{амид(II)}}} \right) - 12,20 \right] \quad (1)$$

Степень замещения (СЗ) КМХЗ определили с помощью метода ИК-спектроскопии и рассчитывали на основе уравнения (2) по методу в [18-19], в котором связывают полосы поглощения аминогруппами (A<sub>амид(II)</sub>) и карбоксиметильными группами (A<sub>карбоксиметил</sub>).

$$\text{СЗ (\%)} = 1 - \left( \frac{A_{\text{амид(II)}}}{A_{\text{карбоксиметил}}} \div 1,33 \right) * 100\%; \quad (2)$$

### Эксклюзионная жидкостная хроматографии (ЭЖХ)

ЭЖХ исследования полученных полисахаридов хитозана и КМХЗ проводили на высокоскоростном жидкостном хроматографе фирмы Agilent 1260 Infinity (США) с

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рефрактометрическим детектором. В качестве сорбента использовали PL Aquagel OH Mixed с линейной калибровочной зависимостью в диапазоне разделения по ММ от  $1 \cdot 10^2$  до  $6 \cdot 10^6$ . Скорость потока элюента составляла 0,8 мл/мин. Объем вводимой пробы 25 мкл. Обработку хроматографических данных осуществляли с помощью программы Windows Chemstation 7.

Молекулярную массу образцов хитозана и КМХЗ определяли с помощью принципа универсальной калибровки в ЭЖХ. Калибровку хроматографической колонки проводили с помощью узкодисперсных стандартов пуллуланов фирмы (PSS, Германия). Для расчета использовали следующие константы Марка-Куна-Хаувинка для: стандартов пуллуланов  $K=1,91 \cdot 10^{-4}$ , дл/г;  $a=0,67$ , хитозанов  $K=1,38 \cdot 10^{-4}$ , дл/г;  $a=0,85$  [20]. Для КМХЗ  $K=7,92 \cdot 10^{-4}$ , дл/г;  $a=1$  [21].

### Дифференциальный термогравиметрический анализ (ДТА).

Термическую стабильность хитозана и КМХЗ определяли с помощью измерений ДТА, выполненных на оборудовании SEIKO II TG-DTA (Япония). Количество образца, используемого для каждого измерения, составляло примерно 2,5-3,5 мг в платиновой чашке. Все образцы прогоняли в атмосфере азота и нагревали от 50 °С до 850 °С со скоростью нагрева 10 °С/мин.

### Дифференциальная сканирующая калориметрия (ДСК)

ДСК анализ был проведен с использованием DSC 3 Mettler Toledo с оборудованием, указанным в спецификации. Количество образцов примерно 2,0–3,5 мг помещали в платиновый поддон. Хитозан и КМХЗ прошли два цикла нагрева. Первый цикл нагрева был от 25 °С до 120 °С для удаления содержания влаги в образце, а второй

цикл нагрева был от 25 °С до 400 °С для определения свойств полимера. Хитозан и КМХЗ анализировали в непрерывном потоке газообразного азота при скорости нагрева 10 °С/мин.

### Сканирующий электронный микроскоп (СЭМ-анализ).

Морфологию хитозана и карбоксиметилхитозана наблюдали с помощью сканирования используя электронный микроскоп (СЭМ) (Jeol/Neoscope Jsm-5000) при ЕНТ = 20кВ. Образцы хитозана и КМХЗ имели порошкообразные формы.

### Результаты и обсуждение

#### Предварительная подготовка цисты Артемии к анализу.

Учитывая, что собранная с побережья биомасса цист содержит значительное количество тяжелых и легких примесей необходимо провести первичную очистку цист от этих примесей, поэтапным выдерживанием и промывкой биомассы в насыщенных солевых растворах (морской или соленой воде) и в пресной воде [22-23]. Во избежания завышенного содержания минеральных веществ при выделении хитина из некондиционных цист [24], также была проведена дополнительная очистка сырых цист от остаточного песка и обессоливание [25-27]. Далее высушенная до влажности 9-10% циста была измельчена на шаровой мельнице. Полученная измельченная полидисперсная фракция цист была просеяна через сито с размером пор 125-130 мкм

В таблице 1 представлены количественное содержание основных химических компонентов сырой и измельченной цисты рачка *Artemia parthenogenetica* Аральского моря.

Таблица 1

Сырьё	Влажность, %	Белки, %	Зола, %	Липид, %	Хитин, %
Цисты Артемии Аральского моря (качественный)	9-10	64,09	8,6-13,0	1,6-2,5	2,3-9,44
Цисты Артемии Аральского моря (некондиционные)	6-10	50,28	8,23-12,83	2,5	4,5-10,8
Измельченный цисты Артемии Аральского моря	9,56	59,77	3-4,27	10,0 -11,8	8,9

### Химические компоненты цисты рачка *Artemia parthenogenetica* Аральского моря

Как видно из таблицы количественное содержание химических компонентов измельченной цисты существенно не отличаются от таковых для сырой цисты. Закономерное повышение содержания липидов для измельченной формы связано с разрушением

внешней оболочки цисты и доступа экстрагента к внутренним липидным слоям.

#### Выделения хитина из цисты Артемии

Для выделения хитина были использованы некондиционные цисты рачка *Artemia parthenogenetica* Аральского моря предварительно очищенные от минеральных примесей и измельченные. В ранних публикациях по оптимизации условий выделения хитина из цисты



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мы отмечаем влияние концентрации реагентов, температуры, времени, а также последовательности процессов обработки на его выход и некоторые качественные показатели [24]. Полученные результаты не противоречили данным авторов Б. В. Гайквада, Дж. М. Кохли и др. [12], метод которых был взят за основу при выделении хитина из цисты артемии. Общая схема выделения хитина включает последовательность процессов ДП, ДМ и деколоризации (ДК) по схеме ДП–ДМ–ДК соответственно. С учетом собственных результатов исследований на этапах ДП, ДМ, ДК внесены небольшие изменения в условия проведения реакций.

Полученные качественные показатели хитина представлена в таблице 2 ниже. Как видно из данных таблицы, процессы ДП и ДМ более эффективно проходят при использовании измельченной цисты, т.к. даже однократная обработка сырья по схеме ДП–ДМ–ДК позволяет

получить хитин с высоким выходом и низким содержанием белковых и минеральных примесей.

### Получение хитозана из хитина

Как правило, хитин рассматривается как сырьё для производства хитозана, хотя хитин широко используется во многих областях, на практике могут возникнуть некоторые проблемы из-за его плотной надмолекулярной структуры. По этой причине вместо хитина предпочтительно использовать хитозан, который получают в результате деацетилирования хитина.

С химической точки зрения для деацетилирования хитина можно использовать как кислоты, так и щелочи. Однако гликозидные связи очень чувствительны к кислоте; поэтому чаще применяют щелочное деацетилирование [28-29]. Но и здесь стандартного метода деацетилирования не существует, и самым распространенным способом является

Таблица 2. Качественные показатели хитина из измельченной цисты рачка Артемии

Показатель	Хитина
Внешний вид	Порошок
Цвет	Тёмно-жёлтый
Массовая доля воды, %	8,6
Выход хитина, %	8,9
Минеральных веществ, %	2,68
Азот, %	5,97

применение растворов едкого натра в диапазоне массовых долей 35...50% с гидромодулем 3:1...10:1 при температуре 20...140°C; время обработки составляет 0,5... 10 суток. Традиционный способ получения хитозана осуществляется обработкой хитина концентрированными растворами едкого натра (40...50%) с десятикратным мольным избытком при температуре 100...150°C, в течение 2...3ч., при котором достигается содержание свободных NH<sub>2</sub>-групп не менее 75%. Для

повышения степени деацетилирования хитозана обычно применяют двукратную обработку раствором щелочи с массовой долей 50% в течение 1,5 часа и температурой 100°C с промывкой после каждой операции. При этом после второй стадии степень деацетилирования достигает более 90% [13].

На рисунке 1 показана схема получения хитозана из хитина.

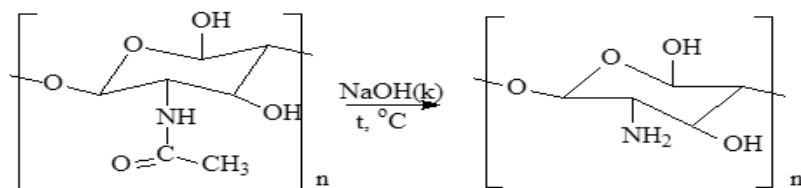


Рисунок 1. Получения хитозана из хитина

Исследованиями авторов [30] влияния природы растворителей на кинетику деполимеризации хитина и хитозана показано, что

при деацетилировании хитина в щелочных условиях происходит деструкция макромолекулы, хотя и не такая сильная, как при кислотной

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обработке. Интересен вывод авторов об отсутствии влияния щелочи и солей на кинетику расщепления гликозидных связей, и что роль инициатора расщепления гликозидной связи выполняет вода, которая присутствует во всех рассмотренных системах в избытке. Меньшая деполимеризация в 50% растворах NaOH объясняется, по-видимому, меньшей концентрацией воды (50 %), по сравнению с чистой водой (100 %).

Учитывая эти данные, для получения хитозана на основе хитина из цист Артемии, был выбран за основу метод В.В. Шикера и Е.С. Баташова с использованием «жесткого способа получения хитозана» [13-14], с некоторой модификацией условий, заключающейся в

использовании 50% раствора гидроксида натрия, при соотношении 1:15 (вес/объем) и температуры 120-130<sup>0</sup>С, в течение 5ч. Выделенный хитозан, тщательно промывали водой до нейтральных значений рН промывных вод. Для обесцвечивания и удаления остатков липофильных примесей промывали ацетоном и экстрагировали 96% этиловым спиртом в течение 7-8ч, при температуре 70-80<sup>0</sup>С. Полученный хитозана сушили при комнатной температуре в течение 24 ч.

Качественные характеристики полученного хитозана представлены ниже в таблице 3.

Как видно из данных таблицы 3. хитозан, полученный из хитина цист Артемии Аральского моря, представляет собой белое

**Таблица 3. Качественных характеристики хитозана на основе хитина из цист Артемии**

Показатель	Хитозана
Внешний вид	Порошок
Цвет	Белый
Массовая доля воды, %	12,55
Выход хитозана, %	21,67
Растворимость хитозана в 2% АсОН	95
Молекулярная масса, кДа	16
Степени деацетилирования, %	84

порошкообразное вещество, хорошо растворимое в 2% уксусной кислоте, имеет высокую степень деацетилирования – 90%, и молекулярную массу 16 кДа. Качественные показатели хитозана согласуются с результатами исследований Баташова Е.С. и Шикера В.В. Как видим, в нашем варианте увеличение времени деацетилирования привело к уменьшению средней молекулярной массы, повышения степени деацетилирования и высокой растворимости хитозана.

#### **Синтеза карбоксиметилхитозана из цисты Артемии.**

Введение в структуру хитозана карбоксиметильной группы, может резко увеличить растворимость хитозана при нейтральных и щелочных значениях рН, не влияя на его характеристики, что существенно расширяет возможности его практического применения.

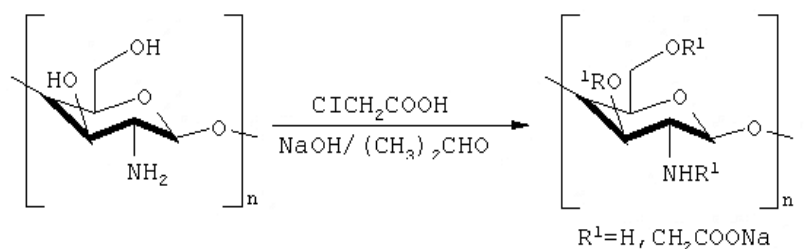
Водорастворимое производное N,O-КМХЗ может быть получено введением карбокси-

метильных групп в некоторые amino- и первичные гидроксильные участки глюкозамидных звеньев структуры хитозана. N,O-КМХЗ является гидрофильным и типичным амфотерным полиэлектролитом с противо-раковым и антибактериальным действием. Помимо растворимости в воде, он также обладает многими привлекательными физическими и биологическими свойствами, такими как удерживание влаги, гелеобразование и хорошая биосовместимость, что делает его многообещающим биоматериалом. N,O-КМХЗ можно получить с использованием хитозана, гидроксида натрия, изопропанола с хлоруксусной кислотой [31].

Синтез КМХЗ проводили по аналогии метода Н. Челикчи, С.А. Зибы и Мустафы Долаз [15] для карбоксиметилирования хитозана, полученного из панциря ракообразных креветок. На рис. 2 показана реакция получения КМХЗ.

**Impact Factor:**

<b>ISRA (India)</b> = 6.317	<b>SIS (USA)</b> = 0.912	<b>ICV (Poland)</b> = 6.630
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<b>GIF (Australia)</b> = 0.564	<b>ESJI (KZ)</b> = 8.771	<b>IBI (India)</b> = 4.260
<b>JIF</b> = 1.500	<b>SJIF (Morocco)</b> = 7.184	<b>OAJI (USA)</b> = 0.350

**Рисунок 2. Реакция получения N,O-KMX3**

Образование N,O-KMX3 согласуется с результатами анализа ИК-спектров.

**ИК спектры хитина, хитозана и карбоксиметилхитозана**

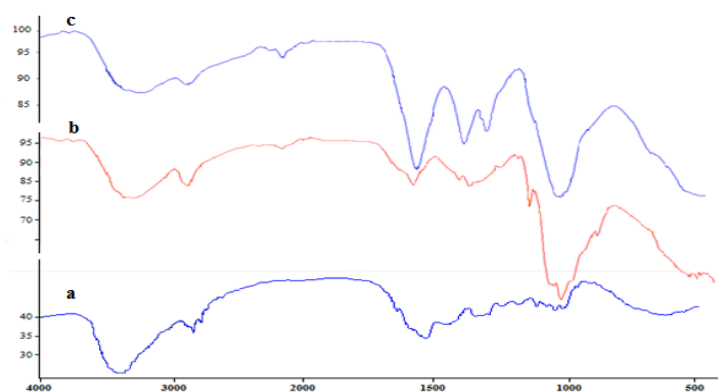
В природе существуют три кристаллические формы хитина;  $\alpha$ ,  $\beta$ ,  $\gamma$ .  $\alpha$ -хитин имеет антипараллельную алломорфную структуру, которая поддерживает водородные связи и создает очень компактную структуру, что приводит к высокой кристалличности и твердости. Природный хитин встречается в основном в  $\alpha$ -форме [31].  $\beta$ -хитин имеет параллельные цепи, менее кристаллические и менее упакованные, более гибкие и активные.  $\alpha$ -хитин может превращаться в  $\beta$ -хитин, но не наоборот [29].  $\gamma$ -хитин представляет собой смешанный состав  $\alpha$ - и  $\beta$ -форм [32-34].

Три алломорфа можно наблюдать с помощью рентгеновской дифракции и ядерного магнитного резонанса (ЯМР). Спектральный анализ ИК также позволяет нам понять кристаллическую форму хитинов.

В ИК-спектре хитина, полученного из цист *Artemia parthenogenetica* Аральского моря, наблюдались следующие полосы поглощения (рис. 3а): Широкая полоса поглощения при  $3444\text{ см}^{-1}$  связана с валентными колебаниями спиртовых групп  $\nu(\text{OH})$  при атоме С6 и гидроксильных групп при атоме С3  $2958\text{-}2854\text{ см}^{-1}$  — соответствуют асимметричным и

симметричным валентным колебаниям  $\nu_{\text{as,s}}(\text{CH}_2$  и  $\text{CH}_3)$  метиленовых и метиловых групп.  $1744\text{ см}^{-1}$  — деформационным колебаниям N-H-связи в первичных ( $-\text{NH}_2$ ) амидах. В случае  $\beta$ -хитина наблюдение большого одиночного пика при  $1640\text{ см}^{-1}$  соответствует растяжению водородной связи СО-группы с амидной группой соседней листовой цепи [35].  $1552\text{ см}^{-1}$  — деформационным колебаниям ( $-\text{NH}-$ ) связи в вторичных амидах;  $1442\text{-}1413\text{ см}^{-1}$  — деформационным колебаниям свободной О-Н связи;  $1381\text{ см}^{-1}$  — деформационным колебаниям С-Н связи в алкильных фрагментах, являющийся важным критерием подтверждения строения, так как оно отсутствует в спектрах соединений, не содержащих метильные группы;  $1315\text{ см}^{-1}$  соответствует деформационным колебаниям  $\text{CH}_3$  групп в алканах;  $1243$  и  $1206\text{ см}^{-1}$  — деформационным колебаниям связанных с водородными связями ОН-групп;  $1156\text{ см}^{-1}$ ,  $1115$  и  $1074\text{ см}^{-1}$  — валентным колебаниям С-О связи в первичных и вторичных спиртах;  $1029\text{ см}^{-1}$  — валентным колебаниям мостиковых С-О-С связи;  $953\text{ см}^{-1}$  — валентным колебаниям С-О и С-С связей и деформационным маятниковым колебаниям  $\text{CH}_2$ .

Эти результаты ИК-спектра полностью согласуются с опубликованными в литературе и могут подтвердить образование хитина.

**Рис. 3. ИК спектры хитина(а), хитозана (b) и КМХЗ (с)**

В ИК спектре хитозана (рис. 3-б) широкая полоса поглощения при  $3295\text{ см}^{-1}$  обусловлена

валентными колебаниями  $\nu(\text{OH})$  спиртовых групп при атоме С-6 и гидроксильных групп при атоме

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C-3.  $2868\text{ cm}^{-1}$  – соответствуют асимметричным и симметричным валентным колебаниям  $\nu_{as}$ ,  $\nu_s$  ( $\text{CH}_2$  и  $\text{CH}_3$ ) метиленовых и метиловых групп [16]. Характерные для хитозана полосы амида I ( $\text{C}=\text{O}-\text{NHR}$ ) и аминогруппы ( $-\text{NH}_2$ ) наблюдались при  $1588\text{ cm}^{-1}$  и  $1380\text{ cm}^{-1}$  [36] соответственно. Поглощения при  $1146\text{ cm}^{-1}$  соответствуют валентным колебаниям C-O связи в первичных и вторичных спиртах;  $1030\text{ cm}^{-1}$  – валентным колебаниям мостиковых C-O-C связи;  $891\text{ cm}^{-1}$  – деформационные колебания  $\text{C}_1-\text{H}$  в  $\beta$ -сахарах. Эти результаты полностью согласуются с опубликованными в литературе и подтверждают образование хитозана по ИК-спектрам. Степень деацетилирования хитозана, рассчитанная по уравнениям (1) и (2) [17-18], составляет 84,5% [37].

В зависимости от расположения зона поглощения функциональных групп хитозана, N-ацетил-D-глюкозамина (A1,380), D-глюкозамина (A1,588) в предложенные методики [17-18], на основе уравнению (1) и (2) рассчитывали степень деацетилирования, которая составляет 84,5% [37].

Карбоксиметилирование вызывало структурные изменения, которые были идентифицированы при сравнении ИК-спектров хитин, хитозана (рис.3). ИК-спектре КМХЗ пики при  $3252\text{ cm}^{-1}$  представляют собой растяжения O-H и N-H. Это появление широкой полосы свидетельствует о более гидрофильном характере КМХЗ по сравнению с исходным хитозаном.

Пик  $2879\text{ cm}^{-1}$  может быть отнесен к  $\nu(\text{C}-\text{H})$  из групп  $\text{CH}_2$ . Введение карбоксиметильных групп подтверждается появлением интенсивной полосы при  $1583\text{ cm}^{-1}$  и умеренной полосы при  $1403\text{ cm}^{-1}$ . Полосы  $1583-1403\text{ cm}^{-1}$ , соответствующие этой карбоксильной группе и группе  $-\text{CH}_2\text{COOH}$ , являются сильными в спектре ККМ, что указывает на карбоксиметилирование как амино-, так и гидроксильных групп хитозана.

Кроме того, образование КМХЗ также подтверждается усилением полосы при  $1067$  и  $1323\text{ cm}^{-1}$ , соответствующей  $\nu(\text{C}-\text{O}-\text{C})$  и  $\nu_s(\text{C}-\text{OH})$ . Валентные колебания в диапазоне  $1154-1029\text{ cm}^{-1}$  отнесены к гликозидным связям C-O-C и C-O. Полоса валентных колебаний C-O при  $1028\text{ cm}^{-1}$ , соответствующая первичной гидроксильной группе, исчезает, что подтверждает высокое карбоксиметилирование OH-6 [38]. В хитозане и КМХЗ полосы при  $989$  и  $943\text{ cm}^{-1}$  были приписаны валентному колебанию C-O пиранозного кольца и валентному колебанию C-O с вкладом деформации C-C-H и C-O-H.

Таким образом, произошло карбоксиметилирование некоторых амино- и первичных гидроксильных фрагментов глюкозаминовых звеньев структуры хитозана [21] и мы можем заключить, что структура представляет собой N,O-КМХЗ. Согласно по ИК спектру КМХЗ определено, что его степень замещения составляет 33,4%.

**Определение молекулярной массы хитозана и КМХЗ методом эксклюзионной жидкостной хроматографии (ЭЖХ)**

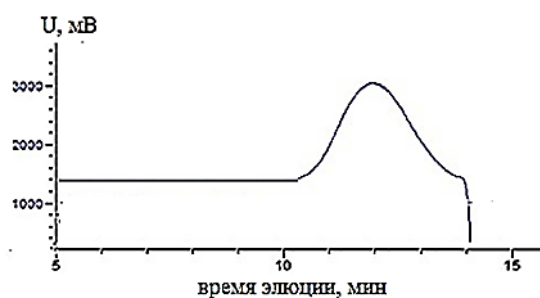


Рисунок 4. Гель-хроматограмма хитозана. Хроматографическая колонка TSK GM PW<sub>XL</sub>.

На рис.4 представлена гель-хроматограмма хитозана, полученная в 0,2 М ацетатном буферном растворе (pH 4,4). Расчет молекулярной массы хитозана проводили с использованием принципа универсальной калибровки в ЭЖХ. Рассчитанное значение ММ для хитозана составляло 10 кДа.

На рис.5 представлена гель-хроматограмма КМХЗ, полученная с использованием элюента, содержащим 0,1 М  $\text{NaNO}_3$  в воде. КМХЗ в воде проявляет полиэлектролитное свойство из-за наличия в цепях карбоксильных групп и поэтому

для подавления полиэлектролитных эффектов и реализации молекулярно-ситового механизма разделения в качестве элюента использовали водно-солевой раствор. Из рис.5 видно, что образец состоит из двух хроматографических пиков, что соответствует двум фракциям разной ММ. Для расчета ММ КМХЗ также применили принцип универсальной калибровочной зависимости.

## Impact Factor:

ISRA (India) = 6.317	SIS (USA) = 0.912	ICV (Poland) = 6.630
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JIF = 1.500	SJIF (Morocco) = 7.184	OAJI (USA) = 0.350

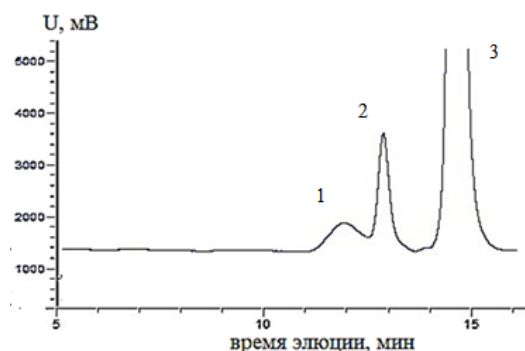


Рисунок 5. Гель-хроматограмма КМХЗ. Элюент: 0,1 М NaNO<sub>3</sub> в воде.

Рассчитанные значения ММ составляют: для 1-фракции 3 кДа, а 2-фракции 800 Да. Уменьшение ММ КМХЗ можно объяснить гидролизом молекул хитозана в процессе карбоксиметилирования.

**Дифференциальная термогравиметрическая (ДТГ) и дифференциально-сканирующая калориметрический (ДСК) анализы хитозана и КМХЗ.**

Проведен термический анализ (ДТГ/ДСК) хитозана и КМХЗ, полученных из цисты Артемии Аральского моря, и изучено влияние степени

деацетилирования этих полисахаридов на процесс их термического разложения.

Известно, что вид кривых ДТГ и ДСК зависит от гетерогенного характера термического разложения, протекания различных химических реакций, разрушения водородных связей, конформационных и фазовых переходов [39]. При термическом разложении, видимо, будет протекать процесс термоокислительной деструкции хитозана и КМХЗ, сопровождающийся разрушением гликозидных, ацетамидных и карбоксиметильных связей (рис. 6).

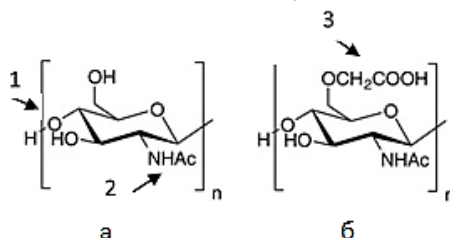


Рисунок 6. Структурная формула хитозана (а) и О-карбоксиметилхитозана (б); 1– гликозидные связи; 2 – ацетамидные связи; 3- карбоксиметильные связи.

### ДТГ и ДСК анализы хитозана

ДТГ-анализ хитозана изучали в температурном диапазоне 50-850°C (рис. 7), а ДСК-анализ изучали в диапазоне температур 25-400°C (рис. 8).

Как видно из ДТГ-анализа хитозана на рисунке 1, процесс термической дегградации наблюдался с начальной потерей массы хитозана

5,7% за счет испарения воды при 100°C. Пик разложения хитозана составляет около 187-404°C.

При температуре 303 С на кривых ДСК хитозана (рис.8) имеется эндотермический пик, соответствующий удалению из образцов адсорбционной воды. Потеря массы хитозана, составляет 51,8 %, скорость потери массы равна 3,12 мг/ в минуту.

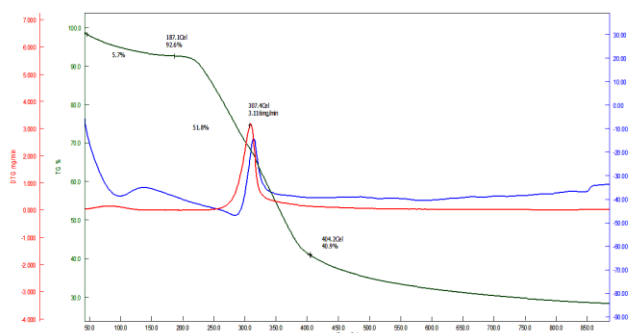


Рисунок 7. Дифференциальная термогравиметрическая анализ хитозана

## Impact Factor:

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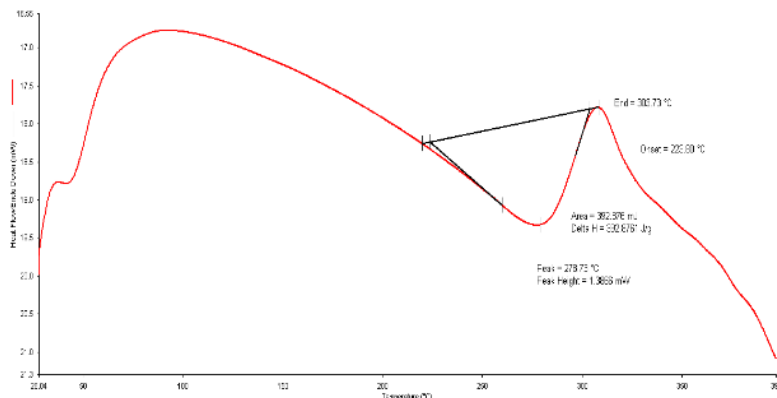


Рисунок 8. Дифференциальная сканирующая калориметрия хитозана

Полученные экспериментальные данные согласуются с литературными сведениями. Так, в работе [40-41] установлено, что изменение массы при деструкции хитозана (со степенью деацетилирования 84 %) составляет 52 %.

ДТГ и ДСК анализы карбоксиметилхитозана  
ДТГ-анализа КМХЗ изучали в температурном диапазоне 50-850 °С (рис. 9), а ДСК-анализ изучали в диапазоне температур 25-400°С (рис.10).

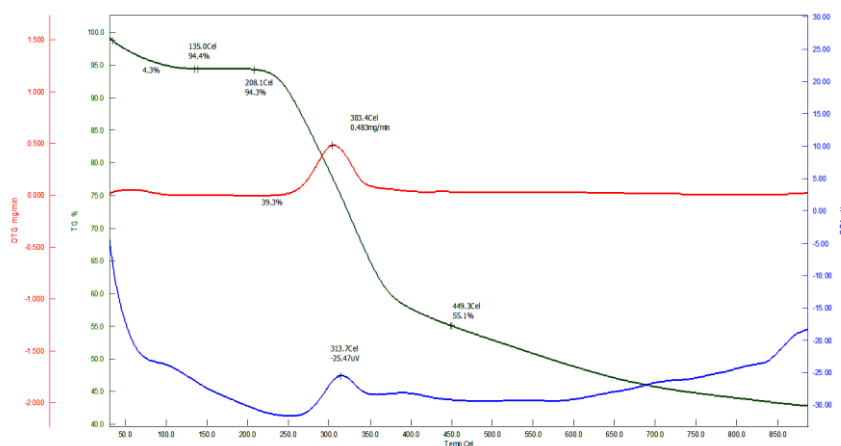


Рисунок 9. Термогравиметрический анализ КМХЗ

Как видно из рисунка 10, процесс термической дегградации наблюдается при температуре 25–85°С, начальная потеря веса КМХЗ на 4,3 % связано с испарением воды.

Второе тепловое событие начинается примерно при 135°С и продолжается до 450°С для

КМХЗ и сопровождается потерей массы на 39,3% соответственно. Это термическое событие соответствует разложению основной цепи хитозана и отщеплению замещающих групп в карбоксиметилированных производных [42].

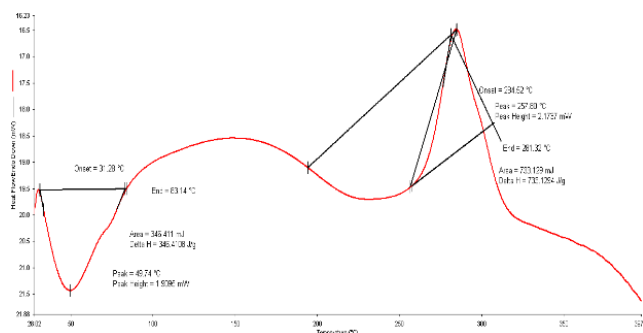


Рисунок 10. Дифференциальная сканирующая калориметрия карбоксиметилхитозана

## Impact Factor:

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Как видно из рис. 10, КМХЗ демонстрирует два термических явления: первый эндотермический и второй экзотермический пики. Первый эндотермический пик, наблюдаемый при 49,7 °С, формируется за счет испарения влаги в течение первого периода нагрева. Экзотермический пик (Td1) появляется при 257,8 °С, что соответствует термическому разложению полимерной цепи [21, 42]. Согласно результатам, представленным рис. 7,8,9,10 производные хитозана демонстрируют большую потерю массы на этой стадии, поскольку карбоксиметилирование повышает их гидрофильность.

Установлено, что хитозан терял в весе больше, чем КМХЗ, при температуре выше 400°С. Это можно объяснить деградацией деацетилизованной части молекулы [15].

### Сканирующая электронная микроскопия (СЭМ) анализа хитозана и КМХЗ.

Морфологию порошков хитозана с разными размерами частиц анализировали с помощью СЭМ. Как показано на рисунке 11, порошкообразная форма хитозана относительно непрозрачна, имеют слегка шероховатую поверхность и частицы неправильной формы.

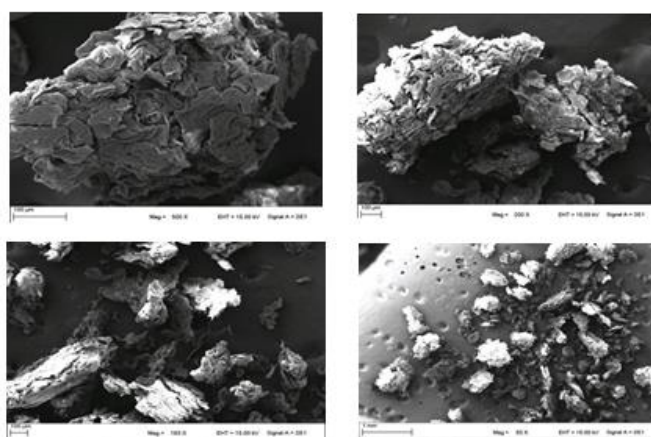


Рисунок 11. СЭМ анализ хитозана

На основании данного СЭМ-анализа видно, что поверхность хитозана была неровной и имела слоистую поверхность и микроструктуру. Увеличение от 50 до 500 раз выявило ямчатую и пористую поверхность хитозана [15].

### СЭМ анализы КМХЗ

Как показано на рис. 12, частицы КМХЗ относительно прозрачны, чем в хитозане. КМХЗ имеет слегка шероховатую поверхность и частицы неправильной формы.

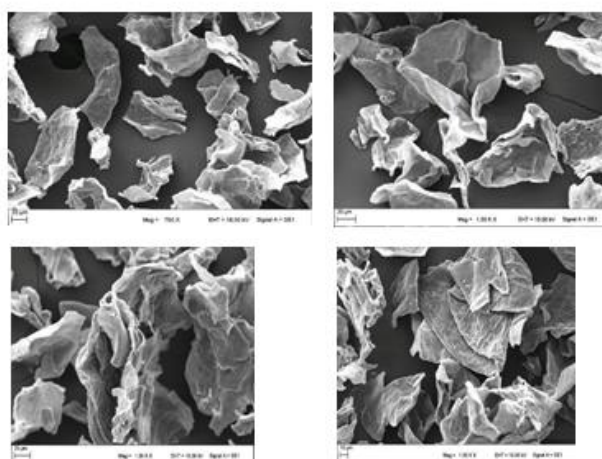


Рис. 12. СЭМ анализ карбоксиметилхитозана

Ширина частиц КМХЗ больше, чем у частиц хитозана, что связано с эффектами образования на их поверхности объемных групп (-CH<sub>2</sub>COOH).

Напротив, длина частиц КМХЗ была меньше, чем у частиц хитозана из-за эффектов химической

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реакции при модификации поверхности, которая привела к разрыву цепи

На основании СЭМ-анализа поверхность КМХЗ была неровной и имела слоистую поверхность и микроструктуру. Тот факт, что КМХЗ имеет неровную поверхность, указывает на наличие нового слоя, прикрепленного к поверхности хитозана [15, 43].

### Заклучение

Успешно синтезированы хитозан и его карбоксиметильное производное, полученные на основе хитина из некондиционных цист рачка Артемии Аральского моря. Введение карбоксиметильных групп в хитозан подтверждено методом ИК-спектроскопии. ИК, ДТГ и ДСК- анализы подтверждают, что термическая стабильность карбоксиметилированного образца выше, чем у хитозана. Результаты СЭМ-анализа показали, что образцы хитозана и КМХЗ имеют неравномерную морфологию поверхности и пористую структуру.

Методом ЭЖХ установлено, что водный раствор КМХЗ проявляет полиэлектролитное свойство, а при использовании в качестве элюента водного раствора  $\text{NaNO}_3$  с концентрацией 0,1 моль/л происходит подавление эффекта полиэлектролитного набухания. Рассчитанное значение ММ для хитозана составляло 10 кДа. Образец КМХЗ состоит из двух фракций разной ММ. Определенные значения ММ составляют: для 1-фракции 3 кДа, а 2-фракции 800 Да. Уменьшение ММ КМХЗ можно объяснить гидролизом молекул хитозана в процессе карбоксиметилирования.

Полученные результаты показывают, что цисты Артемии Аральского моря являются хорошими источниками для получения хитозана, а синтезированный КМХЗ может быть использован во многих областях, таких как пищевая промышленность, медицина, фармацевтика, сельское хозяйство и др. [15].

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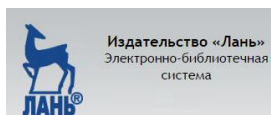
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Signed in print: 30.12.2022. Size 60x84  $\frac{1}{8}$

«Theoretical & Applied Science» (USA, Sweden, KZ)

Scientific publication, p.sh. 70.5. Edition of 90 copies.

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Printed «Theoretical & Applied Science»