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IT HAS BEEN ACCOMPLISHED

By

V. V. Parin

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It has Been Accomplished !

by

V.V.Parin

It has been accomplished !

As a fantastic-giant roller has this word rolled over our planet. It hummed in wires of telephone lines. Scattering by a firework of dots and dashes it came off from under the keys of the telegraphers and radio transmitters. Beginning its path in Moscow it travelled over all meridians and parallels, sounding in every language of the world. It has been accomplished !

The dreams of the Russian scientist-revolutionary Nikolay Kibal'chi, confined in the stony jail first utopist-communist Fomi Campanelli have become a reality/.

A son of the land- simple Russian man, Communist Yuriy Alekseyevich Gagarin, journeyed into the cosmos.

It is he, our soviet man, who opened the door into the future. He opened the way into the tomorrow.

Many grandiose achievements thanks to our famous XX century. The genius of scientists, creativeness of engineers, the inspired labor of workers gave to the world TV and antibiotics, jet aviation and polymers. Having conquered the atom, people performed a wonder. Man's flight into the cosmos - a wonder of all the wonders. It is a scientific record, a wonder of which history has no equal.

A feeling of pride and happiness grips today every soviet man, all the good people of the world. Today we have a celebration. And in this celebration we give the results of what has been accomplished. We give these results not at all for the purpose of intoxicating ourselves with its successes. By giving the results hoping that in this

way we will enable to make farther progress in this respect.

The name of Konstantin Eduardovich Tsiolkovskiy is being repeated today in all languages of the world. And many years back no one even knew the modest teacher from Kaluga, who ventured to practically solve Newton's problem and dispatch a rocket to the Moon. Konstantin Eduardovich wrote already then " At the beginning we unavoidably have: idea, fantasy, yarn. Then follows scientific calculation. And at the final end, utilization crowns the thought ".

Imagine a sheet of photopaper. A white sheet, on which nothing can be seen until it is developed. Much effort has to be applied to obtain an image on that sheet. I mentioned photography because the activities of the scientists deciding to conquer the cosmos were nothing but a white sheet of paper.

The first dot on that sheet was plotted by physics. It gave an answer to the question on what rocket velocity should be. Scientists have conceded that a velocity of 7.91 km/sec assures under certain conditions the possibility of transforming heat into an artificial satellite of the Earth. They explained, that at a velocity of 11.2 km/sec the body will already be capable of overcoming terrestrial gravitation and escape into cosmic space of our solar system. They succeeded in figuring out that at the third cosmic velocity - 16.3 km/sec - it is possible to send a rocket to beyond the limits of the solar system. Thought, fantasy, yarn acquired scientific calculation.

Much effort was required to transform the prerequisites of creating a cosmic ship from theory into practice of concrete engineering-technical constructions. Not only blueprints of rockets have appeared but what is most important problems of high power rocket engines as well as rocket fuels have been solved.

We still remember the day, when having broken the obstacles into the cosmos, the first soviet satellite weighing 83.6 kg made a round trip around our planet.

From that memorable day on a little more than three ^{years} have passed. These years were a shining firework of successes in the field of mastering the cosmos. You recall the flight of the dog Layka. The first "parcel" to the Moon - a banner of our

country. Photography of the reverse side of the Moon. Flight of the first cosmic ship-giant weighing 4540 kg. The first trip of the Zoo-Botanical Garden headed by dogs Byelka and Strelka in August of past year. Finally, flights of the third, fourth, fifth cosmic ships.

With exclusive scrupulousness have been plotted the results on the sometimes white sheet of unknown. But each new "development" appeared to be more difficult and difficult. And then entirely new branches of science originated and even new sciences such as cosmic biology and medicine. It has been confronted with the task of clearly and absolutely truly to represents all the functions of the human organism in cosmic flight. It was necessary to explain to what dangers a person trying to invade the cosmos will be exposed to. It was necessary to solve how to shield and protect the human being against such hazards.

There were not sufficient methods for investigating and theorizing cosmic biology and medicine only. And all branches of science came to the aid to the one who was brave enough to offer safety for life and health of the cosmonaut. Into organic relationship with cosmic biology and medicine came biophysics and biochemistry, physiology and aviation medicine, aerodynamics and rocket technology, geophysics and astronomy, radiology and radio electronics and other sciences.

What did we know to that time about the cosmos ? Truthfully speaking, very little. In essence this was no knowledge, but assumptions. And assumption is not science. In the best event it is only a stimulus for its development.

We journeyed over a desert where there were almost no reference points. Our knowledge was reduced to the following.

Blast off. The cosmic ship gains speed. It travels faster and faster. The flight is so impetuous that considerable overloads are created.

The ship orbited. Here we have weightlessness.

The journey continues. The cosmonaut is in the zone of ultraviolet and cosmic corpuscular radiation. Cosmic radiation has greater penetrability, and it is danger

ous.

Finally, the descent to Earth, Deceleration of the ship. And overloads again, a sharp rise in temperature.

At the beginning scientists were interested in magnitudes of these overloads and intensity of ray radiation. They were determined by special instruments mounted on board the rockets and the first satellite.

The numerical values became known to science. But how will living organisms react to these values ? How do they reflect themselves on the activities of the respiratory apparatus, blood bearing and blood forming apparatuses, central and peripheral nervous systems ?

At the time when in the stillness of construction offices and in the noises of factory shops were being produced rocket-carriers of future cosmic ships, when the engine of the rocket for the second man-made Earth satellite weighing 508.3 kg was being readied for launching and the Americans calculated its power, into the upper layers of the atmosphere one after the other were dispatched the first voyagers. These were companions of the already legendary dogs Layka, Byelka, Strelka, Zvezdochka and Chernushka . Their names will also be added to the history of mastering the cosmos. Their names were Ryzha, Lamka, Albino, Modnitsa, Kozyavka, Linda, Malyska. Some of them made several vertical ascends to altitudes of 100, 200 and more than 400 km. Ivan Petrovich Pavlov once said: "The dog brought the human being into people". Flights of four-legged cosmonauts opened for man a way into the cosmos.

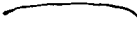
Experiments on dogs were the basic method of soviet investigations. This is legal. To this we were called upon by the better traditions of native science. It is known that the experiment as a basic method of investigating was the basis of the most grandiose discoveries by K.A. Timiryazev when studying the physiology of plants, of I.I. Mechnikov in developing the theory of phagocytosis, of I.P. Pavlov in decoding the mechanism of higher nervous activity.

But one thing is experimentation in terrestrial physiology, where the scientists

have the chance of directly observing the experiment and when necessary intervene in it. Here it was necessary to carry out experiments on experimental animals being at a great distance from the researchers. Nevertheless it was necessary to continually measure the arterial pressure in the living things at the time of the flight. It was necessary to record an electrocardiogram (bioelectric activity of the heart), tones of the heart, depth and frequency of breathing. All this was done with the aid of telemetering.

Special converters (sensing elements), placed on the body of the animals, were supposed to determine the physiological indications and convert same into electric current pulsation. In turn the electric pulses had to modulate radio waves, emitted by the transmitters, which were situated on board the flying labs. It was necessary to create such an apparatus, which has minimum weight (on a cosmic ship every gram is taken into consideration), capable of carrying various physiological investigations simultaneously, memorize their results and transmit the obtained information over radio-telemetering channels.

Each alternate flight of the four-legged cosmonauts brought new discoveries. A photo showing the life activity in the cosmos has become more clearer and clearer. Step by step cosmic biology and medicine marched toward the realization of the task.

Four-legged cosmonauts brought down to Earth answers to numerous enigmatic questions. Especially, the flight by Layka showed, that the animal has endured with satisfaction the  acceleration on the way from blast off to orbiting. It was explained that during long stay under the state of weightlessness the organism of the dog experienced no considerable disorders.

At the very same period and somewhat earlier on dogs participating in flights on vertically take off rockets, was worked out a method of registering physiological functions and methods of safe return of the animals to Earth.

Of great value to science was the flight of the second cosmic ship. The basic feature of this flight consisted in the evolutionary approach to the experiments being carried out.

In containers aboard the ship were placed animals and plant organisms, very different in the complexity of their physiology. Here were assembled different substances - from dogs to microbes.

I was often asked the question: why does the USSR conduct its experiments on dogs while the USA is using monkeys? The fact here is that it is very difficult to train a monkey to calm behavior under flight conditions. They are very difficult in preflight training. Dogs, on the other hand, behave in flight and during flight training, as under ordinary conditions, - obedient and calm. The blast off of dogs can be carried out without chemically doping their nervous system. Monkeys must be narcotized before the flight. Narcosis changes practically nothing in the activities of the heart and lungs. But how about the nervous system... It is known that a fainting spell may some times originate also during normal activity of the heart and lungs. To avoid unreliable results which may appear during the cut off of the higher nervous activity mechanism, and that is why a selection was made in favor of dogs.

Byelka and Strelka returned to Earth, bringing remarkable results. Investigations showed that changes in pulse and respiration frequency along the section of descent were not of pathological nature but rather a normal adaptive reaction in response to the effects of new outer factors.

Safe return of Byelka and Strelka from the cosmos enabled to carry out long lasting and detailed investigations to reveal the consequences of the flight. Particularly, the possibility was obtained to check again the effects of cosmic radiation on the organism. Investigated were the effects of flight on the ability of white and red corpuscles to absorb bacteria, as well as on the capability of substances, included in the composition of the blood, to act destructively against the microbes.

Results of each investigation were accepted as reliable only to the point after analogous results have been obtained from repeated experiments on various living substances and plant organisms. For this purpose among the inhabitants of the Zoo-Botanical Garden were also situated two white lab rats. Their task was to bring replies

to questions on the effect of cosmic flight on the higher nervous activity.

We ask ourselves sometimes: if higher substances, let us say, dogs, do satisfactorily endure the flight, why then do we send into the cosmos monocellular substances and plants? This was governed by definite purposes. For example, it was necessary to learn, whether the cells present in the cabin are damaged in general by radiation present in the cabin or is the destruction of a part of the cells compensated by the generation of new cells.

It is known, that on the surface of the skin and mucous membranes microbes-saprophytes live and thrive. Under ordinary conditions the organism possesses a natural and acquired immunity (imperception) to infections and resistance to the toxic effect of microorganisms. Will these qualities disappear in cosmic flight? An answer to this question was given by dispatching a piece of skin into the cosmos. After returning back to Earth this piece of skin was planted back on the body of its owner. In this way was obtained the possibility of thoroughly investigating the consequences of cosmic journey. In this way were explained problems about the natural protective functions of the organism.

Finally a "photo of cosmic physiology" became absolutely clear.

Since I have already said a lot about photography, I shall resort to it for the last time. Flights of the fourth and fifth cosmic ships with Zvezdochka and Chernushka dogs on board served as a special "confirmant". They followed the object again to make certain about the accuracy of previously obtained results.

And so, science reported, that man's flight into the cosmos on board a soviet ship is connected with no danger to his health and life.

Everything was ready for the invasion of intraastral distances.

And here we can report about its realization!

Several years ago Nikita Sergeyevich Khrushchev said:

"The launching of man-made Earth satellites appears to be a way of competing between socialistic and capitalistic countries. And socialism won this competition".

These were gains on the first stage of mastering the cosmos. Now in the back of us is victory in general. On the way into interplanetary spaces, in the interastral distances burns a green light.

The Poet said: " create, think out and test ".

Create, think out, test, my young friend reader of the "Smena magazine. Learn from your fathers and mothers, from older sisters and brothers. Soon they will undertake a journey toward the nearest planets. Soon will come to reality the predictions of K.E.Tsiolkowskiy: "Heroes and daredevils will built the first air routes- Earth - orbit of the Moon, Earth - orbit of the Mars and even further: Moscow-Moon, Kaluga-Mars. "

With you, our youth, our change, our Komsomolia (Communist Youth), - the way into the galaxy.

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