

# Cosmic Rays in the “Urusvati” Institute by Archives of Nicolas Roerich Centre-Museum (Moscow)

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**Abstract.** The history of cosmic rays study by means of ground-based methods in the 1930s contains some gaps. The press barely covered the study of cosmic rays at the "Urusvati" Himalayan Research Institute that functioned in the Indian Himalayas in 1928-1939. Archival materials of the "Urusvati" Institute now stored at the International Centre-Museum by name of N.K. Roerich (Moscow), give evidence to the active participation of the Institute staff in the study of cosmic rays. By the initiative of A.H. Compton, in 1932 several expeditions on the studies of cosmic rays were organized in different parts of the world. One of these expeditions passed through the Himalayas in the region of the South-Eastern Ladakh. The report on this highland expedition which took place at the altitude of 19,500 feet above the sea level was published by J.M. Benade in the "Urusvati Journal" (was issued during 1931-1933). Cooperation between George Roerich, the Institute Director, and Prof. J.M. Benade in expedition to Ladakh has been documented.

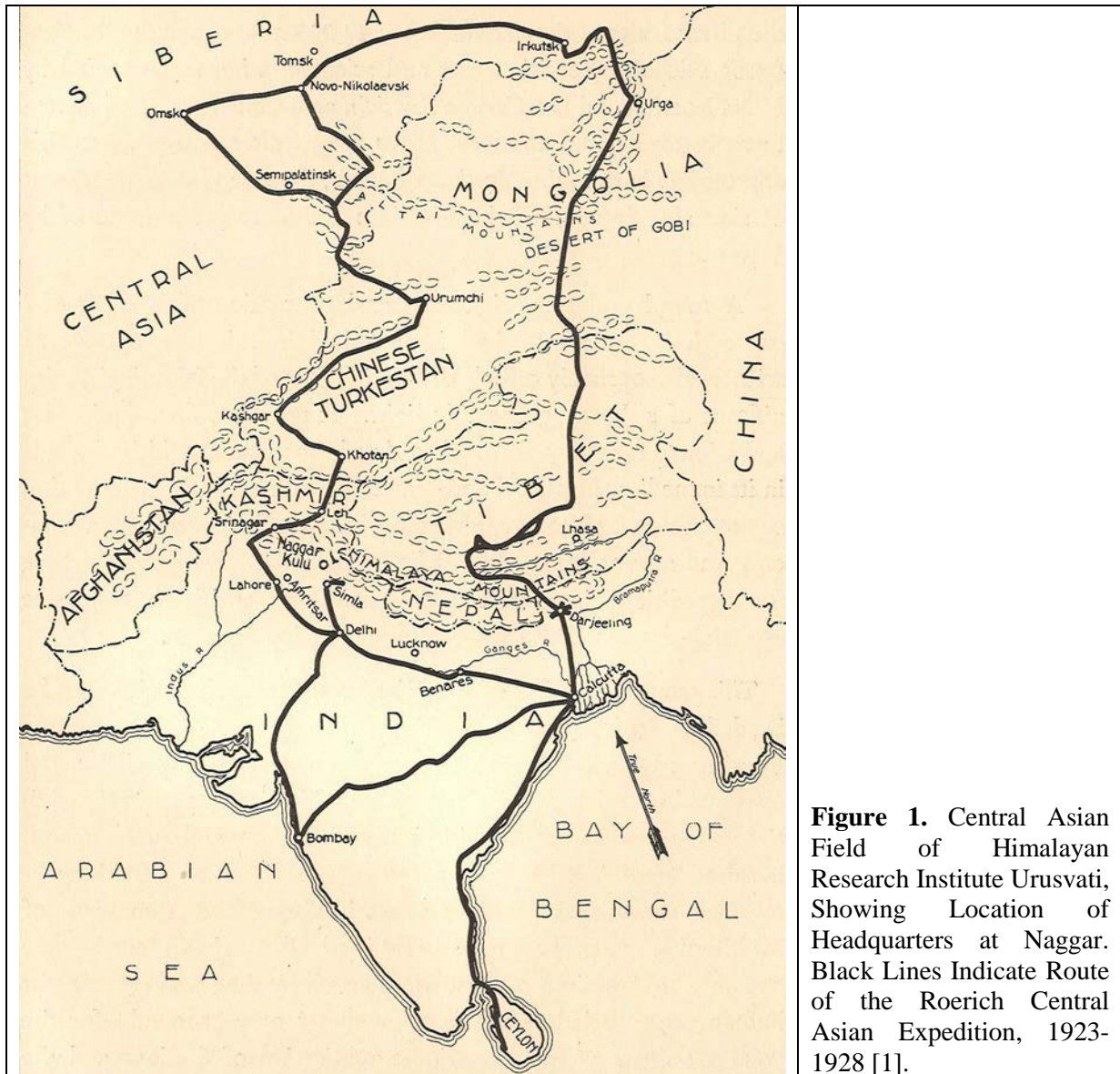
## 1. Introduction

"Urusvati" Himalayan Research Institute was founded in Darjeeling in the summer of 1928 by the Russian artist and scientist Nicholas Roerich (1874-1947) after his grand Central Asian expedition of 1923-1928 (figure 1), which he carried out accompanied by his wife Helen Roerich (1879-1955) and their son, archaeologist George Roerich (1902-1960). In December of that year, the Institute was relocated to the valley of Kullu, the State of Naggar, India [1]. Among the scientific objectives that influenced the choice of the place for the Institute, there were issues of cosmic rays research. Thus, H. Roerich, Honorary President-Founder of "Urusvati", wrote: "The place of the [Institute] station was chosen quite consciously and deliberately, as the Himalayas give countless opportunities in all respects. The attention of the scientific world is drawn to these heights. New cosmic rays that give humanity new valuable energy can be studied only on the heights ... "[2]. The Roerichs were aware of the latest researches in this area as evidenced by the archive papers of those years [3, 4].

## 2. Scientific Studies at the “Urusvati” Institute

The "Urusvati" Institute conducted research in archeology, ethnography, botany, biochemistry, as well as in astronomy and meteorology. The Director of the Institute, George Roerich, during his research

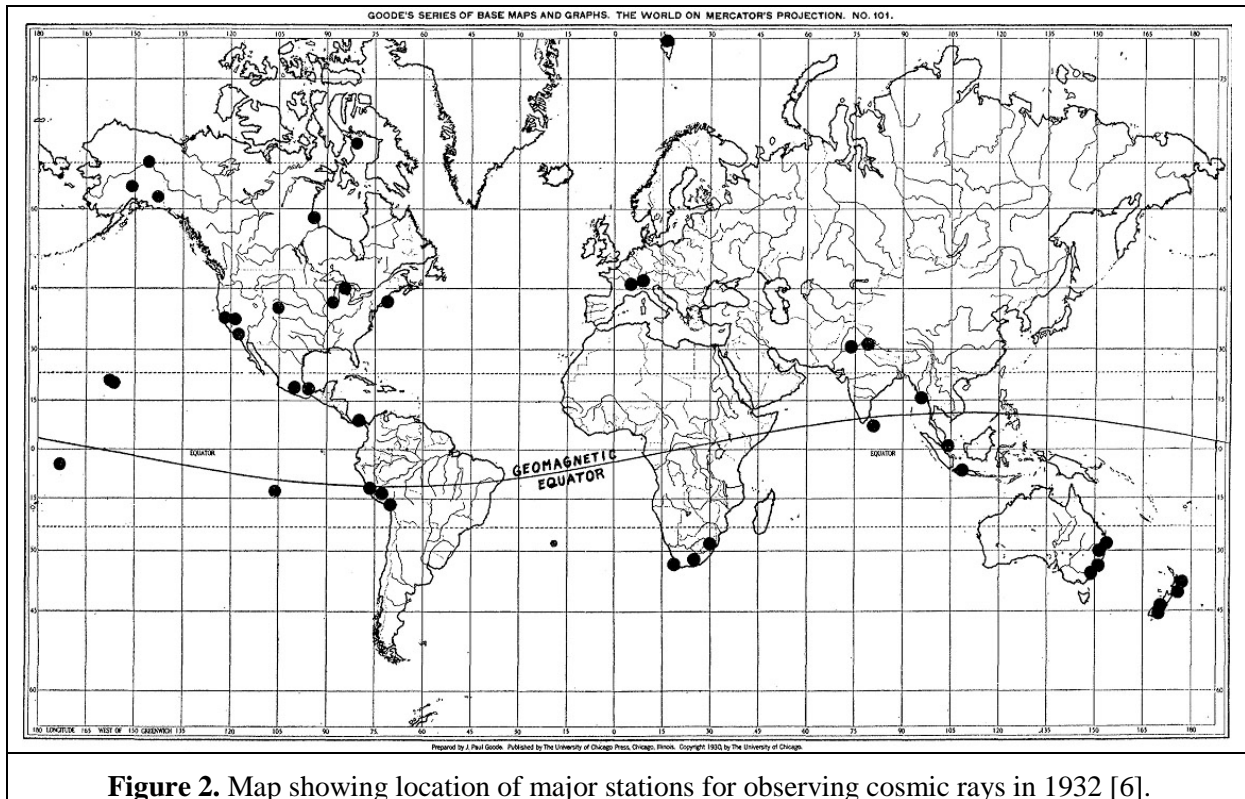
trip to America and Europe in 1929-1930, managed to interest the international scientific community in the exchange of scientific information and assisting to the scientists visiting Asia. In 1931-1932 the Institute conducted five expeditions to the Himalayan regions [for example, 5]. In addition to its headquarters in Kullu, the Institute had its own scientific base beyond the Rohtang Pass in Lahul.



**Figure 1.** Central Asian Field of Himalayan Research Institute Urusvati, Showing Location of Headquarters at Naggar. Black Lines Indicate Route of the Roerich Central Asian Expedition, 1923-1928 [1].

In 1932 one of the expeditions aimed at study of cosmic rays and initiated by A. Compton [6], passed through the Himalayas (figure 2). This expedition was led by J.M. Benade, a physics professor at the Forman Christian College, Lahore (India). He conducted similar studies in Ceylon, Java and other places, and, apparently, he was well experienced in organization of expeditions to remote areas. The route of his expedition passed through the Rohtang Pass and Kullu [7]. By August 12, 1932 Benade's expedition reached the maximum height of 19,500 feet (5850 meters above sea level), Lanyar La, 30°N, 78°E, at which ground-based observations of cosmic rays were ever carried out. At this height measurements were taken during two days and by two different instruments. It is interesting to note that right on the 12th of August Prof. E. Regener (Germany) obtained a record of altitude measurements by launching a balloon with recording electroscopes for cosmic rays registration

to a height of 17.5 miles (28 km) [8]. Subsequently, A. Compton [6] included Benade's data (Lahore and Lanyar La points) into the summary table of the high-altitude and latitude variation of cosmic ray intensity around the globe. Below, basing on archival materials, we will try to prove that Benade chose this route by no accident, for in Kullu the "Urusvati" Institute was located.



**Figure 2.** Map showing location of major stations for observing cosmic rays in 1932 [6].

The staff and correspondents of the "Urusvati" Institute [1] were prominent scientists, including such world-renowned physicists: A. Einstein, R. Millikan, A. Michelson, and L. de Broglie. We assume that the Roerichs' prominence as scholars and experts on local conditions attracted J.M. Benade when he was choosing a high-mountain route. In any case, close relationship between the expedition and the Institute can be proved by the following letter [9]:

"G.N. Roerich – J.M. Benade, December 26, 1932, Naggar, Kullu, Punjab.

Dear Sir,

I acknowledge receipt of your letter of 19th of this month, containing your interesting account on the expedition to Ladakh aimed at the cosmic rays study. Fortunately, it arrived just in time to be sent to printers for the upcoming issue of the journal. The copies of the article will be sent to you as soon as they are ready. Thank you for your participation.

Yours very sincerely,  
Director"

The "Urusvati" Institute spread this report [7] among its other publications. The Institute's interest in cosmic rays is shown in the documents. Thus, in June 1933, A. Kiriloff (Paris), a radio engineer, sent a letter to the "Urusvati" Institute addressed to J.M. Benade, asking for the results of experiments on cosmic rays study [10], and already in November he sent his article "Problems of Vibration in the Exact Science (Cosmic Rays)" for publication in the "Urusvati Journal" [11]. However, there we can easily notice the incompleteness of historical coverage of this issue. The fact is that in his report J.M. Benade, while detailing the expedition, its route, the weather, etc. mentioned almost all the participants, including those, who contributed into the expedition's success: the cook, the shoemaker,

and horse drivers. Why did not he mention George Roerich, Director of the Institute? After all, according to indirect, but absolutely reliable historical data, they collaborated closely! Moreover, summing up all the expeditions for cosmic rays study carried out around the globe in 1932 (Figure 2), A. Compton in his article [6] lists all scientists who contributed to this large-scale study. But in this list there is no mention either of Nicholas or of George Roerich, President-Founder and Director of the "Urusvati" Institute. What is the reason? If we go back to the report by J.M. Benade, we will notice a modest reference to "other persons" whose advice and discussions influenced the choice of the expedition route. Who are they?

The situation becomes clearer when one considers the fact that the "Urusvati" Institute was founded by Nicholas Roerich against the wishes of the Indian colonial government (India's independence was proclaimed only in 1947). After Nicholas and George Roerich visited New York in connection with their research interests in 1929, London functionaries delayed with granting visas for their return to India for 8 months. Nicholas and George Roerich solved this problem by entering India in 1930 through the French colony of Pondicherry. From that time on the obstacles to the "Urusvati" Institute functioning were gradually eliminated [12]. And subsequently even the English Colonel A. Mahon, who lived in Kullu close by the Roerichs, appreciated the potential of "Urusvati" and took an active part in its research activities.

However, we assume that in 1932 J.M. Benade did not want to "flaunt" publicly his collaboration with the "Urusvati" Institute. Apparently, J.M. Benade did not wish to find himself in such a disgrace that was surmounted by the Roerichs. Therefore, in the article by A. Compton [6] there is no mention of the involvement of Nicholas and George Roerich in the route planning and of other assistance they may have provided to the Ladakh expedition led by J.M. Benade.

### 3. Conclusion

Thus, filling in the gaps in the history of cosmic rays study by means of ground-based methods, we note that the "Urusvati" Institute was in a certain way involved into the most high-altitude measurements of cosmic rays, made by A. Compton during 1932. Using archival data, we demonstrate that in the 1930s the Russian scientists Nicholas and George Roerich interacted very intensively with foreign scholars in the study of cosmic rays. It will also be recalled that the 100th anniversary of the discovery of cosmic rays by V. Hess, celebrated in 2012, coincided with the 110th anniversary of the birth of George Roerich, Director of the "Urusvati" Institute.

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### 4. References

- [1] A New Outpost of Science. "Urusvati" Himalayan Research Institute of Roerich Museum. 1930. P.16.
- [2] The Letters by H. Roerich. V.1. Minsk. Publ. PRAMEB. 1992. P. 60.
- [3] Millikan sees world remade by use of scientific method / The New York Times. 1930.12.21 / MDCM. F.1. I.7. L.213.
- [4] J.H. Paelian. Electronic Waves. 1938. Journal of American Electronic Research Association, Indianapolis, Ind., U.S.A. / MDCM. F.1. I.4. L.11325.
- [5] Annual report for 1932 / Urusvati Journal. No.3.1932. P. 197-209.
- [6] A.H. Compton. A Geographic Study of Cosmic Rays // Journal of Experimental and Theoretical Physics. V.43. No.6. 1933. Second series. P.387-403.
- [7] J.M. Benade. Cosmic Ray expedition to South Eastern Ladakh // Urusvati Journal. No.3.1932. P. 17-20.
- [8] E. Regener. Messung der Ultrastrahlung in der Stratosphäre. – Naturwissenschaften. 1932. V.20. P.695.
- [9] G.N. Roerich. Letters. V.1. 2002. Publ. ICR. Moscow.
- [10] Letter of A. Kiriloff to J.M. Benade / MDCM. F.1. I.7. L.291.
- [11] A. Kiriloff. Problems of Vibration in the Exact Science (Cosmic Rays) / MDCM. F.1. I.7. L.159.
- [12] L.V. Shaposhnikova. The Great Journey. Book first. Master. 2006. Moscow: ICR. P. 459-481.