

ASTRONOMY AND METEOROLOGY – TWO SCIENCES INTERCONNECTED IN ASTROPHYSICIST NICOLAE DONICI'S LIFE

ANCUTA MANEA, FLORINELA GEORGESCU, GEORGE TUDORACHE

Administratia Nationala de Meteorologie

Sos. Bucuresti-Ploiesti Nr. 97, 013686 Bucharest, Romania

*Email: ancuta.manea@meteoromania.ro, florinela.georgescu@meteoromania.ro,
george.tudorache@meteoromania.ro*

Abstract. Brilliant minds of humanity have tried to understand both the heavenly events and the earthly phenomena. Scientist Nicolae Donici was one of the first researchers from the Bessarabian space who, due to his intense passion for astronomy, understood the deeper implications that cosmic processes can have on the aspect of the weather (and therefore climate) on planet Earth. Thus, along his career he founded the first point for meteorological observations within his Observatory from Bessarabia, in Dubasarii Vechi locality. His concerns about meteorology were not at all superficial, as the scientist understood both the need to distribute weather stations in order to cover all forms of relief so that the meteorological data will be able to describe the climatic regions of the territory, and the endowment requirement of such an observational point with specialized equipment used by the meteorological community. From a social perspective, he managed to popularize the importance of meteorology as a science by attracting the interest of teachers in Dubasarii Vechi town for making meteorological observations. The scientific development in the field has also benefited from his contribution in the observational area of cloudiness and clouds.

Key words: history of astronomy – Nicolae Donici – meteorology – clouds – meteorological instruments – meteorological observations.

1. INTRODUCTION

Over time the Carpathian-Danubian environment has generated many personalities who joined the world intellectual elite. The areas where the exponents of the Romanian cultural and scientific elite has made its presence felt, with the force that characterizes the gifted who contribute to the progress of the society as a whole, are of a variety that would honor any nation. Constantin Brancusi (1876 – 1957) was a genius Romanian artist with overwhelming contributions in contemporary sculpture to the renewal of plastic language and vision. He was posthumously elected member of the Romanian Academy. In 1937, Henry Moore (Moore, 2002) wrote (author's note: translation from Romanian): "Brancusi was the one who gave our time consciousness of the pure form." George Enescu (1881-1955) was a composer, violinist, teacher, pianist and conductor. Yehudi Menuhin (Malcolm, 1990) said about

the great Romanian musician (author's note: translation from Romanian): "For me, Enescu remains one of the genuine wonders of the world. (...) His strong roots and nobility of his soul came from his own country, a land of unequaled beauty." Victor Babes (1854 – 1926) was a bacteriologist and pathologist, member of the Romanian Academy, author of the first bacteriology treaty entitled "Les bacteries et leur role dans l'anatomy histology pathologiques des maladies et l'infectieuses" (1885). He created the concept that may be called "the pathomorphology of the infectious process" that is a synthesis of microbiology and histopathology and he stood among the forerunners of modern ideas about antibiotics. George Titeica (1873 – 1939) was a mathematician and Romanian Professor, who taught at the University of Bucharest and at the Polytechnic School of Bucharest. He was also a Romanian Academy member and a member of several foreign academies, Doctor Honoris Causa of the University of Warsaw, creator of some chapters about the projective and affine differential geometry, where he introduced a new class of surfaces, curves and networks that bears his name. Horia Hulubei (1896 – 1972) was a physicist, member of the Romanian Academy and member of numerous academies and prestigious national and international scientific societies. He obtained the first in the world X-ray spectra in gases. He has important contributions in neutron physics, the study of transuranic elements in the study of nuclear reactions, especially in the nuclear interactions at low, medium and high energies.

Nicolae Donici (1874 – 1956) was an illustrious representative of the Romanian creation and innovation capacity in the field of real sciences. He was born in Petricani, Chisinau. The education he received in school and the training years as intellectual at the faculty of the Department of Physics and Mathematics at the University of Odessa Novorossiisky, between 1893 – 1897, having as teachers S. P. Sleshinsky, I. M. Zanchevsky (Balaban, 2005), S.P. Yaroshenko (Yarochenko, 1893), (Yarochenko, 1893), V.V. Preobrajensky, F.N. Shvedov (who held the position of Rector of the University), A.V. Klossovskii and A.K. Kononovich (Baikov, Gaina, 2003), helped him to actively express the potential in astrophysics and partly in meteorology, in the age of beginning of major scientific discoveries. Baikov (Baikov, Gaina, 2003) points out that Nicolae Donici was interested in all manifestations and aspects of human life, due to his multidisciplinary education.

2. SCIENTIFIC PROGRESS IN METEOROLOGY DURING THE CREATIVE YEARS OF NICOLAE DONICI – GENERAL ASPECTS

To describe the meaning of the scholar Nicolae Donici involvement in meteorology, one must report his activities to the development of atmospheric sciences in the second decade of the 19th century. In this regard, it is useful to synthesize the scientific concerns at the time, the lifestyle, the conceptions about life and pur-

sue of a profession of those times. After the First World War (WWI), the society had gone through significant mentality changes regarding personal freedoms, at least for city inhabitants. In the 1920s the idea arises of the mass consumption economy, cars begin to conquer the streets, broadcasting is hosted in people's homes, with all the implications arising from a regular information of a large part of the population about the actual issues, the movie-making technology progresses, and fascism is gaining political influence. The spirit of those years is found in the paintings of Picasso, Mondrian and Van Dongen and is written in the works of Hemingway, Henry Miller, Scott Fitzgerald etc. It is a time of peace where the thirst for knowledge has a better chance of manifestation and fulfillment. Many of the articles published in the international scientific press deals with subjects placed at the border between astronomy and meteorology. In the absence of the Sun, we would not be able to talk about life as we know it on Earth. The studies having as subject the influence of the Sun on the physical processes developed in the Earth's atmosphere and on the land surface have been critical for understanding and further developing of meteorology. In 1922, Professor Perrin (Perrin, 1923) from the Faculty of Sciences of Paris published an article outlining the main features of solar radiation. In Romania, as a proof that the intellectual elite was aware of the latest developments and scientific pursuits, Professor IM Dobrescu (Dobrescu, 1921) from the Academy of Agriculture of Cluj, published an article on the uptake and conversion of nutrients for plants, depending on the properties of the Sun's radiation. Also in this stage, the concerns about the study of ozone intensify, concluding that selective absorption of the atmosphere between 4800 m and 6400 m a.s.l. is due to this particular gas (B., 1926). In some articles published in 1926 the authors were trying to make a scientific link between solar activity and the occurrence of hurricanes. One of the articles concludes the "maximum solar activity does not always coincide with the maximum of hurricanes; they seem to be more frequent and more violent when approaching maximum sunspot" (Dumitrescu, 1926). The influence exerted by the Moon on the Earth's atmosphere is noted in some magazines of that time. So, in 1927, one was examining the possibility to consider "whether the new moon almost always causes a change of time" (Jagot, 1927). C. G. Abbot (Dissescu, 1925), using observations from Smithsonian Institute observatories, communicates very precise measurements of solar radiation outside the Earth's atmosphere. E. M. Antoniadi (Antoniadi, 1925) continued the research of C. G. Abbot, who held a prominent place regarding the studies with subjects situated in-between the two sciences: astronomy and meteorology. In 1922 Ad. Schmidt (Otetelisanu, 1922) wrote in one of his articles: "astrophysicists must pay special attention to the study of the conditions that lead to the solar perturbation occurrence (...) and to deduce the related physical theory of solar phenomena". In those years, the findings related to the processes occurring in the Earth's atmosphere have been there merged and perceived as "atmospheric

physics". In the scientific vocabulary there were introduced terms (that we now consider normal) such as: "atmospheric front" (Bjerknes, Solberg, 1922), "Polar front theory" (Bjerknes, Solberg, 1922), "the lifetime of the cyclone", "Norwegian Cyclone Model" (Johnson, 2001), (NOAA, 2010), (Balaban, 2005), *etc.* Jacob Bjerknes and Vilhelm Bjerknes study in detail the structure of the atmosphere when precipitation occurs (Bjerknes, 1921), (Bjerknes, 1920). Norwegian Professor Vilhelm Bjerknes's ideas about the dynamics of the circular vortex and the general circulation of the atmosphere are published in scientific magazines (Bjerknes, 1921), (Bjerknes, 1921). Some scientific publications include emerging concerns about the clouds and cloud masses' physics and dynamics. Thus, M. Schereschewsky (Schereschewsky, 1926) examines the observations made by Danjon and Couder at the Observatory of Strasbourg, on a cloud located at a height of 2300 m and notes that the cloud classification will soon be reviewed by the International Commission of Clouds. Durr and Wehrle (Durr, Wehrle, 1927) present in their course: the definition of cloud, the classification and identification principles for clouds and detailed descriptions of each cloud form. Hildebrandsson (Hildebrandsson, 1924) tries to establish with "the most accurate indication of the typical form the cloud belongs and which is closer to composite and intermediate forms that are in the air" and describes the cycle of formation and disintegration of clouds. The review paper "Les Systemes nuageux" (Schereschewski and Wehr (Schereschewski, Wehrle, 1923), (Dissescu, 1923)) recalls that in 1891 the first international cloud classification was strictly based on cloud elevation. Over time, "it was noted that there is a strong connection between the shape of the clouds and their altitude". An article by M. G. Guilbert (Dissescu, 1923), "Succession nuageuse ou systeme nuageuse" is written in the same tone as the previous work, adding that "the cloud system is described by four variables (the three coordinates and time), while the cloud succession is described by two variables (altitude and time)". Most of the articles published by foreign researchers in journals from abroad had strong echoes in the Romanian scientific publications ((Otetelisanu, 1921), (Ioan, 1922), (Otetelisanu, 1922), (Dissescu, 1923), (Dissescu, 1923), (Dissescu, 1924), (Dissescu, 1925), (Dissescu, 1925), (Dissescu, 1925), (Teodorov, 1926), (Ionescu, 1927), (Ionescu, 1927)) during the years when Nicolae Donici performed observations on the Earth's atmospheric phenomena. At this point, one can conclude that Nicolae Donici have lived, published and conducted research during the booming years of the atmospheric structure study and of the associated terrestrial weather phenomena, being a scientist heavily involved in this global current. In Romania, the beginnings of meteorology, as an organized activity, acknowledge by the government structures, have two coordinates: the eminent Stefan Hepites and the year 1884, when the Central Meteorological Institute was established (Fig. 1). Since its establishment, the Institute has had its own publication (Fig. 2), where over the years there has been printed the most important information concerning the meteorological

activity (the type of equipment used to perform meteorological observations, communications about the research activities of the Institute's staff, reviews of scientific articles published in international journals, summaries of the issues discussed at the international meteorological meetings, *etc*).



Fig. 1 – Central Meteorological Institute from Bucharest Filaret and the staff in the year 1922 (photo from the Metadata base of the National Meteorological Administration).



Fig. 2 – Cover of the first volume of *Annals* of the Central Meteorological Institute – year 1885 – (publication from the National Meteorological Administration Library).

The history of this activity, and hence of the Institution once it has been established as a component of the administrative structure of the state, has not been without the natural turmoil of a permanently transforming society. Thus, after 24 years, the so-called Legislative Bodies (Otetelisanu, 1921) at that time decide that the Central Meteorological Institute (C.M.I.) should join the Astronomical Observatory. This historical period between 1908 and 1920 is crossed with difficulty by the meteorological activity. It had to face both financial shortcomings and, especially, the withdrawal of Director Stefan Hepites who did not accept the new administrative arrangements imposed by the Legislative Bodies. The 1920s meant the re-birth of the meteorological activity, since the law for the establishment of the Ministry of Agriculture dated 21st of July 1921. The C.M.I. was removed from the Astronomical Observatory's administrative subordination (Otetelisanu, 1921). Nicolae Donici made first contact with the Meteorological Institute in this period of upswing.

3. THE OBSERVATORY FROM DUBASARII VECHI AND THE RELATION OF NICOLAE DONICI WITH ROMANIAN METEOROLOGICAL INSTITUTE

In 1921, E. Otetelisanu, the Director of the Meteorological Institute, realized the fact that the country's territory was too vast to be represented, in terms of meteorological observations, by the existing weather stations from the national network of meteorological stations. The surface observational network suffered losses due to both WWI and the financial restrictions from the 1908 – 1920 time period. Thus, in the January 1921 issue of "Monthly Bulletin", E. Otetelisanu published an appeal to all Romanians who wanted to contribute to meteorological observations in the country, in order to obtain a higher spatial density of the information (Fig. 3, Otetelisanu (1921)).

Although in the 1908-1920 period between the two institutions (Central Meteorological Institute and Astronomical Observatory) a state of disagreement persisted, among the intellectual elite of the time, those purely administrative incidents did not leave their mark. Thus, the meteorologist and also director of the Meteorological Institute, E. Otetelisanu, build a close friendship with Nicolae Donici, the astrophysicist. Since 1923, the latter began to show interest in meteorological observations, by establishing a meteorological station, as stated in the "Report on the Dubasarii Vechi Observatory" (Donici, 1924) in February 1924 (author's note: translation from Romanian): "At the beginning of the last year, I have proceeded to establish near my Observatory a meteorological station where observations could take place during the whole year, in accordance to the program to other similar resorts in Romania". The concerns of scientist Donici in meteorology were profound, he was able to render the essential issues regarding the meteorological observations. Thus, he realized that within a meteorological network stations should be distributed to cover all forms of

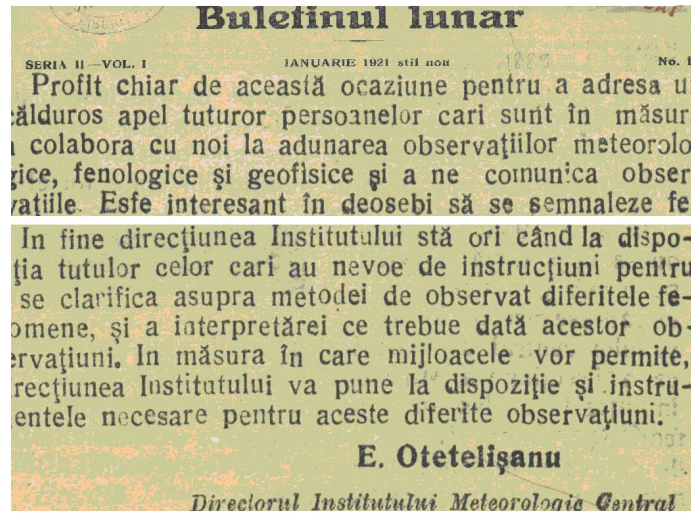


Fig. 3 – The appeal of E. Otetelișanu (“Monthly Bulletin” 1921, publication from the National Meteorological Administration Library).

4) Resultatul observațiilor pluviometrice dela toate stațiunile din țară ¹⁾ Septembrie 1921

STAȚIUNI pe BASINURI și REGIUNI	Apa sub formă ●*△▲				Numărul zilelor	STAȚIUNI pe BASINURI și REGIUNI	Apa sub formă ●*△▲				Numărul zilelor	STAȚIUNI pe BASINURI și REGIUNI	Apa sub formă ●*△▲				Numărul zilelor
	Total mm	mij. 100 zile	max. în 24 h	0.1 mm			Total mm	mij. 100 zile	max. în 24 h	0.1 mm			Total mm	mij. 100 zile	max. în 24 h	0.1 mm	
Oitenestii . . .	26.5	38.0	26.5	1	—	Hârda . . .	64.9	—	18.7	5	—	Vrânceni (mont) . . .	77.8	—	31.5	11	
Botesti Giug . . .	35.7	—	—	—	—	Trusești . . .	33.2	48.3	11.4	8	—	Hotin . . . (ful) . . .	86.8	—	40.2	9	
Podurile . . .	53.0	46.1	20.0	4	—	Stefănești . . .	69.0	47.0	19.0	6	—	Secureni . . .	72.0	—	41.0	6	
Valca Rea . . .	10.2	47.0	5.1	3	—	Mihăileșeni . . .	30.1	42.2	11.4	11	—	Lipnic . . .	15.5	—	6.5	5	
Găsteni . . .	47.5	54.3	36.0	2	—	Săveni . . .	—	—	—	—	—	Siroca . . .	41.2	22.9	24.3	9	
Filipeni . . .	39.5	42.1	8.5	7	—	Pomăria . . .	—	42.5	—	—	—	Bălib . . .	—	—	—	—	
Valca seacă . . .	—	—	—	—	—	Săveni . . .	18.5	46.1	7.0	4	—	Hudești . . .	31.5	—	10.1	6	
Prăjești . . .	71.8	32.6	56.4	4	—	Herja . . .	47.1	45.2	20.5	5	—	Biliceni . . .	57.1	—	20.2	8	
Botesti . . .	—	—	—	—	—	Crasulca . . .	33.7	—	7.6	10	—	Drăgănești . . .	30.5	—	20.0	5	
Buhuzi . . .	44.9	37.3	7.2	10	—	Moșu Sălt . . .	39.5	33.8	10.0	6	—	Saharna . . .	15.4	—	7.0	5	
Platru-N . . .	58.7	66.3	24.4	8	—	Cotelea . . .	58.4	—	19.8	10	—	Saharna fermă . . .	0.4	—	0.4	1	
Budești Gh . . .	93.0	57.4	63.0	3	—	Sirăuți . . .	56.5	—	12.0	10	—	Șephercenii . . .	15.9	—	9.0	3	
Pașăveni . . .	95.3	42.6	80.1	2	—	Petești-Ferma . . .	34.2	—	15.0	6	—	—	—	—	—		
Bălițești . . .	67.4	58.0	38.5	6	—	Briceni . . .	—	—	—	—	—	Dubăsari Vechi . . .	5.7	—	4.4	2	
Grăsi . . .	121.1	—	87.6	4	—	Grinăuți . . .	30.0	—	12.8	5	—	—	—	—	—		
Pipirig . . .	111.0	58.2	30.0	6	—	Bumbota . . .	21.2	—	7.7	6	—	—	—	—	—		
Galbeni . . .	15.9	—	8.7	2	—	Dănușeni . . .	25.0	—	11.0	4	—	Bucovet . . .	20.5	—	10.0	5	
Chili . . .	95.0	—	40.0	4	—	Cașangiu . . .	11.0	—	8.5	2	—	Chidoleni . . .	4.2	—	2.4	2	
Penia de Jos . . .	—	35.8	—	—	—	Leovo . . .	16.5	—	7.0	3	—	Botârceni . . .	49.8	—	15.3	7	
Băcești . . .	70.2	—	18.2	10	—	Cașul . . .	6.4	—	42.1	3	—	Chișinău . . .	16.0	42.0	7.3	6	
Carligul . . .	—	45.8	—	—	—	Măstăcani (dâmpii) . . .	—	—	3.1	3	—	—	—	—	—		
Pâncești Dr . . .	77.2	42.7	50.3	7	—	Bujor . . .	—	—	34.4	—	—	—	—	—	—		
Dăgâba . . .	25.0	35.1	12.0	4	—	—	—	—	—	—	—	—	—	—	—		
Brănișteni . . .	178.0	51.3	80.0	6	—	—	—	—	—	—	—	—	—	—	—		

Fig. 4 – First record of the meteorological measurements from Dubasarii Vechi Observatory in “Monthly Bulletin” of the C.M.I. (publication from the National Meteorological Administration Library).

relief in order to be able to describe all the climate regions of the territory. In support of this assertion is that statement he included in the “Report on the Dubasarii Vechi Observatory” (February 1924) (Donici, 1924) (author’s note: translation from Romanian): “I rely on the consideration that the Dniester valley, where my Observatory is located, is distinguished in terms of climate neighbouring regions and no station that was part of the Romanian meteorological network was located in this valley”.

Another essential idea about meteorological observation performing is that weather stations should operate with specialized equipment that is used by the members of the international community (Donici, 1924) (author's note: translation from Romanian): "I succeeded accomplishing this project of mine at the 1st of September, with the kind help from Mr. Otetelisanu, who gave me meteorological equipment which I did not possess, thus: a Fuess heliographer, a maximum thermometer, a minimum thermometer and two rain gauges". He was also aware of the continuous improvement meteorological equipment needed and the necessity of the dissemination towards the scientific community of the achieved results (Donici, 1926), the same kind of action he performed in astronomy. As mentioned before in his "Report" from 1924 (Donici, 1924), the meteorological observations took place "according to the program performed by other similar resorts in Romania" (author's note: translation from Romanian), proving the fact that he understood that the meteorological data cannot be used for further studies (from the point of view of comparability and compatibility) if they are not determined in similar conditions within a standard observational program. These ideas of Nicolae Donici are up to date and his perception about the organization and functioning of a surface meteorological network able to surprise all climatic features using standardized programs are found today in the recommendations of the World Meteorological Organization (WMO): ((WMO, 2008), (WMO, 2010)). The immediate result of the collaboration of these two personalities is the inclusion of the meteorological station data from Dubasarii Vechi in the "Monthly Bulletin" published by the Central Meteorological Institute (Fig. 4, (Otetelisanu, 1923)) beginning with the September 1923 issue. In 1923 Nicolae Donici published in the "Monthly Bulletin" of the Central Meteorological Institute an article entitled "The twilight light of 2nd of July 1923" (Donici Nicolae, 1923), in which he mentioned the types of clouds that he identified during his astronomical observations (Fig. 5).

In 1926, Nicolae Donici mentioned in his "Report on the Dubasarii Vechi Observatory" (Donici, 1926) the transformations his Observatory had undergone (author's note: translation from Romanian): "The Central Meteorological Institute moving from the Ministry of the Domains to the Air Force, the August Head of this department of the War Ministry condescended to order that the Observatory from Dubasarii Vechi be guarded by a detachment from the department of Aviation". In the same article he wrote about the spatial extent of the Observatory (author's note: translation from Romanian): "However, with the kind approval of a benevolent aunt, Mrs. E. Lasacovschi, owner of Dubasarii Vechi mansion, the formerly glacier changes in a new laboratory with a darkroom for developing of the photographic cliches and an underground room with constant temperature." What is stated further in the 1926 "Report" (Donici, 1926) is very interesting, both in terms of human relations and as a research activity in the observational meteorology by Nicolae Donici. In addition to

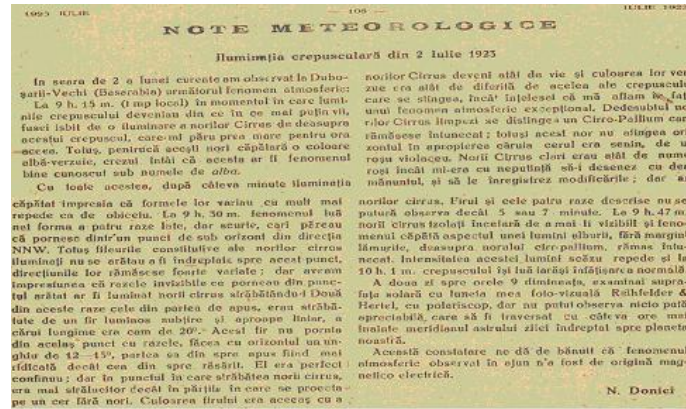


Fig. 5 – The article “The twilight light of 2nd of July 1923” published by Nicolae Donici in the “Monthly Bulletin” of the Central Meteorological Institute – publication from the National Meteorological Administration Library.

confirming the inclusion of the meteorological Observatory within the meteorological network existing at the time (author’s note: translation from Romanian): “The meteorological station established near my Observatory and incorporated into the Romanian meteorological network has operated continuously during the whole past year. During that time I sent to the Central Meteorological Institute of Romania 33 decades of observations, and the last three decades (for December) are in preparation and will be shipped in a few days at the aforementioned Institute” it is remembered that the Observatory has received another set of meteorological equipment from the Central Meteorological Institute, with the assistance of E. Otetisanu (Donici, 1924) (author’s note: translation from Romanian): “As I had the honor to refer in the Report of 1924, on January 31st this year three recorders (medium size) started to work at my Observatory, namely: a barograph, a termograph and a hograph.” It can be concluded that both the friendship between E. Otetisanu and Nicolae Donici and the word given by the Director of the Central Meteorological Institute, in his appeal launched in 1921 (Fig. 3), transcended the administrative battles between two institutions of great importance for the country. The next passage of the 1926 “Report” (Donici, 1926) supports the idea launched at the beginning of this section, on the early research work of Nicolae Donici regarding meteorological measurements. His restless spirit, his strive for perfection and his passion for the work well done, led him to apply his knowledge in order to get accurate weather data, but also to communicate to experts of the Meteorological Institute the discoveries he made related to the adjustment of meteorological recorders (author’s note: translation from Romanian) “in such a way that the register of the meteorological elements be made with the utmost precision, which also triggered the need to decipher particularly the

diagrams obtained other than is regularly performed. This paper that I have started after my arrival from England is close to being finished, and I hope to send it soon to the Romanian Central Meteorological Institute. Mr E. Otetelisanu, the Director of the Central Meteorological Institute of Romania, provided me a Fuess heliograph, which until now I could not use in order to start the interesting observations of solar radiation, because I do not have an appropriate place in the Observatory park to install this device". Dubasarii Vechi Observatory is remembered by A.A. Baikov (Baikov, Gaina, 2003) in his article "The Astronomer – N. N. Donitch" (author's note: original in English): "The Observatory, which consisted of an astronomical and meteorological department, was located in the park of the Land of Dubasari, not far from the residences of the researchers. The Observatory had an assistant for meteorological observations, which N.N. maintained to be of a paramount importance. One of them participated in the expedition to Turkey, in 1936. The meteorological department was equipped with devices from the Central Meteorological Institute". The fact that Nicolae Donici considered as essential the presence of the meteorologist assistant may also be deduced from his own notes – the "Report" of 1926 (Donici, 1926) (author's note: translation from Romanian) : "In 1925 there occurred the following change regarding the Observatory staff: Former Observatory assistant for meteorological observation, Mr. Gh. Aftenie, was replaced by Mr. S. Donos, who begun his work on October 14." As an astronomer, Nicolae Donici took part in expeditions to land areas of the globe where astronomical events of interest to him were visible. The close relationship that he developed with meteorology was even better highlighted during these expeditions, where he was always accompanied by an assistant for meteorological observations and by appropriate equipment for such kind of observations, after reports of A.A. Baikov (Baikov, Gaina, 2003) in his article "The Astronomer – N.N.Donitch" (author's note: original in English): "Since 1935, we begun preparations in Dubasari, as well as in Bucharest, for the total solar eclipse expedition on 19 June 1936. (...) The expedition was composed of N.N. and myself, while for meteorological observations we took the assistant of the Observatory for meteorology N.K. Guma (...) In addition, the meteorological instruments, as well as a small portable universal instrument (like a theodolite) for exact determination of the time and longitude of the place of the observations were brought". The study activity of low atmospheric parameters took place at Dubasari Vechi Observatory between 1923 – 1940. As mentioned in a previous paragraph, the 1920s, complementary to a change in mindset of society, have witnessed the development of fascist tendencies which ended into the Second World War. In an article, A. A. Baikov (Baikov, Gaina, 2003) wrote that during the war, when scientist Donici returned to Dubasari, he found the Observatory destroyed (author's note: original in English): "During the War, coming back to Dubasari, N.N. found a ravaged observatory. His creation, the big spectroheliograph, disappeared without trace, while separate parts of the fixed

instruments (of the equatorial) were found fortuitously in the cellar of the Eparchial school in Chisinau”.

4. INTERNATIONAL CLOUD WEEK

The National Meteorological Office of France organized from 24th to 30th of September 1923 an international research of the sky (Dissescu, 1923). This action aimed at photographing and identifying clouds by “a large number of observatories and individuals who were going to photograph clouds, simultaneously, three times a day” (as Nicolae Donici reported on the meeting at the Romanian Academy held on the 4th of April 1924 chaired by I.C. Negruzzi (Negruzzi, 1924)), the types of clouds that were to develop in that period. The meteorological activity regarding this international project of cloud observation is summarized in an article published in the “Monthly Bulletin” of the Central Meteorological Institute (Dissescu, 1923). Again the friendship and special appreciation shown by E. Otetelisanu to astrophysicist Nicolae Donici led to a proposal to the latter to participate in this international action (Donici, 1924) (author’s note: translation from Romanian): “Receiving such circular, the Director of the Central Meteorological Institute of Romania, Mr. E. Otetelisanu, sent me a request to take part in this work, which I gladly accepted”. Thus, showing the same unbridled passion for science and for accurate records, the scientist stated that he managed to get 17 cliches with photos of clouds (Negruzzi, 1924) (author’s note: translation from Romanian): “During the mentioned week, (from September 24th to 30th inclusively) I managed to get 17 cliches with photos of clouds. Also on those days there was noted in detail the state of the sky, from early morning till night, and meteorological observations were made at the times when the clouds were photographed.” The modesty of this great scientist didn’t allow him to write about the high quality of his work. But his achieved results could not be overlooked by the international community ((Talman, 1925), Fig. 6) and by the national experts of the Central Meteorological Institute (author’s note: translation from Romanian): “From all of these (cliches with photos of clouds) we have to make a special remark regarding the work of Mr. N. Donici who sent us the best-made series of photos ... ” (Dissescu, 1923).

The result of this international effort was founded on achieving both one of the first synoptic maps with fronts that were uniformly observed over an area stretching over almost the whole continent (Lebart, 1997) and an improved version of the “Cloud Atlas”. For the Carpathian-Danubian environment in Fig. 7 (Lebart, 1997) there are highlighted the following weather stations that took part in this action: Craiova, Targu-Mures, Bucharest, Brasov, Chisinau, Iasi, Ploiesti and Focsani. Following this experience, Nicolae Donici wrote a Note that he presented at the Ro-

BIBLIOGRAPHY

C. FITZHUGH TALMAN, Meteorologist in Charge of Library

RECENT ADDITIONS

The following have been selected from among the titles of books recently received as representing those most likely to be useful to Weather Bureau officials in their meteorological work and studies;

Brooks, Charles F.
Some striking displays of coronas and iridescent clouds. 12 p.
23½ cm. [Typewritten.]

Dole, Eleazer J.
Studies on the effects of air temperature and relative humidity on the transpiration of *Pinus strobus*. Burlington, 1924. 39 p. illus. plates. 23 cm. (Univ. of Vt. & State agric. coll. Vt. agric. exper. sta. Bull. 238, July, 1924.)

Ferguson, S. P.
Methods for measuring humidity. p. 119-121. 24 cm.
(Repr.: Journ. optic. soc. Amer. & review of sci. instrum.

RECENT PAPERS BEARING ON METEOROLOGY

The following titles have been selected from the contents of the periodicals and serials recently received in the library of the Weather Bureau. The titles selected are of papers and other communications bearing on meteorology and cognate branches of science. This is not a complete index of all the journals from which it has been compiled. It shows only the articles that appear to the compiler likely to be of particular interest in connection with the work of the Weather Bureau.

Académie Roumaine—Bulletin de la section scientifique. Bucarest.

3 ansée. No. 5-6. 1925.
Donici (Donitch), M. N. Semaine internationale des nuages du 24 au 30 septembre à l'Observatoire d'Astronomie Physique sis parc de Dubosarii Vechi. p. 28-35.

Fig. 6 – The article of Nicolae Donici mentioned in the “Monthly Weather Review” (Talman, 1925).

manian Academy (Donici, 1924), including details on how he had obtained photos of clouds. In the current observational meteorological activity of the surface meteorological station network the WMO publication known as “The International Cloud Atlas” (WMO, 1987), (WMO, 2008), (WMO, 2010) is used. Without the involvement of dedicated and passionate people, such as the great scholar Nicolae Donici, this kind of large-scale work used in all weather stations on the globe would not have been possible. The current use of such publications, which comprise the work and dedication of great personalities, is a tribute to them over time.

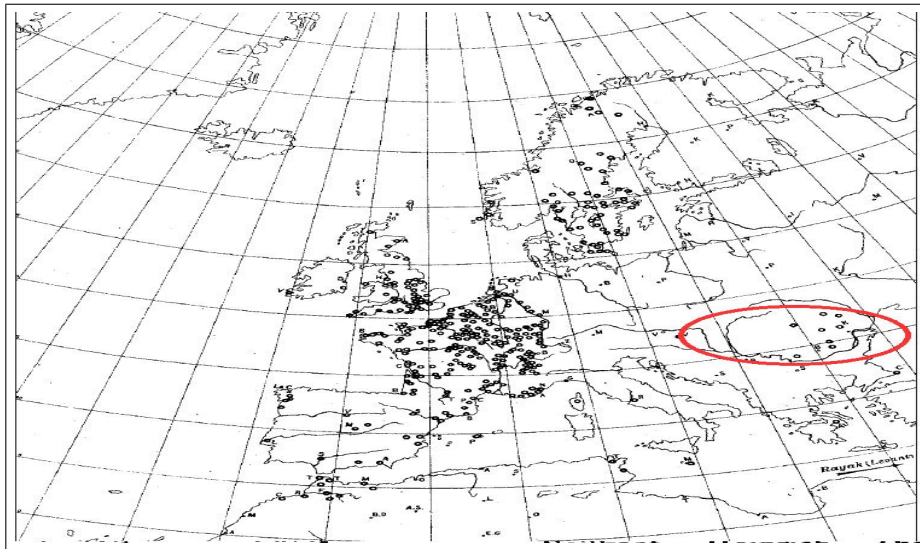


Fig. 7 – Location of weather stations that supplied photos for the *International Cloud Week* in 1923 (after Tire de Schereschewsky et Wehrle, 1926) (Lebart, 1997).

5. CONCLUSIONS

Nicolae Donici, a great scientist with a multidisciplinary education, approached without failure both Astrophysics and Meteorology. He had a superior, visionary and profound capacity of understanding, the proof being his ideas that have lived through time, that can be found in various international scientific publications that regulate the activity in the fields of Astronomy and Meteorology.

Finally, the portrait of the great scientist would not be complete if his work regarding the promotion of education to the general public in the fields of Astronomy and Meteorology had been forgotten. He succeeded to draw the attention of teachers from Dubasarii Vechi in performing meteorological observations (Donici, 1924) (author's note: translation from Romanian): "As assistant for meteorological observations I have invited Mr. E. Rau, the supervisor of the local school for boys, who is interested in scientific issues". A. A. Baikov (Baikov, Gaina, 2003) states in his article "The Astronomer - N.N. Donitch" (author's note: original in English): "The Observatory was visited from time to time by excursions from the Bessarabian schools, whom N.N. warmly welcomed, showing them each instrument and explaining them every detail".

Acknowledgements. This paper was presented at the International Symposium "The Astronomer Nicolae Donici – 140 years after the birth", Bucharest, 8th September 2014. We would like to address special thanks to Mrs. Magdalena Stavinschi for the supplementary materials she provided us.

REFERENCES

- Antoniadi, E.M.: 1925, *L'astronomie Bull. de la Soc. Astronomique de France* **XXXIX**, 11.
 B., A.: 1926, *Revue generale des Science* **37/21**, 593.
 Baikov, A.A., Gaina, A.: 2003, *Serb. Astron. J.* **166**, 71.
 Balaban, A.P.: 2005, *Scientific and Technical Journal*, I.I. Mechnikov National University, Ukraine, Odessa **1**.
 Bjerknes, J., Solberg, H.: 1921, *Geofysiske Publikasjoner* **2/3**, 1.
 Bjerknes, J., Solberg, H.: 1922, *Geofysiske Publikasjoner* **3/1**, 1.
 Bjerknes, V.: 1920, *Quarterly Journal of the Royal Meteorological Society* **XLVI/194**, 119.
 Bjerknes, V.: 1921, *Monthly Weather Review* **49/1**, 3.
 Bjerknes, V.: 1921, *Geofysiske Publikasjoner* **2/4**, 1.
 Dissescu, C.A.: 1923, *Buletinul lunar al Institutului Meteorologic Central al Romaniei* Seria II **III/2**, 30.
 Dissescu, C.A.: 1923, *Buletinul lunar al Institutului Meteorologic Central al Romaniei* Seria II **III/5**, 80.
 Dissescu, C.A.: 1923, *Buletinul lunar al Institutului Meteorologic Central al Romaniei* Seria II **III/10**, 156.
 Dissescu, C.A.: 1924, *Buletinul lunar al Institutului Meteorologic Central al Romaniei* Seria II **IV/4**,

- 68.
- Dissescu, C.A.: 1925, *Buletinul lunar al Institutului Meteorologic Central al Romaniei* Seria II **V/2**, 34.
- Dissescu, C.A.: 1925, *Buletinul lunar al Institutului Meteorologic Central al Romaniei* Seria II **V/7**, 146.
- Dissescu, C.A. : 1925, *Buletinul lunar al Institutului Meteorologic Central al Romaniei* Seria II **V/12**, 273.
- Dobrescu, I.M.: 1921, *Buletinul lunar al Institutului Meteorologic Central al Romaniei* Seria II **I/9**, 138.
- Donici, N.: 1923, *Buletinul lunar al Institutului Meteorologic Central al Romaniei* Seria II **III/7**, 108.
- Donici, N.: 1924, *Raportul despre Observatorul din Dubasarii Vechi*, 1.
- Donici, N.: 1924, *Semaine internationales des nuages du 24 au 30 septembre 1923 a l'observatoire d'astronomie physique sis parc de Doubossary Vecchi-Note presentee a l'Academie Roumaine le 13 Juin 1924*, 106.
- Donici, N.: 1926, *Observatorul de Astronomie Fizica din Dubosarii Vechi-Basarabia afiliat Fundatiei Principele Carol-Raportul astronomului Nicolae Donici*, 115.
- Dumitrescu, V.: 1926, *Buletinul lunar al Institutului Meteorologic Central al Romaniei* Seria II **VII/11**, 252.
- Durr, L., Wehrle, Th.: 1927, *Cours de Meteorologie* **2**.
- Hildebrandsson, H.H.: 1924, *Geografiska Annaler* **1**, 24.
- Ioan, C.: 1922, *Buletinul lunar al Institutului Meteorologic Central al Romaniei* Seria II **II/3**, 30.
- Ionescu, Al.: 1927, *Buletinul lunar al Institutului Meteorologic Central al Romaniei* Seria II **VII/4**, 82.
- Ionescu, Al.: 1927, *Buletinul lunar al Institutului Meteorologic Central al Romaniei* Seria II **VII/4**, 83.
- Jagot, A.: 1927, *La Meteorologie* **4**, 128.
- Johnson, S.: 2001, <http://web.archive.org/web/20060901163934/>, http://weather.ou.edu/~metr4424/Files/Norwegian_Cyclone_Model.pdf#search=%22norwegian%20cyclone%20model%22.
- Lebart, L.: 1997, *La Meteorologie* **8/17**, 33.
- Malcolm, N.: 1990, *George Enescu: His Life and Music, with a preface by Sir Yehudi Menuhin*, ISBN 0-907689-32-9 ISBN 0-907689-33-7.
- Moore, H.: 2002, *Henry Moore - Writings and Conversations, Documents of the 20th Century art*, ISBN 0-520231-61-9 978-05-20-23161-0.
- Negruzzi, I.C.: 1924, *Analele Academiei Romane* **XLIV**.
- Otetelisanu, E.: 1921, *Buletinul lunar al Institutului Meteorologic Central al Romaniei* Seria II **I/1**, 1.
- Otetelisanu, E.: 1921, *Buletinul lunar al Institutului Meteorologic Central al Romaniei* Seria II **I/1**, 13.
- Otetelisanu, E.: 1921, *Buletinul lunar al Institutului Meteorologic Central al Romaniei* Seria II **I/5**, 80.
- Otetelisanu, E.: 1921, *Buletinul lunar al Institutului Meteorologic Central al Romaniei* Seria II **I/9**, 140.
- Otetelisanu, E.: 1922, *Buletinul lunar al Institutului Meteorologic Central al Romaniei* Seria II **II/5**, 78.
- Otetelisanu, E.: 1923, *Buletinul lunar al Institutului Meteorologic Central al Romaniei* Seria II **III/9**, 138.
- Perrin, J.: 1923, *Notice sur les Travaux Scientifique*, Toulouse, 101.
- Talman, C.F.: 1925, *Monthly Weather Review* **53/3**, 121.
- Teodorov, Gh. : 1926, *Buletinul lunar al Institutului Meteorologic Central al Romaniei* Seria II **VI/7**,

155.

Schereschewski, Ph., Wehrle, Ph.: 1923, *Revue generale des Science* **1**.

Schereschewsky, Ph.: 1926, *La Meteorologie* **14**, 210.

NOAA: 2010, U.S.A. National Weather Service, <http://www.srh.weather.gov/srh/jetstream/synoptic/cyclone.htm>.

WMO: 1987, *International Cloud Atlas*, World Meteorological Organization **II**, ISBN 92-63-12407-8.

WMO: 2008, *WMO-No.8 Guide to Meteorological Instruments and Methods of Observation*, ISBN 978-92-63-10008-5.

WMO: 2010, *WMO-No.488 Guide to the Global Observing System*, ISBN 978-92-63-10488-5.

Yarochenko, S.P.: 1893, *Zap. Novoross. Univ.* **58**, 193.

Yarochenko, S.P.: 1893, *Bull. Sciences Math.* **2/17**, 113.

Received on 11 September 2014