# Comets&Logic

1. INTRODUCTION

  The year of 1986 is the Halley comet year. The history of cometology retained the following curious case. In 1910, when its (i.e. the Halley comet’s) previous visit to the Sun took place, one of the March numbers of a newspaper “Golos Samary” (“The Voice of Samara”) reported, that a certain monk sold shrewdly at the central city square the leaves of “Charm against meeting with Halley comet” of the following content: “You are devil! Satan! Never world Velzewool! Don’t feign you are a celestial star! Don’t deceive the Orthodoxes, hide your godless tail, because the God’s stars have no tails…Dip your tail into fiery river, let it reduce to ashes, let it char, let it fry! Etc…” This curiosity was reprinted by “Russkiye Vedomosti” (“Russian Registers”) on the 3-rd of April, 1910 and went down in the history of the Russian science.
  It is interesting to note, that the next visit of the Halley comet was in 1986 and coincided with the 400th anniversary of the city of Kuibyshev (formerly and now afresh -   SAMARA! – rem. A.G.).
  The author of this article, living in Kuibyshev, dedicated to this significant date the application for the discovery “Comets formation phenomenon” [1,2], which, as the author considers, convincingly confirms and at last resolves a so-called comet problem.

2. EXISTING VIEWS (HYPOTHESES) ON THE COMETS FORMATION MECHANISM

  In accordance with the views, which were shared by the most part of the astronomers before the experiment “Vega” (“Venus-Halley”), the comets originate from the so-called comet cloud of Oort and consist basically of dirty ice [3].
  This hypothesis cannot convincingly explain the fact why the comets are grouped around the major planets of the Solar system (in families of planet-giants). Besides, the mechanism of comets breaking-away from the Oort cloud is actually very unconvincing.
  The Nemesida hypothesis (the dwarfish star – the satellite of the Sun) did not save the situation.
  The second basic hypothesis (S.K.Vsehswiatsky) states, that the comets are the result of volcanism on the major planets or their satellites. Yet it’s obvious, that this mechanism demandes too high initial speed.
  The basic hypothesis now, after the experiment “Vega”, is the idea that  the asteroids are dead comets. The author considers this point of view as an intermediate stage on the way to the truth.

3. A CONCRETE COMETS FORMATION MECHANISM

  The basic author’s idea is the following: “The comets are formed from asteroids as the result of asteroids piercing through the rings of the major planets of the Solar system”.
  Indeed, it is known that the planets of the Solar system can be collided with small space bodies including asteroids. The major planets (Jupiter, Saturn, Uranus, probably, Neptune)  are surrounded by rings consisting of separate particles. The rings can also be subjected to collisions with asteroids because they are not the exception in this sense. During these collisions the rings may be pierced through because they are not very dense.
  For instance, the thickness of the Saturn ring is about 2-5 km, moreover the stars can be viewed through them. A typical size of the particles is about 1 cm (in accordance with the data of “Pioneer-11”).
  It is interesting to note, that the space apparatus “Voyager” discovered the two Saturn satellites in the ring system, moreover, one of them is moving in the ring, but the other has a slightly slanting orbit and therefore it finds itself either at one or the other side periodically. This circumstance confirms the possibility of piercing of the ring. The destruction of both the ring particles and asteroid and the distribution spectrum of the particles by speed will take place as a result of the piercing of the ring by asteroid as strong as the concrete circumstances allow. Besides the asteroid flown through the ring takes off some quantity of its substance. The small fragments of this collision can generate the meteor flows afterwards.
  A basic part of the asteroid (a big “piece”) will be soiled by the ring substance and, actually, this very part forms the comet. Indeed, the chemical composition of comet tails and major planets rings are remarkably similar: H2O (ice, snow, steam), different frozen gases and other volatile components (to the point, the Saturn rings are localized inside the Roche’s sphere for a liquid body).
  The above-mentioned mechanism makes clear and obvious the fact, that the periodical comets (i.e. by the type of orbits – orbit classification in families) are conventionally grouped around the major planets having the rings.
  The Jupiter ring is less dense than Saturn rings and it probably consists of snow and gas. This partially explains the fact, that the most of short-period comets (Jupiterian family) have a faint tail or only have a coma (here it is necessary to take into consideration the rapid evolution, as far as the period is short enough).
  A periodical variations of glitter of the Donati and Halley (with 52-hour period) comets are explained by the fact, that monolithic nucleus of these comets has an asymmetrical stretching form and accomplishes the rotary motion. This rotation may be the result of collision with the particles of the ring.
  A basic mass component of a comet nucleus is determined by the type of mother’s asteroid: stony, iron-stony, ferrous.
  The facts of the division of some comet nuclei may be explained by the presence of cracks in the nucleus (it may be the result of the collision with the ring). It may lead to the thermodeformation in the vicinity of the Sun.
  The orbits of the most part of comets lie in the ecliptic plane or near it, although the orbits of separate comets are precessing. This circumstance is normal in the proposed mechanism frames.
  Let us value the frequency of the comets rise. Let us take the Earth statistics.
  In the current century (here – in the 20th century – rem. A.G.) the next coarse enough meteorites fell to the Earth (on the land): Tungus in 1908, Sihote-Alin in 1947, Fenes-County in 1948, and some others. Adopting that the water surface of the Earth is more, than thrice larger that of the land, we suppose, that about 15 coarse meteorite fell onto the Earth in this century. Considering that the radius of our planet is nearly equal to 6370 km, we shall get, that on each 2.7.106 km2 of the transverse section area of the Earth (i.e. the ball) may be one collision with a space body in century. The outside diameter of the Saturn rings is nearly 2.74.105 km and the width of the rings is 5 times as great as the Earth diameter, hence, the Saturn rings area is equal to ~ 4.2.1010 km2. Considering the relative frequency (on the unit of the transverse section area) of the collisions of Saturn rings with small space bodies (with asteroids) equal to the that of the Earth, and also considering that the probability of the hit into the flat disk from the free direction is half as much as that of a ball of the same transverse section area, it’s possible to get the value of nearly 7800 collisions in a century (i.e. every week!). As a result of this collisions the ring may be pierced and the comet is formed. Still in this calculation was not taken into consideration the gravitation and screening influence of planet-giant itself, the influence of the mutual speed of collisions, the finite thickness of the rings and the angle of interaction, the sizes and mass of the asteroid and the particles of the ring, etc., so the real frequency of the comet forming will be less, than it is calculated. Considering the real value even 10 times less, we’ll see, that the figure still remaines big enough (we discover not more than 10-20 comets every year as average this refer to all the families taken together).
  The best criterium of the truth is the experiment. The author considers that the space experiment “Vega – Jiotto” shiningly confirms his hypothesis. Indeed, it turned out that the nucleus is monolithic and it has the asymmetrical form, it is darker, than it was supposed from the “ice” hypothesis. Still the concrete analisis of the results will be given in the next chapter.

4. A CRITICISM OF THE REALIZATION OF THE EXPERIMENT “VEGA” AND THE INTERPRETATION OF ITS RESULTS, GIVEN BY THE ISR OF THE AS OF THE USSR
(Remarks: -    This chapter is, basically, the co-name author’s article of 20.03.86

About 150 soviet organization and enterprises took part in the creation of the station “Vega” [4]. The considerable forces and means were taken for the experiment carrying out. It may seeme, that the experiment have passed successfully, the unique data have been received about the structure of comet nucleus. Still, the author of these lines does not agree with a such synonymous appreciation, although he doesn’t deny the fact, that there really as received some unique information.
  Even more, than a year ago before the peak of the events of the experiment “Vega”, the author formulated and argumentally substantiated the hypothesis about comets forming in the result of piercing the rings of the planet-giants of Solar system by asteroids. This hypothesis was prevented to the ISR and other organizations. Unfortunately the hypothesis has not been considered at the ISR and author received only formal letters.
  Comrades from the ISR adopted the ice nucleus comet (with soils) hypothesis among their weapons, as a dogma, which, ostensibly, was shiningly confirmed by the experiment. In accordance with this hypothesis, the ice comet nucleus must gush out great quantities of steam and dust, that was reflected on the experiment itself: the minimum distance from the nucleus at which the both “Vega” apparatuses passed by, was intentionally chose within the limits of 8-9 thou km, although the actual precision of pointing was not worse than 1500 km. Only apparatus “Jiotto” (although not without the aid of the “Vegas”) passed closely to the nucleus and showed the features of a relief: hills, craters.
  In conformity with the author hypothesis the comet nucleus must be monolithic: stony, iron-stony, ferrous – by the type of mother’s asteroid. Gases, given off by nucleus under the Solar heating, - are the result of absorbtion and adsobtion the gases and other volatile components, composing the particles of the rings of major-planets. Thus, the ejections from the comet nucleus (“soiled” asteroid) must be comparatively small. To the point, it is confirmed by the data of apparatus “ICE” (ex “ISEE-3”), which passed through the tail of Jacobini-Cinner comet on 11 September 1985 (before the peak of the experiment “Vega”) the distance of 7850 km from the nucleus and which fixed an unexpectedly small density of the dust [5,6]. The experiment with the station “Vega-1” showed, that dust density is significantly less, than it was predicted by the “ice” model of the nucleus. In connection with this circumstance author sent a telegram at the ISR. The mistake may be corrected, inasmuch as also “Vega-2” took place and it trajectory may be improved so that photos would qualitative really, still it is no happened…
  But, after all, strictly speaking, even if both “Vegas” would be directed straight to the nucleus (with the accuracy of aiming equal to 1500 km all the same the result would be negative: they wouldn’t hit the aim!) and on approaching to it they would be put out of order but still the task of the stations would be fulfilled as far as the information was transferred to the Earth in the real time. Nowadays the capacity for work of the two stations are no longer of any  importance because the unique chance has been lost… There were two “Vegas” and each of them passed by the comet nucleus at the distance of 8-9 thousands km! It may be compared with the situation when the volcano eruption taking place at the Kamtchatka is observed from Moscow. It at least “Vega-2” approached closer to the nucleus then it would be possible to excuse the ambiguities and sheer blunder of the type: “The Halley-comet has a double nucleus?!” or “…it seems that the nucleus has no clear boundaries, - it is similar to a boiling pot” [7] – according to the data of “Vega-1”. In [8] the following figures are offered: the time error of the meeting with the nucleus is 10-20 s, a relative velocity of the approach of SA (space apparatus) to the comet is less than 80 km/s. Consequently, the possible error of the two “Vegas” aiming (multiply these figures) is not more than 1.5 thousand km. Why was it necessary to fulfil such a senseless double? And who was interested in it?
  However, it was proudly declared that both of the stations are keeping their capacity for work and now the objects in Universe are searched that might be studied by the “Vegas”. Still, this declaration sounds as no more than an attempt to appologise their own mistakes (but to-day we don’t hear much about these searches). Let us wish the ISR sucsess as far as the area of the searches is very wide: the whole boundless space!
  Probably the author is a little bit exaggerating, on the photos of “Vega-2” something is seen and this was shown for first time by TV USSR on the 24th of April, 1986 (after the program “Vremya” (“Time”)), but in this very TV-program a sacramental statement was formulated: the comet nucleus is a dark, coal-like body having the coefficient of reflection comparable with that of asteroids! But you see, the author of this paper expressed his opinion on this point even more definitely more than a year ago! My first letter to the ISR was sent on the 20th of February, 1985! Then at the same TV-program an incorrect conclusion was heard about that the comet nucleus was still icy. The same very thesis was formulated by Academician R.Z.Sagdeyev in [9, p.88]: “…the hypothesis according to which the comet nucleus is an enormous block of “dirty” ice of an irregular form has been confirmed…Its surface is covered by a crust of some refractory material having the thickness of about a centimeter – the composition of this material is being specified”. The thesis is repeated with a really enviable persistence! R.Z.Sagdeyev is echoed by Professor V.I. Moroz the author of the so-called nucleus model in the form of a “March snow-drift” [10,11] that at first sight seems to be convincing. But this is at first sight only! The case is that this model is not in principle able-bodied! Though I had no chache to pick the nucleus of the Halley comet with my finger still I declare that the comparison of the comet nucleus with the March snow-drift is erroneous because of quite different physical condition. We know that specks of dust and mud don’t fly away from the snow-drift due to the gravitation, and the Halley comet nucleus has practically no gravitation influence, as far as its mass is too small. Add to this the pressure of vapours  being formed and dilating into vacuum… Under such circumstances even the crust of porous platinum would not keep at the surface for any considerable period of time, to say nothing of the impossibility of the process of the crust growth resulting in its self-renewal, i.e. the “March snow-drift” model that was widely advertised in disabled and groundless in principle!
  Basing on the theory of the icy nucleus it is difficult to explain the hills and craters at the surface discovered by “Jiotto”, not by the “Vegas”, as far as the melting of ice leads to the smoothing of “wounds” (Mr. B.A.Vorontsov-Veliaminov is of the opinion that craters are percussive formations).
  Probably, R.Z.Sagdeyev and his colleagues being the focus of attention of the press and taking a great interest in giving  away autographs were too busy and had no time not only to analyse  the materials which I sent them but even to go deep into their own statements. Let us recall the situation around the experiment “Vega”: at first there were a lot of advertising in the press, by radio and TV, then the experiment itself was carried out and were promised that the results were to be published soon. Now the racket has been finally faded and it turns out that to “process the obtained material” requires a considerable time (more than a year) and the results will be published  in special journals. And nowadays our attention is switched over to the project “Phobos”  (“Fobos”) (writed in 1986 - Rem. A.G.). As for the Halley comet, it turns out that the answer  to all the questions might be finally  given probably only in 76 years when its next visit to the Sun  takes place and  we’ll have at our disposal different technical possibilities - such a “regret” was expressed by the Academician R.Z.Sagdeyev (wasn’t it done so that not to return any longer to this an unpleasant for him questions?). I am afraid that this “regret” is simulated. Still I suppose that tens of millions of roubles were not wasted only for the sake of vague knowledge?
  However, it is interesting to note that in [9] R.Z.Sagdeyev writes: “…the inevitability of the objective tendency doesn’t diminish our responsibility before this (i.e. communist – A.G.) future…”. Here undoubtedly Acad. R.Z.Sagdeyev is right. I would like to remind of that the USA are planning to realize their projects “Asteroid Flieby” and “Comet’s Rendezvous” earlier than in 76 years – and the USSR may lose its priority in the science of comets…
  A comet nucleus reflects approximately 4% of the incident light [12], so it may be conclude that it is a black body of a good quality! And it was really difficult to call it icy.
  In [10] R.Z.Sagdeyev revealed a turn in his views that is unexpected enough, the academician writes: “Outwardly it (i.e. the object – A.G.) is somewhat like Mars’s satellites - Phobos and Daimos (the “Phobos” – project is in prospect with R.Z.Sagdeyev (in 1986) – here is a sound logical connection for you! – A.G.) but still more similar analogues may be some small satellites of Saturn and Uranus. This keeps within the frames of the hypothesis (I wonder, which and whose? As far as before this there was said a lot of nonsense about the cloud of Oort, Nemesida, etc. – A.G.), assuming, that comet nuclei were formed comparatively not far from the Sun, approximately at the placewhere the major planets are located – from Jupiter to Neptune, and then were thrown off at a greater distance during the formation of these planets” (underlined by A.G.). Any explanation is needless… For Academician R.Z.Sagdeyev it remains nothing but to wait a little more and to pronounce quite a fatal phrase: “It seems to me that comet nuclei were generated out of asteroids while the latter were punching the rings of the major planets of the Solar system…” – i.e. to read at last the formula of my discovery.
  In [13] we were told that during the “Vega” – experiment the amount of steam lost by the comet nucleus every second was measured for the first time. And the figure of tens of tons was cited. It would be interesting to know in what way this figure was obtained as far as there were no direct measurements of this index  (for this purpose it would be ideal to place the comet nucleus into a sack!). However the author of this paper having at his disposal such values as the cross section of the nucleus, integral flow of the solar energy per unit of the area (i.e. solar constant taking into account the distance from the Sun) has determined the amount of water that may be heated from 3oK (the temperature of the cosmic background) up to the vaporous condition (with the account of all the phase transfers) per 1 second and has obtained the figure of the same order that in [13], assuming that ice is a black body (Kabs = 0.96). It means that this figure was simply calculated in ISR on the basis of their faulse model, i.e. the desirable was claimed as real.
  The apparatus “Jiotto” revealed the jet escaping of gas (vapours). The intensity in jets may not be higher than the physical limit caused by the ideal conditions of the solar heating (as far as the nucleus is not a gas-bag) and also by the accepted  physical model (let it be even a black icy nucleus), consequently, the intensity out of the jet is much lower than the physical limit and the total loss of the nucleus mass in the form of vapour is in any case considerably lower than the figure mentioned in [13] and which representing the physical limit. Besides, it is known that the Halley-comet nucleus is rotating and one side of it is more active [14] and consequently the other is on the contrary less active. This circumstance  reinforces the “activity contrast” and lowers the index. Thus the figure of 40 tons of the vapour lost by the comet per one second is exaggerated (and not by the order!), and if to take into account my hypothesis (i.e. the nucleus is the asteroid in its basis) it is exaggerated still more. The “Vega” – apparatuses passed at a great relative velocity (~ 80 km/s) by the Halley comet nucleus thus creating their own blast, the amount of the registered dust and gas is to be distributed over a lot of kilometers of the trajectory; the dust and gas in their basic part may fly together with the comet and break off from it not so fast as it may seem – taking account of all the forces and factors (many of them though weak act in great scales) may lead to an unusual result.
  Note that the fact consisting in that one side is more active than the other substantially confirms the mechanism of the comets formation as the result of punching the rings of the major planets of the Solar system by asteroids (see the materials of the application for the discovery), as far as the time of punching the ring by an asteroid (<1 s) is not sufficient for the asteroid to swing significantly. The porosity of coaly hondrites, for instance (and as hondrites may serve asteroids and also, in particular, the nucleus of the Halley-comet) may reach the value of more than 20% [15], that may promote a significant adsorption and absorption of volatile components which the ring contains. You should not forget that the punching of the ring (the layer of small bodies of the finite thickness and some average density) by a large asteroid is the process of a successive interaction of a massive monolithic body of irregular form with a great number of small bodies during a certain time interval. In this case as the evaporation of the colliding bodies is going on the shock wave will be growing “smoothly” enough and exerting its influence for a long time. In general, the physics of such an interaction differes from the physics of the stroke of two solid bodies commensurable with each other and is of interest as the object of a separate investigation both theoretical and experimental. It is obvious, however, that this circumstance may promote the capture of the volatile components of the ring.
  And now some remarks  in respect of the photoes made by the “Vegas” apparatuses. In [10] Academician R.Z.Sagdeyev  says that: “Powerful  dust rejections are slightly camouflaging the nucleus surface but a detailed photometrical treatment allowed to determine its form, dimensions and reflecting ability”. However there’s no statement that they succeeded is seeing the nucleus surface itself. There’s no doubt that the averaging of images, space filtering, etc., may “emphasize” something but they are not able to “extract” the information that is  absent in the initial image. In this  connection the statement that the images of the comet nucleus  proper were obtained is not  quiet correct. Incorrect and groundless is also the statement about that “...in comets... the material of which the Solar system was generated is preserved in its original form” [4]. Comets occur  and die  nowadays with the probability which estimated the above.
  After the “Vega” experiment a number of new hypotheses of the comet formation appeared, but they don’t resolve all the contradiction in  contrast to that offered by the author. At present the major part of specialists suppose  that asteroids are dead comets (those left after the melting of ice - the main  component). This point of view is an intermediate one, as far as it would be more correct to say: some asteroids are dead comets (the main component of the comet mass is the asteroid proper).
  The basic arguments were formulated by the author as far back as the beginning of  1985 and were expressed in the letters, besides in 1986 they found their reflection in the materials of the Application. At present these materials may be only supplemented in the light of the new experimental facts and data.
  The potent aspects of the  hypothesis are:
- its concrete character and the absence of any obstacles for the further concretization; absence of any abstractions of the type comet cloud of Oort, Nemesida, etc., that were seen by nobody;
- logical inevitability of the offered mechanism, caused by the absence of physical interdictions and the finite value of the probability of the event;
- possibility of a versatile verification;
- logical connection with all the available facts.
  Besides, the hypothesis at the same time gives a harmonious picture of such a phenomenon as the “Tungus meteorite” (appendix to the Application, here chapter 6), that in general agrees with new views on this phenomenon [16] and removes any misticism and mystery, created around this sensational question.

5. TERMINOLOGY AND EXCEPTION  TO THE RULE

  If the term “comet” implies a small celestial body with a gaseous cover (coma) or tail consisting of gas and dust that is probably more concrete than a vague meaning of this word given in dictionaries, then the  author proposes to call the comets formed as result of piercimg of the major planets of the Solar system by asteroids to call these comets “samaroid(s)” - in honour of the city of Samara which in 1986 celebrated its 400th anniversary (that was also the year of the Halley-comet). As it follows from the introduction to this article this name “samaroid”  is quite justified.
  For the comets formed as a result of an asteroid passing along the trajectory close to the tangent through the atmosphere of such planets as the Earth, Mars and Venus (the Earth group) - it is known at least one case when a bolide (fire-ball) entered the atmosphere of the Earth, passed it through  and then again went away beyond the limits of the atmosphere and at this it didn’t become the Earth satellite - the author proposes the name (or term) “novid”. Though the  probability of the formation of weak comets is such a way is almost zero, still it should  not be fully excluded out of the sphere of our attention. After the contact with the atmosphere any celestial body takes away with it a portion of gases. Even SA - artificial Earth satellites have their own atmosphere. The term “novid” descend from the name of a small and very picturesque village “Novinky” situated in the Zhiguli mountains near the city of Samara within the area of the first national park in Russia (not 1st in the USSR) “Samarskaya Luka”.
  The two terms proposed by the author symbolize the unity of great and small in the Universe...
  For the comets out of the cloud Oort (let it be so! - the author is just enough) the author offers the term “Oortides”. - Let the Time to prove the vitality of these names.
  Thus, the “cosmic bulldozer” - the Halley-comet is, apparently, a ferrous-stony “samaroid” belonging to the Neptune (or Uranus?) family.

6. TUNGUS PHENOMENON

  One of the arguments against the proposed mechanism of the comet formation may be a false interpretation of the event that took place in 1908 and is known under the name “Tungus meteorite” as far  as the zone of fall was of an unusual character; the meteorite proper was not found. In this connection a great number of hypotheses appeared on the collision of the Earth and the icy comet that later on evaporated. But as far as the comet is no more than a “dirty asteroid” and is not a very original one as for the results of its influence then the author  offers the following non-contradictory explanation of the event (without any pretension on originality).
  At  8 o’clock a.m. on the 30th of June, 1908, in the Tungus taiga the event took place known under the name of “Tungus meteorite”.
  The examination  of the place of the Tungus meteorite fall in 1927 and later on showed the absence of the meteor body and craters. The woods within the radius of 30 km was brought down by the blast [17, p.54]. All these in total was unlike a usual fall of meteorite.
  Take notice of several facts.
  After the fall of Sihote-Alin meteorite in 1947 numerous splinters were found. On having analysed these splinters a soviet scientist E.L.Krinov marked out conditionally three stages of the meteorite splintering into composing parts by a number of characteristic signs [17, p.42].
  At the Tungus meteorite fall an unusual phenomenon was observed: at the vast territory to the west of the place of the meteorite fall the night from the 30th of June to the 1st of July practically did not set in [17, p.53]. The sky was light and even in England it was possible to read a paper at this time (this phenomenon is, apparently, belonging to the type of “crepuscular” ones as far as this season the Sun sets not far beyond the horizon and the diffusion of Solar light may occur in the upper layers on fine-dispersed particles). At the same time to the east of the place of the meteorite fall there was nothing of the kind. This circumstance substantially confirms the assumption that the trajectory of the Tungus meteorite fall was close to the tangent to the Earth surface, i.e. the meteorite entered the atmosphere of the Earth  at the small angle to the horizon. At such a trajectory the meteorite must move significantly longer in the Earth atmosphere, experiencing at this its resistance and being subjected to destruction. Thus, there are all the grounds to suppose that the number of stages of destruction of the Tungus meteorite was more than that of the Sihote-Alin meteorite (mentioned above) and on approaching to the place of its fall the Tungus meteorite was almost completely destroyed to small splinters, forming a kind of a cloud consisting  of stony hail or “rain” if the body was melted in addition. On collision of this cloud with the Earth surface a powerful blast must be generated over a great area and in fact this phenomenon took place in case of the Tungus meteorite. Besides, recently in the region of the explosion the microscopic balls were discovered. These balls were not of the earthly nature [17, p.55].
Thus, the Tungus meteorite is a small cosmic-body entered the Earth atmosphere by the trajectory close to the tangent and consequently subjected to the full destruction.

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