

"Աստղագիտության կապն այլ գիտությունների, մշակույթի և հասարակության հետ"

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Արարատ Եղիկյան

Astrophysical terms in Armenian

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Աստղագիտական աշխատանքային լեզուն անգլերենն է, և որոշ հապավումով, ռուսերենը: Ուստի հայերենում մեծ քանակությամբ հայերեն համարժեքի կարիք ունեցող տերմիններ կան: Սակայն աստղագիտության դասավանդման պրոցեսում որպես կանոն օգտագործվում են անգլերեն կամ ռուսերեն տարբերակները: Այդ գործընթացը կարգավորելու նպատակով առաջարկվում է ստեղծել միջառարկայական աստղագիտական տերմինների հայերեն բացատրական բառարան տարբեր գիտությունների մասնագետների համագործությամբ: Քննարկվում են նորագույն աստղագիտական հայտնագործությունների հետ կապված որոշ տերմինների հայերեն համարժեքները: Զեկուցման երկրորդ մասում քննարկվում է հայագիտության համար կարևոր նշանակություն ունեցող "երկաթ" բառի ստուգաբանությունը, կապված պատմությունից հայտնի երկնաքարերի երկաթի տվյալների հետ: Հայագիտությանը վերաբերվող ցանկացած թե լեզվաբանական և թե պատմագիտական տեսությունները պարտավոր են հաշվի առնել այդ փաստերը, որոնք հայտնի են և ներկայացվում են հեղինակի կողմից հայագետներին դրանց վրա ևս մեկ անգամ ուշադրություն հրավիրելու համար:

1. Introduction

There are only a little astrophysical textbooks (to say nothing about monographs) in Armenian, which are, however out of date and miss all the modern terms concerning space sciences. Many terms have been earlier adopted from English and, especially, from Russian. On the other hand, teachers and lecturers in Armenia need scientific terms in Armenian adequately reproducing either their means when translating from other languages or (why not) creating new ones. In short, a permanently updated astrophysical glossary is needed to serve as explanation of such terms. I am not going here to present the ready-made glossary

(which should be a task for a joint efforts of many professionals) but instead just would like to describe some ambiguous examples with comments where possible coming from my long-year teaching, lecturing and professional experience. A probable connection between "iron" in Armenian as concerned to its origin is also discussed.

2. Unusual and ambiguous astrophysical terms in Armenian

Accretion - “տարափում, սկրեցիա”: it is interesting to note that in astronomy this term is used always to stress a gradual accumulation of matter due to gravitation while the original meaning has come from geology in the sense of “increase of matter by a river flow deposits”, so it is up to you, a lecturer, which one may be used.

Astrobiology – “աստղական սարքանություն”: instead of such a literally translation with a funny sense one may use more neutral (but slightly more tired) term, like “արտերկրային կենսաբանություն”.

Black hole – “սև խոռոչ”. There is no doubt for Armenian astrophysicists in adequacy of such a translation, which has supported not only by the professional leader (V. Ambartsumian), but also by the writing classic author, e.g.

Antony and Cleopatra by William Shakespeare , Act 2, Scene 7,

<http://shakespeare.mit.edu/cleopatra/full.html>

**To be called into a huge sphere, and not to be seen
to move in't, are the holes...**

(It is used also as epigraph in the book "Stars" by I. Shklovski, at the corresponding chapter). The point is that sometimes one may listen "սև սևոց" from schoolchildren, students and popular TV, which evidently contradicts to the generally accepted meaning coming from specific details of black hole astrophysics.

Debris - “փշուրներ, բեկորներ”: one should note that it is either a waste remnant of a **Protoplanetary disk** (“նախամոլորակային սկավառակ” or “նախամոլորակային նյութի փշուրներ”) or is a result of geosatellites destruction (“արբանյակային բեկորներ”).

Mass-loading flows - “բեռնվող զանգվածով հոսքեր”: many stellar winds interacting with the interstellar medium (or with remnants of previous more slow winds) operate in the mass-loading flow regime which demands on a more complicated gasdynamical description.

Nuclear energy – Atomic energy - “միջուկային – ատոմային էներգիա” or “հյուլեական էռանդ”: it is up to the user to decide what term is applicable.

Osculating ellipse - “շոշափող էլիպս” or “համբուրող էլիպս”: it is based on the folklore of Celestial Mechanics concerning topics of a perturbed motion. The case is that the term is

designed by Lagrange, who has adjusted a Latine “osculatio” (kiss) to designate touching curves. Later Prof. N.D. Moiseev (Moscow, 1902-1955) has noted in his lectures: “Это название отражает интимную близость возмущенной и невозмущенной орбит” (cited by V.V. Beletcky).

Planetary nebula - “մոլորակաձև միգամածություն”: as is known, such objects have nothing common with planets because present a short live stage of solar-like stars at the end of their evolution. On the other hand, to avoid any misunderstanding, ancestors of them should be designated as **Preplanetary nebula** (see below)

Preplanetary nebula - “նախամոլորակաձև միգամածություն”, which should not be confused with ancestors of real planets – **Protoplanetary disk** (see below)

Protoplanetary disk - “նախամոլորակային սկավառակ”: according to a modern point of view here is a planets formation area

Pulsar - “բւրբախիչ”, but **Pulsating star** - “բւրբախող աստղ”: these are quite different things and should be distinguished when using in popular literature. It is important also to stress for students that the former name is coming from a detection method while another is directly reflecting its nature.

Stellar association - “աստղասփյուռ”. There is no news here rather just as outstanding example of creation of new professional term by a cooperative effort of astrophysicist (V. A. Ambartsumian) and philologist (Jrbashian).

3 Iron in Armenian, the location of carriers of that term and all that

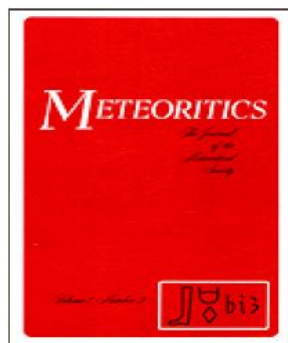
Below an intricate and unsolved problem of the term “iron - երկաթ” in Armenian is discussed. This is of course the task for philologists and historians but at least astrophysicist may have some contribution into the statement of the problem and hope to get from professionals clear answers for the simple questions listed in this paragraph.

As is known, etymology of Armenian twin words “երկինք” and “երկիր” is very uncertain (e.g. Աճառյան) especially if one would like to connect them with “iron-երկաթ” by means of the debatable common root “եր” and decode the word as a “sky drop”. Modern philologists (e.g. H. Martirosyan, Groningen, oral message, 2011) refuse any such a relation and announce as a coincidence the spelling of the modern Armenian word resulted with the mentioned meaning. Historians probably also will decline that explanation because according to the usually accepted point of view when the Iron Age has started in the Hittities Kingdom (Bryce, 2007), or to be more correct, in the northern part of the Empire (the Hatti Kingdom) around XV-XIII B.C. there were no carriers of (pre)Armenian: (pre)Armenians

have leaved their Balkan ancestral land and have entered into the mentioned area now known as the Armenian Highland no earlier than at XII B.C. (ДЪЯКОНОВ, 1968). It should be highlighted here that the ancient name for iron was “Metal of Heaven”: a well-known example is coming from the hieroglyphic language of the ancient Egyptians where it was pronounced as ba-en-pet (in other sources, “ba-ne-pe”), meaning either stone or metal (“ba”) of Heaven “ne-pe”. A basic idea, expressed in ancient religious texts, was that the firmament of Heaven was of iron. This belief probably arose from the occasional fall of meteoric iron from the sky. It is interesting to note that the "iron from heaven" hieroglyphics which look like as presented below (Fig. 1),



were displayed on the Meteoritical Society journal cover from 1969 to 1987 (Fig. 2).



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It should be stressed that iron in Egypt as in some other countries was obtained from meteorites long before the Iron Age set in (about XXV-XX B.C.), but such iron things (e.g. knives) were very rare. Now we distinguish between meteoritic and ore iron by at first their Nickel abundance which in the former is larger by a magnitude and more and at second, by their quality: meteoritic iron things are of course, better. Later Egyptians lost the ability to get iron things and began to import them from the Hatti Kingdom, controlled by the Hittites Empire. The most important point for us is that people in that country have distinguished between the meteoritic and rocky iron and have been named them differently (“ha-pal-ki (more later form is ha-wal-ki), ”“heaven iron”, “good iron” – probably steel, “black iron” – БАЮН, 2011). As is well documented by Ancient Greek sources the first industrial production

of iron was done by Halibs, who lived at the Western most end of their territory (South-Eastern Black Sea coast) and their dominant occupation was iron melting and fabrication (Геродот, Ксенофонт, Эсхил – cited by Russian publ.). It is generally accepted now that the dating of the process is about XV-XIII B.C. The magnetite sands of the river deposits in that area played the important role and provided a good quality of iron. Aristoteles claims that “halib iron is the best one in the world, because Halibs produce it in their own secret way”. He calls it “white Halib iron” (cited by Kosidovskii, 1975). There is a point of view that “halib” means an occupation (“iron maker” – Арутюнян, 1998) and it is interesting to note that Pliny the Elder (cited Strabon) marked them as armenohalibs (Pliny the Elder, Strabon). In fact, of course, geographically the area of halibs is located on the part of the Armenian Highland at the coast of Black Sea. Moreover, Hittitologists discuss long time about a possible relation of Hayasa country with Armenians (e.g. compare the English and Russian versions for Hayasa in the Wikipedia). It is out of scope of this note to reveal pro and contra concerning the problem of the Armenian nature of the Hayasa country but one should stress that there is a good geographical coincidence between Hayasa and the territories of (Armeno)Halibs (Bryce, 2007). It is worthy to note also that it is an area of Hamshen Armenians for whom iron in their dialect is “Էրկաթ” (Աճառյաւն). At last but not least technologically more convenient production of iron on the area of historical Armenia (e.g. Metsamor) is dating at XIV-XIII B.C. (Иванов, 1987). I am not going here to present a complete decoding of the questioned term by reasons described above but just try to underline a following. (1) in Greek, iron is known in 3 forms: “σίδηρος”, i.e. “sederal” which probably reflects possible communications between Greeks and first “iron makers” at the Early Iron Age; “χαλκός” – which means “metal, copper, steel”; and “χαλυψ” - “iron, steel”, coming from mentioned halibs (Иванов, 1983). Interestingly, “χαλκός” is connected with more earlier term “ka-ko”, coming from Mycenaean and meaning general name of metal in the pre_Iron Age (Иванов, 1983). Let now browse in the Wiki Dictionares: it is easy to check following meanings: Parzillu – iron stone – Assyrian, bar-zel – Hebrew – as cutting, Ferrum – in all Romanian languages, also as hard, абхазский – аиха (железо) – твердый, German – Eisen – (adopted from Keltic=Celtic) – superpower, etc. One can see that among existing languages (skipping Egyptian and Hittite) only Armenian name of iron (probably) is connected with its nature and source of the origin while other languages stressed the function. Thus one comes to the final question, concerning interpretation of the term “Էրկաթ - iron” in Armenian: is it correct to connect “Էրկաթ” with “sky iron” or not. The author understand how complicated is the problem from the philological point of view, on

the other hand if all the mentioned above is impossible and is a mere coincidence then one should hope for unbiased explanation of that from the professionals in the subject.

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