

A Historical Vignette

“Be proud of yourself: you have a History!”

The imagination and medical nomenclature; Teutonic mythology as a presence in ENT and related fields

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Abstract. *The Imagination and Medical Nomenclature.* The imagination is one of the sources of inspiration for medical nomenclature, as can be seen when nomenclature reflects mythology. In this paper, we consider Teutonic (Scandinavian, Germanic) mythology as it appears in the field of minerals, in the field of hearing and in the field of respiration. As far as hearing is concerned, the author suggests naming “Heimdall’s ear” physiological hyperacusis.



Figure 1

From left to the right:

1. Illustration from “*Le voyage au centre de la terre*” by J. Verne. The etching is by E. Riou (1867).
2. Heimdall, the sentinel of the gods, at the foot of the rainbow, by Constantin Hansen, National Museum of Copenhagen (1861).
3. The Ondines/Undines (water nymphs), here the daughters of the Rhine, illustration taken from “the Rhinegold” by R. Wagner; a watercolour by Hermann Hendrich, in about 1920.

1. The mythology of ores (Figure 1)

The metals we discuss have implications for ENT and related fields. They sometimes owe their names to a place evoking mythical Scandinavia, sometimes to gods

or gnomes of Scandinavian origin. Examples of these metals are thulium, thorium and vanadium. None of the three are very well known but they have some applications in odontology. Cobalt and nickel are more familiar to us. They are linked to the Nibelungen,

the dwarfs of Wagner’s musical dramas. It is worth pointing out that all these names were introduced by Scandinavian chemists and mineralogists, the people who remained the most faithful to the traditions of the Teutonic mythology.



Figure 2

Here you see Thule spelled “Tile” on the marine map of Olaus Magnus, together “with a monster seen in 1537”, which is probably a whale (polygonal marker), and an orca (arrow) alongside it.

The name **THULIUM** (Figure 2) was introduced by the Swedish chemist **Per Theodor Cleve** as a tribute to his country, Scandinavia, when he discovered that metal in 1879. The mythical place of **Thule** was the most distant northern limit of the known world during Antiquity. We now

think it corresponds to Iceland, one of the Shetland isles, or even of a part of Scandinavia itself. “Thule” was the name given in the IVth century BC by **Pytheas**, a sailor sent out by the Greeks from Marseilles. He was the first to write about Thule, in “Concerning the Ocean”, which was written between 330 and 320 BC.

- Thulium is one of the rare earths. It is not radioactive in itself but it becomes so when it is bombarded with neutrons in a nuclear reactor. Then it emits soft gamma rays which closely resemble traditional X-rays. It can therefore be used in small mobile devices for dental radiology because it is possible to dispense with a source of electricity for these devices.

The name **THORIUM** (Figures 3,4) was given in 1829 by **Berzelius** to a silvery metal that had the property of emitting

sparks when struck by steel (an alloy of iron and carbon). This property led to the name, which refers to the Scandinavian god of war and thunder, **Thor**.

In French, “tonnerre” has the same origin as “thunder” in English, “donner” in German, and “donder” in Dutch. The same root is also to be found in the English “Thursday”, German “Donnerstag” and Dutch “Donderdag”.

- After 1930, the use of thorium in radiology as “Thorotrast” (ThO₂) led to cancers of the liver, the spleen, the bones and the lymph nodes. Carotid arteriographies with Thorotrast ended in the formation of cervical granulomas, sometimes with cutaneous fistulae (Figure 4). Thorium emits carcinogenic alpha rays, it has a half-life of 22 years and it is carcinogenic. Its use in medicine was therefore abandoned in the 1950s.



Figure 3



Figure 4

Figure 3. Thor’s journey to the land of Giants, the enemies of the Gods, painted by Constantin Hansen (national museum of Copenhagen). In his right hand, Thor holds his famous hammer. The other characters are a young countryman and his sister on either side of the god Loki.

Figure 4. Thickening along a left cervical neurovascular bundle corresponding to a deposit of Thorotrast in a patient who received Thorotrast for a cerebral angiography. Notice the pharyngeal fistula in the skin at the level of the cranial part of the deposit (arrow).



Figure 5

Figure 5. Lithography by Paul Delvaux for Alain Robbe-Grillet's "*Construction d'un temple à la déesse Vanadé*", Paris, Le Bateau-Lavoir, 1973.



Figure 6

Figure 6. Three miners frightened by a kobold.

The name **VANADIUM** (Figure 5) was introduced by **Sefström** and **Berzelius** in 1831 because of the beauty of its coloured compounds. **Vanadis** was the alternative name for Freya, the goddess of Beauty.

Vanadium, which is family to titanium and aluminium, is used mainly in orthopaedic surgery (pins, screws) and for dental implants. Vanadium improves the resistance of implants to corrosion, and resistance to compression by comparison with pure titanium.

COBALT and NICKEL

The names cobalt and nickel have a shared origin: small, mischievous or indeed hostile creatures that inhabit mines known as **kobolds** and **nickels**. They are related to the famous Nibelungen found in Wagner's opera cycle "*Das ring der Nibelungen*".

a. COBALT (Figure 6) comes from German folklore. During the

Middle Ages, European miners believed in subterranean spirits and gnomes. The latter were thought to be miners and experienced metal workers. People heard them continuously drilling, hammering and pushing things about. Some claimed that they lived inside the rock itself. People called on them for help but they were also blamed for accidents and rock falls. In the XVIth century, it was said that they deceived miners by making them discovering valueless ores. For example, they would lead them to deposits of what were apparently copper or silver ore which later proved to be no more than pollutants or even poisons. These cursed deposits were called cobalt by the miners in reference to the creatures behind them: the kobolds. In 1735, the Swedish chemist and mineralogist **Georg Brandt** isolated a substance from this type of ore, and he named it Cobalt Rex. In 1785, other scientists found that

it was a genuine new element and named it cobalt.

Some have seen in the kobold a caricature of Norwegian miners, whose short stature allowed them to work in narrow and low shafts.

- The kobold in the arts

In literature, the kobold represents different things:

– He is the symbol of the earth (one of the four elements of Greek philosophy). In Goethe's "*Faust*", we read:

Salamander shall kindle,
(the fire)

Writhe nymph of the wave,
(the water)

In air sylph shall dwindle,
(the air)

And kobold shall slave
(the earth)

– In Paul Verlaine, the kobold represents the coal-miner of the land of Charleroi. In his poem "*Charleroi*", he writes:

*Dans l'herbe noire
Les kobolds vont.
Le vent profond
Pleure, on veut croire...*

Through the black grass
The **kobolds** are going,
The deep wind
Cries, we want to believe...

– Turning to music, the kobold was the subject of a composition by Edward Grieg (lyric piece, opus 71, number 3).

- Cobalt is particularly suitable for the treatment of cancerous lymph nodes in the ENT field given the fact that it is most active 0.5 cm under the skin. In 1951, Dr Ivan Smith treated cancer with Cobalt 60 for the first time in the world in the Victoria Hospital of London, Ontario (Canada).

b. NICKEL was the name given to a metal discovered by the Swedish mineralogist **Axel Frederik von Cronstedt** in 1751. The name comes from the German **Nikolaus**, Nicholas in English, one of the names meaning “devil”, “mischievous imp”, an etymology also seen in the English expression “Old Nick” for the Devil, and the word “Nickelman” in modern German for “goblin, gnome”.

In miners’ legends, the Nickels haunt the mines at night and corrupt or contaminate the good ore.

The nickel ore deceived the miners, who thought they had found copper. So this ore was first named “Kupfernickel”, meaning “copper goblin” before the word “nickel” was applied to pure nickel, which therefore means “goblin”.

- In dentistry, nickel is sometimes used in dental amalgam.

Unfortunately, it is the most allergenic of all the metals. The chronic inhalation of nickel vapour is one of the factors leading to cancer of the lungs.

2. Heimdall’s ear and physiological hyperacusis (Figures 7,8,9)

The word “hyperacusis” has an established position in medical dictionaries. By contrast, the concept is practically never dealt with separately in the ENT literature or the usual audiology journals. The reason is probably that it is less an autonomous disease than a symptom associated with cochlear deafness. However, it should be pointed out that the term “tinnitus”, another symptom, is dealt with separately. The difference is due to the fact that the number of “essential” tinnitus victims is so great that the phenomenon has acquired *de facto* autonomy.

- Be that as it may, it is important to make clear what is meant by “hyperacusis” to determine in which cases its comparison with Heimdall is justified.

Painful hyperacusis is classically a symptom in facial palsy with the loss of the stapedius reflex. In that case, it is not hyperacusis proper because there is no genuine enhancement of hearing but rather a painful sensitivity to sound. People do not hear “more”; they hear more painfully.

Hyperacusis in cochlear deafness. This is the only form of hyperacusis that is both pathological and objectifiable. It is present in cochlear deafness, for instance in the early stages of Ménière’s disease. The phenomenon described as “over-recruitment” is

apparent. During the augmentation of the intensity of the sound presented alternatively to both ears, the sensation of loudness in the diseased ear not only matches, but also exceeds, the sensation in the normal ear. This hyperacusis is, however, relative to the normal ear and it is present only at high sound intensities. It is not therefore “absolute”.

Physiological hyperacusis is typical of people whose hearing is supernormal. Although it is rare, we have sometimes encountered, in our practice of military medicine, some cases where the tonal audiometric curve is located above the line of normality of 0 db loss (for instance +5 db or even +10 db). It should be pointed out that most audiograms do indeed have a zone that is above 0 db loss, and that it extends to + 10 db. We suggest using the term “**Heimdall’s ear**” exclusively for this last type of “physiological” hyperacusis.

- Heimdall’s identity

Heimdall was first the god of light. He may have personified the rainbow that we see on the painting by C. Hansen (Figure 1.2). In any case, the god was positioned close by because the rainbow was also the great bridge leading from the dwelling-place of man to that of the gods. Heimdall was also the guardian of that road, the divine sentinel. He needed less sleep than a bird. He could see equally well during the night and during the day. And, above all, he could hear the grass growing on the earth, a leaf falling on the ground and the wool growing on the back of the sheep. To alert the gods, he used a horn which was audible throughout the world. Heimdall was a thundering hyperacusis god!

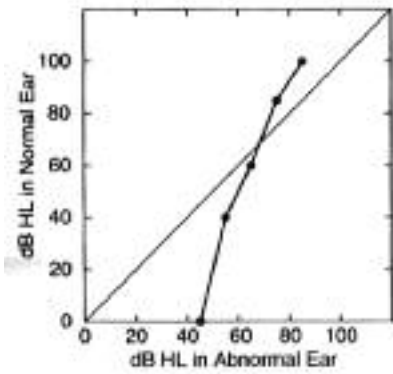


Figure 7



Figure 8

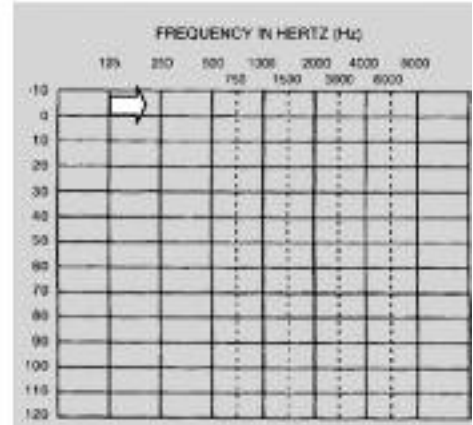


Figure 9

Figure 7. Equal sensations of loudness with two normal ears (straight diagonal line); and with unilateral cochlear deafness (the deaf ear is represented on the horizontal axis). Above 70db, the sounds in the deaf ear are perceived more strongly than in the normal ear.
 Figure 8. Etching showing Heimdall by Frederik Sander, published in the Swedish edition of the Poetic Edda, in 1893. The god is listening and is holding a horn. The ram head could mean that the god can charge like a ram, headlong.
 Figure 9. Audiometric chart representing the zone of the auditory threshold of a physiological hyperacusic ear or "Heimdall's ear".

3. Ondine's curse/disease and sleep apnoea (Figures 10,11)

*Life is not measured by the number of breaths
 But by the moments when something takes our breath away*

- The disease Children suffering from the "Central Congenital Hypoventilation Syndrome", CCHS, or "Ondine syndrome", or "Ondine's curse" have progressive hypercapnia and hypoxemia during their

sleep, particularly during the light and deep sleep phases, and to a lesser degree during the REM phase (Rapid Eye Movement). Unfortunately, these patients lack a reflex response to the hypercapnia or to the hypoxemia.



Figure 10

Jean Giraudoux, a French writer, studied German. On the eve of the Second World War, he published a play entitled "Ondine". The tragic fairy tale was stated for the first time in 1939. The leading roles were taken by Louis Jouvet, a friend of Giraudoux's. He played "the knight" and Madeleine Ozeray (a Belgian actress born in Bouillon who was Jouvet's companion at the time) played "Ondine".

However, ventilation may be appropriate during the period of wakefulness.

These patients have a mutation in gene PHOX2B situated on chromosome 4. During the embryonic and foetal stages, this gene plays a determinant role for the entire autonomic nervous system, which regulates automatic activities like respiration, the regulation of glycemia, temperature or the heartbeat. The identification of the relevant gene has made it possible to understand the disease better and also to make progress in understanding the functioning of the autonomic nervous system in general. There have also been studies of the possible link between Ondine's curse and "sudden infant death syndrome".

- The source of the expression "Ondine's curse"

Of the medical dictionaries, Stedman's is to my knowledge the only one that mentions the link between "Ondine's curse" and the French writer **Jean Giraudoux**:

"Ondine's curse. Idiopathic central alveolar hypoventilation in which involuntary control of respiration is depressed, but voluntary control of ventilation is not impaired. ["Ondine", character in play by J. Giraudoux, based on Undine, German mythological character]". (Stedman's medical dictionary)

On the other hand, the other medical dictionaries do state the names of the physicians who introduced the name "Ondine" for the disease: **Severinghaus** and **Mitchell**. These authors were members of the Cardiovascular Research Institute of the University of California Medical School based in San Francisco. In 1962, they wrote: "*The syndrome*

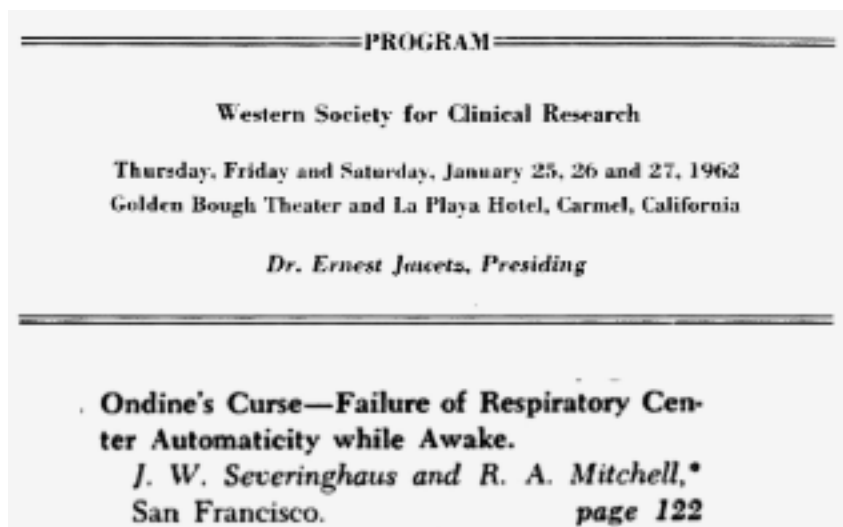


Figure 11

The frontispiece of the original edition of the paper by Severinghaus and Mitchell, 1962.

was first described in German legend. The water nymph Ondine, having been jilted by her mortal husband, took from him all automatic functions, requiring him to remember to breathe. When he finally fell asleep, he died".

- The Ondines in the French tradition

The Ondines were nymphs living in fountains or in rivers. They had blue-green hair that they came to comb coquettishly on the surface of the water. They were always pretty and mischievous, sometimes cruel. Ronsard listed several of them, inspired by Virgil's *Georgicae*:

«Près de la nymphe, au plus profond des ondes,

Etait Antrine aux belles tresses blondes

Et Azurine aux tétins découverts,

Verdine, Ondine, et Bordine aux yeux vers»

[Near the nymph, in the depths of the waters,

Was Antrine with her nice blond plaits

And Azurine with her breasts uncovered,

Verdine, **Ondine**, and Bordine with their green eyes]

- The Ondines in the Germanic tradition

– **Richard Wagner** refers to the Ondines in "The Rhinegold".

– Giraudoux was a French writer who received a German literary education and was inspired by the tale "Undine" written by the romantic German writer of French origin, **Friedrich Heindrich Mark de La Motte Fouqué**. His tale was published in French in 1834, based on a translation by **Baroness Isabelle de Montolieu**. In that story, a knight named Huldbrand marries Ondine, who then dies. He subsequently decides to marry again but is in fact tormented by despair. On the day of his wedding, he encounters the ghost of Ondine, who kills him:

«Elle le serra plus étroitement contre son cœur, en pleurant, comme si elle eût voulu le noyer dans ses larmes. Le chevalier les sentit pénétrer dans ses yeux,

dans sa poitrine. Sa respiration devint toujours plus faible; enfin, ses bras qui serraient encore Ondine avec ardeur, se détachèrent d'elle. Il échappa de même aux bras qui le pressaient, tomba doucement sans vie sur les carreaux du sofa...»

[She held tight him more closely against her heart, crying, as if she wanted to drown him in her tears. **The knight felt them penetrating in his eyes, into his chest. His breathing became weaker and weaker;** finally his arms, that were still holding Ondine with ardour, let her go. He fell from the arms that were squeezing him and fell gently, bereft of life, onto the checked pattern of the sofa.]

– **Jean Giraudoux himself**, in 1939, told the story a little differently in his play “Ondine”. However, we again see the emphasis on the respiratory difficulties. A knight named Hans falls in love with a nymph named Ondine, but he later deceives her with a girl from his past. Alas! To acquire human form, Ondine had accepted that she would kill the man she loved if ever he were to deceive her. Which is exactly what happens. Giraudoux’s play ends with the death of the knight. Hans, feeling his end approaching, says to Ondine:

«Tout ce que mon corps faisait de lui-même, il faut que je lui

ordonne. Je ne vois que si je dis à mes yeux de voir. Je ne vois le gazon vert que si je dis à mes yeux de le voir vert. Si tu crois que c’est gai le gazon noir!...C’est une intendance exténuante. J’ai à commander à cinq sens, à trente muscles, à mes os eux-mêmes. Un moment d’inattention, et j’oublierai d’entendre, de respirer... Il est mort parce que respirer l’embêtait, dira-t-on...»

[“Everything my body once did alone, I must order it to do. I see only if I tell my eyes to see. I only see that the grass is green if I tell my eyes to see it green. It is not a joyful thing, black grass! ... The whole thing is an exhausting chore. **I have to command five senses, thirty muscles, my bones themselves. A momentary lack of attention, and I will forget to hear, to breathe... People will say: ‘he died because breathing bored him’**”].

4. Conclusion

For researchers, there is a unique moment: the moment when, after having succeeded in lifting a corner of the veil, they give a name to their discoveries. Then they suddenly remember that they are poets and children at heart. Poets, in other words “makers, creators” (from Greek ποιεῖν, “ποιεῖν”, to make), creators of imaginary

worlds, worlds made by them and for them. Children also, because of their wondrous devotion to stories they have been told. In the cases presented here, the scientists have drunk in the mythology to the full, drawing on the names of a distant country, of deities more or less powerful, of mischievous gnomes. And in these ways, they have brought their dreams to life.

But there is something more: by naming things, researchers themselves have a magic power, a little as though they create the things they have only discovered.

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