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# GREEK THERMALISMOS
## Healing sources - Bath-places - SPA-tourism

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**ABSTRACT**

*This paper which tackles with "Thermalismo Hellenico" is an approach to the historical data, from the moment that hydrotherapy has started because of Herodotus' very first observations and later on proved to be a healing process according to Hippocrates and his school. Some concepts and definitions are to be provided in order to explain the contemporary meaning of "Thermalismos" both as a social need and as a wishful hope for human health. Moreover, the natural and chemical properties of the water are being mentioned, once they play a major role in the application of hydrotherapy. Last but not least, the hydrotherapeutic applications of mineral water in the thermalistic centers (spas) are being presented.*

**HISTORICAL RETROSPECTION**

The use of the natural mineral – hot waters at the service of the human health is undoubtedly a fact that originated in ancient times. The ancient Greeks inherited the "hydrophilia" by the Achaeans of the Homeric times. Greeks' frequent contact with the water –which proved to be beneficial- led them to consider it a religious symbol.

From the 1500 B.C., the systematic use of the baths had already begun, having the belief that the "cleanness" and particularly the sanitation of the body, concerns all the citizens regardless their social status. The great spread of the use of baths in Greece, during the ancient times, established them, as a public affair while previously it was a private affair. In the 5th century B.C. there are the common baths, public or private, for the proper service of all the social classes. The ancient Greeks' belief, about the baths was differentiated depending on the time and the place. Their preferences for having cold or hot baths were not irrelevant to the time of the season and mainly to the prevailing morality. The cold bath was preferred in the arenas and the gymnasiums, the hot in the new public baths, which were called Valania. It's worth to observe that in the main hot bath there was also the steam - bath or "pyriatirion", which caused perspiration. According to the tradition, after the steam - bath, there was the hot – bath and, usually soon after, the cold bath. The general spread of the use of bath, as well as the relation and actions of humans with the water causes the spa – therapy to begin. Herodotus (484 – 410 B.C.) describes a few water springs that had a beneficial influence on human organism and suggests the healing spa, which according to the historiographer should last for 21 days. Of course we must notice that the hot healing baths did not take place in the Valanias but in the Asclepiads, also known as the temples of Health. There –in the Asclepiads- gathered everyone who wanted to get cured or relieved. Before each special cure, they were doing hot or cold baths under the supervision of priests or doctors. In about 100 regions such institutions were established. As Ploutarchos and Pausanias witness, in these regions there were healing springs, where patients were taking their bath. In time the spa therapy played a central role not only in the personal life of every

ancient Greek but also in the social life of Ancient Greece, too. The philosophy and the love of the Greeks for the spas were remarkable, since these springs were offering the “divine gifts of health, welfare, beauty and stamina”.

Unquestionably, the systematic knowledge of the hydrotherapeutic art, belongs to Hippocrates (460 – 375 B.C.). Thus, the spa, an autonomous sector of the healing process was developed and expanded by Hippocrates and his school, in the Aegean region. Historical essays, buildings, works of art e. t. c., still existing in our days, represent the living testimony of a civilization with a philosophy and principles for the treatment of human health.

From that time on, the beliefs for the use of the therapeutic water in every historical period depended on the dominating perceptions about the human being and were in accordance with the organization of theirs societies. The ancient Greek, Roman, Byzantine – after-Byzantine and Modern Greek as main phases of the evolution of hydrotherapy, are being marked by the presence of the monuments “Thermae over thermae”. During their evolution one element remains unchanged. The spa is not only a means of physical relief and healing, but also a mean of spiritual and psychic welfare. The period of modern scientific approach of the spa and of the “Thermalismos” starts in 1830 on the island of Kythnos. Therefore, the systematic recording and study of the geological, physic – chemical and healing characteristics of the springs begins, and the era of the spa tourism – Thermalismos starts. Nowadays, we could say that the new tendencies and directions, which are related to the spas and human health, are based to the triptych “Thermalismos – Ecology – Culture”.

In the modern thermalistic centers, a wide acceptance of the meaning of healing process is being adopted, not only as a preventive method or as revitalizing one but also as a way, which is founded on a strategy of promotion of the human health. This effort for new orientations is believed to offer to the visitor the role of the protagonist for the sake of his own personal health. In an alternate, healthy, natural, functional and beautiful environment, which is socially and historically wealthy, harmonious and safe, the visitor takes care of his personal health and with pleasure experiments on healthy habits, behaviors and ways of living. He is encouraged to adopt an active role, and not to be only a passive receiver of healing methods, on the contrary he learns how to take advantage and to develop his individual skills in such ways so that he ‘the visitor’ can practice with knowledge and conscience his choices which concern his own health and also to recognize the role and the responsibility for the designing of the plan of his personal physical and psychological health.

The new concepts about the physiognomy, the position and the role of thermalismos in our modern social reality, lead us in the philosophy and the practice of the healing skill of Hippocrates. In his work ”About winds, waters and places”, he describes in every detail the ways through which the human health can be affected, from the environmental factors: the quality of the air, the water, the food, the morphology of the residence, the habits of daily life e. t. c. The author himself underlines that the understanding of the environmental effects constitutes the essence of doctors’ skill.

This belief, which we could characterize as «a study on the human ecology», was laid aside, and thermalismos was caged mainly in a passive bath centric model. However, it is a fact that during the last 20 years a lot of spas’ aspects are being redefined having as a base the Hippocrates’ ideas.

The spas in Greece, in the environment of mineral – hot, healing springs, have been during the centuries places of meeting, communication, healing, recreation, entertainment, welfare and relaxing. They have hosted generations of people. Since the time when, the visitors during their entrance in the Baths of Hypaty, were reading on marble inscription, until our times when the scientist study, record, evaluate and plan future actions and activities about thermalismos.

## CONCEPTS, DEFINITIONS, CHARACTERISTICS

Etymologically speaking, despite the fact that the term thermalismos looks like inaccurate or vague, it is scientifically, unanimously, accepted that it covers a wide field of healing processes, which are

being conducted with the use of natural spas. Thermalismos as a concept refers to the sum of practices, which are related, with the description of the thermalistic treatment and it's applications on humans as a way of prevention, cure, revitalization and also the personal and social evaluation of the thermalistic results. As a thermalistic treatment we define the totality of the actions and relations with the mineral-hot healing water, the clay, the steam and the environment which establish for a specific duration and in a specific place (thermalistic center) a particular model of living. When using the term "healing (thermalistic) natural recourses", we mean all the terrestrial natural materials which in their authentic state present or even prove, through the practical experience of the past or the contemporary scientific experience, the ability to exercise specific biological actions, which are being utilized in the therapy.

The natural therapeutic resources can be classified into three main categories:

a. Solid, which are of framboidal texture (inorganic, organic and mixed). Nevertheless, we ought to clarify that in the nature, the therapeutic clay that can be used, it is only the clay of hot or cold mineral springs. This kind of clay is limited in quantity. In our country we can find it in the centers clay-therapeutic treatment, Krinides and Pikrolimni. In the past the mud baths of Aidipsos, Lagadas, Plakas of Limnos and Killini were equally well known. Therefore in order to acquire mature healing clay, we imitate nature and we compound it artificially. Applying the procedure of maturity the common clay acquires those properties that make it a confirmed therapeutic means. We would say that the therapeutic clay is: "a mixture overheating or overheated which comes from an analogical, protogenic blend or more often a deuterogenic, of a solid component mainly argillaceous mixed with natural hot water and it is used in the thermalistic centers as a means of therapeutic treatment.

b. Gassy: caverns filled with steam, emissions of gasses, and emissions of steam, dry caverns. In Greece caverns filled with steam, can be found on the island of Nisyros "Artificial Roman", on the island of Ikaria "Cavern source", in the region of Kaiafas and in Kilkis. Emisions of steam with the use of inhaling – therapy we meet in the region of Amarados in Ioannina. There are emission of gases in many cold, low temperature, hot and overheated sources. It is mainly about $CO_2$ and $H_2S$.

c. Mineral – hot – healing waters: are the waters which because of their physical or chemical properties have healing characteristics after an external or internal use which is proved in a scientific way or with the practical experience of the past. We could say that Natural Mineral Waters are the waters that have a normal hydrotherapeutic quality; moreover mineral waters are the natural solutions whose formation under geological circumstances presents in the spring a physic-chemical dynamism in process that is responsible for a large part of their therapeutic nature.

Apart from the above definitions, we ought to clarify that mineral waters are the ones, which contain diluted solid salts in compositions grater than 1gr/kg or even when they contain T. D. S. < 1gr/kg if the composition of one or more of the following elements is:

Fe>10mg/kg, As>0,7gr/kg,
J>1mg/kg, S>1mg/kg,
CO>250mg/kg, Rn>18nci/l

Thus, when the above presuppositions exist and at the same time the water, which according to the practical experience of the past or the scientific documentation (physic – medical medicine), exercises beneficial effect on the human organism when it is used externally or internally, can be recognized as "healing or thermalistic" natural resource. As it was difficult to find a definition, which would contain the properties, the characteristics and the applications, it is intended to examine on the one hand the purpose, which they serve and on the other hand through which characteristics of these waters this purpose is achieved. We would say that the therapeutic nature which is specified in the application of a treatment and action program, which is defined by the following factors:

1. Thermal (Water temperature)
2. Chemical (Minerality, elements – minor-elements)
3. Mechanical (Pressure)
4. Radioactivity
5. Electrical characteristics of the metallic elements (electrolytes)

The combined action of all the above factors gives to the mineral water its

healing nature. Therefore in order to have a full physic-chemical identity it is necessary to explore the followings:

i. Origin
ii. Temperature
iii. Minerality
iv. Cryoscopic point
v. Chemical elements of quantity character
vi. Chemical elements (trace elements) of quality character
vii. Radioactivity
viii. Supply

Having examined the above factors, it is high time for us to classify the Greek mineral sources (either warm or cold):

**HOT AND COLD MINERAL SPRINGS**

Suitable geological and tectonic conditions in various regions across our country have permitted the creation of a number of warm and cold mineral springs.

The two following characteristics of the springs, the water temperature and the minerality, can be defined, the former in relation to the temperature of the water at the point of spout, when this (the temperature) is greater than the average annual temperature of the environment of the spring and the latter in relation to the quantity of chemical elements or even the sum of the solid remain in 180$^{o}$ C.

The rise of the water temperature is caused by:

I. The geothermal gradient G.G. (1$^{o}$C every 33m of depth - Fig. 1-
II. The presence of a thermal focus – Fig. 2 –

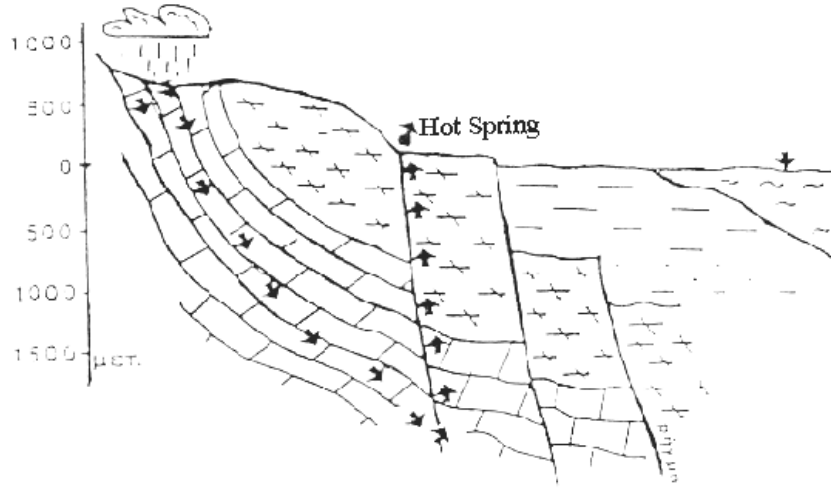


Figure 1

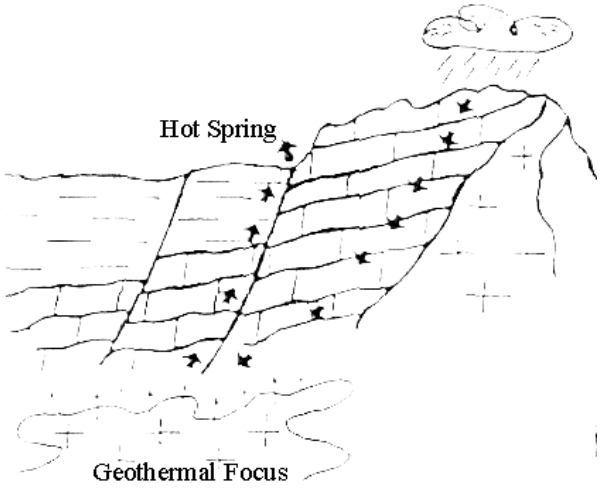


Figure 2

In the first case the water gets warmer because of its deep circulation in the solid crust, where the geothermal gradient causes the water temperature to rise.

In this category a number of warm springs belong to this category, such as the ones of Nigrita, Loutraki in the region of Pella, Smokovo, Thermopiles, Kaiafa, Kilini, Amarantos (vapors), Hypate, Thermi

in the region Thessaloniki, Kavasila in the region of Konitsa e. t. c.

In the second case during it's descent and before it reaches in greater depth the water gets warmer with the help of the thermal focus, which exists, in depth and in the same region.

A great number of springs belong to this case such as the springs of Ikaria, Milos, Traianoupolis in the region of Evros, Nisiros, Lesvos (Polihnitos, Thermi, Molivos, Lisvori, Argenos, Palaiohori), Lemnos, Samothrace, Aidipsos, Kamena Vourla, Kythnos, Methana, Kos, Eleutheron, Thermon, Paranesti e. t. c.

The hot waters always have an upward movement; on the contrary the cold waters have a downward movement. The waters coming from the rainfalls, snowfalls or the seawater descent to deeper horizons, where they get warmer. The rise of the geothermal liquids on the surface, presupposes the presence of faults in the area of the springs, which function as natural tubes of the upward movement. The reasons that cause this motion and finally the presence of the spring on the surface, it's the hydrostatic pressure, the dilatation (increase of its volume) of the water and the effect of the gaseous phase.

Finally, it is worth mentioning that in our country there natural hot springs which are famous for their great supply, a phenomenon which is considered rare worldwide. Such springs are the ones of Thermopiles (600 – 1000$m^3$/h), Loutraki in the region of Pella 520 $m^3$/h, Lefkada, Ikaria 150 $m^3$/h, Eleutheri in the region of Kavala 120 $m^3$/h, as well as the springs of Loutrki – Perahora, Kaiafas, Methana, Kavasila in the region of Konitsa e. t. c.

## CLASSIFICATION OF THE MINERAL SPRINGS

The classification of the hot and the cold mineral springs is conducted based on various criteria, in order for us to have a clear picture of their characteristics.
The criteria are:

**A. <u>Temperature:</u>** In the case where the water is used for therapeutic purposes, the best classification is actually the following:

- Cold: when the temperature (T) is less than 20$^o$ C
- Semicold: when we have 20$^o$ C < T < 30$^o$C
- Semiwarm: when we have 30$^o$C < T < 40$^o$ C
- Overheated: when T > 40$^o$C

**B. <u>Chemical composition:</u>** Out of a variety of classifications the most objective and applicable is the chemical one.

In addition the main characteristic of kind of a mineral water based on it's suitability as drinkable. Therefore, Greek mineral waters are divided into two major categories.

1) Mineral waters meeting the standards of drinkability are or could be characterized as natural mineral waters (N. M. W.) according to the legislation (Presidential Decree 433/9-11-83). The most known in relation to their major chemical elements and independently to their temperature are: Agiassos on the Island of Lesvos ($Mg^{++}$), Lagadas (F), Ehinos in the region Xanthi ($HCO^-_3$), Agistro in the region of Serres ($F^-$), Souroti ($Ca^{++}$, $Mg^{++}$, $HCO^-_3$, $CO_2$, $Cl^-$), Ksino Nero in the region of Florina ($Ca^{++}$, $HCO^-_3$, $Mg^{++}$, $CO_2$), Loutraki in the region of Corinth ($Mg^{++}$), Sidirokastro ($HCO^-_3$, $Na^+$, $F^-$), Karitsa in the region of Larisa ($Ca^{++}$, $Mg^{++}$, $HCO^-_3$, Fe, $CO_2$), Agrapidia in the region of Florina (F) e. t. c.

2) Non-drinkable mineral waters, which are used in hydrotherapy or the production of energy. We must also take into account that the Presidential Decree 433, provides with the definition, defines the chemism (chemical composition), the microbiological composition and contains the regulations, which are related to the standards of bottling, trade and hygiene.

**C. <u>Minerality:</u>** Mineral waters can be classified into two broad categories, depending on the Solid Remain (S.R.) in 180$^o$ C, thus we have:

- Low-mineral waters, when they have S.R. in 180$^o$C less than 1gr/l
- Mineral waters which they have S.R. more than 1gr/l

D. **<u>Molecular composition:</u>** mineral waters according to their molecular composition and compared the cryoscopic point of blood (0-56$^o$C) are characterized as hypotonic, isotonic and hypertonic.

E. **<u>Radioactivity:</u>** usually, mineral waters contain a greater composition of radioactive elements than common waters do. Depending on their radioactivity are characterized as low-radioactive (46,6 – 266,6 Bq/l), medium-radioactive (266,6 –

1333 Bq/l) and highly-radioactive when the percentage is greater than 1333 Bq/l. Compositions of Rn 222, which are the highest in the world exist in the springs of Thermae on the Island of Ikaria. Highly radioactive waters also exist in the spring of the Therma Loutra in the region of Loutraki – Perahora, in the springs of Kamena Vourla and in some springs in the region of Aidipsos.


**F. <u>Chemical elements that define the quantity and the quality character of the water:</u>** this classification is being conducted based on the great quantity of elements, which are contained in the water. The composition of an element, which is larger than 20%(in meq %) in the sum of the anions or cations, is considered a great quantity. The presence of trace elements in certain quantities offers a specific character to the identity of this water. These elements are: K, Li, Sr, Ba, Br, F, J, As, S, Fe, e. t. c. Taking under consideration the criteria which have been described, the characteristic identity of the waters of a spring arises: For instance the water of the spring of Taianoupolis in the region of Evros is characterized as hyper-

heated (52°C), mineral (Cl-Na-K-B-Sr-Br-J-Li-Hs), hyper-tonic, low-radioactive, mineral water.

**G.** **<u>Concentration of salts:</u>** Particularly the one of the NaCl.


**I.** If the water's concentration in NaCl is larger than 30gr/l, then the mineral water's composition is somewhat similar to that of the seawater. Such sprigs are: Agia Paraskevi in the region of Chalkidiki, Agios Fokas on the island of Kos, Aidipsos, Ikaria-springs of Apollo, in the cavern of Artemis on the island of Leukada, Thermi on the island of Lesvos, Kithnos, Methana, Nisiros, Samothrace. Obviously the zone of the supply of these springs is the sea (sourcing of the sea)

**II.** Mineral waters whose concentration in NaCl reaches the 50% of the totality of the

dissolved salts, but with a sum of dissolved salts which is not more than 15gr/l. Such springs are: Admanas on the island of Milos, Geras on the island of Mitilini, Eleutheres in the region of Kavala, Thermopiles, Kamena Vourla, Killini, Lisvori in the region of Lesvos, Polihnitos in the region Lesvos, Preveza, Traianoupoli, Ipati e. t. c. The origin of the water of these springs is characterized as 'Mixed'. More specifically the water of these springs originates from the compination of the seawater and the water coming from precipitations.

**III.** The carbonated – acid carbonated mineral waters whose concentration in salts is less than 2 gr/l, without taking into account the concentration of NaCl. Such waters exist in: Amoudaras in the regipon of Kastoria, Ehinos in the region of Ksanthi, Lagadas in the region of Thessaloniki, Sidirokastro in the region of Serres, Smokovos in the region of Karditsa, Trifos in the region of Aitoloakarnania, Nigrita in the region of Serres, Loutraki in the region of Pella, Kivotos in Grevena, Krinides in the region of Kavala.

## THERMALISTIC CENTER (SPA)

A thermalistic center which meets the contemporary social needs as well as the visitors' wishes ought to offer a number of characteristics-data, for instance: certified mineral water, installations properly constructed for the physical and psychological treatment, parks (areas covered with vegetation), areas and buildings for entertainment, recreation, offering of a variety of services e. t. c.

The outdoors thermalistic system must include all the qualitative characteristics of the area (history, culture), ecological elements (nature and landscape), social elements (meetings, shows, artistic performances). Center of all the activities must be the installations of hydrotherapy as well as the ways of it's (hydrotherapy) application.

## HYDROTHERAPY AND WAYS OF APPLICATION

Hydrotherapy is an autonomous healing sector, which depends on and at the same time utilizes the natural and chemical properties of mineral waters in order to be in the service of human health, the prospects of the application of hydrotherapy cover a wide range of needs of the human organism such as the confrontation of pathological states, the prevention and remedy. The type of cure that is to say, the way, the duration and the frequency define as well its results.

**Ways of application:**

1. **Hydrotherapy:**
2. a) SEAWATER THERAPY
   b) HEALING MINERAL WATER THERAPY
c) HYDROTHERAPY WITH MINERAL HEALING WATER:
i) EXTERNAL HYDROTHERAPY (Full baths, on the spot showers, full hydro-massage, hydro-kinesitherapy, semi-baths)
ii) INTERNAL HYDROTHERAPY (Drinking mineral water therapy, inhaling the mineral water steams, washing of the nasal and oral cavities, and of the vagina)

**2. Clay-therapy:** a) FULL
b) PARTIAL (Compresses)

**Full baths:** these baths are classified according to the water temperature and are realized with a full or partial submerging of the body in a private or a common bath. The program lasts for 15 to 20 days and the duration of each treatment is 20 minutes. The Full baths are useful to people who suffer from arthropathy, dermatitis and problems in the vascular system.

**Hydro-Massages:** they are based on the application of water pressurized in 1.5 atm, on a body, which is already in the water. This method applies on meta-traumatic cure, fractures, injuries, arthropathy, backache, spondylo-arthritis.

**Hydrokinesitherapy:** is the combination of bath-therapy and kinesitherapy in the water. A useful method, which is applied to those who suffer from rheumatism and injuries in their muscles and bones.

**Drinking mineral water therapy:** is a cure which is achieved through the drinking of a certain quantity and quality of mineral water. It is used for the cure of the upper part of the peptic system the liver complaint therapy.

**Inhaling steams from mineral water therapy:** the only suitable type of hydrotherapy in order to cure respiratory

diseases. The techniques applied during this method also define the treatment.

*On the map "Centers of Thermalismos" the above uses of the spas are being shown.*

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