

## FROM METALS TO HUMAN BEINGS : MEDICAL ASPECTS OF EUROPEAN ALCHEMY

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### ABSTRACT

The evolution of medical alchemy, alchemical practices oriented on human health, is followed on the background of European history. Several crucial moments can be observed : 1. In European alchemy the orientation on the transmutation of metals was dominant. 2. Twice a possibility appeared to incorporate to a significant extent medical aspects into alchemy; it is connected with names of Arnaud from Villanova and Paracelsus. 3. Failure, or only limited success of both of these attempts should be further examined in broad relations to cultural, political, religious and epidemiological situation in Europe.

### 1 Introduction

For at least six hundred years, between 12th and 18th centuries alchemy had exerted significant influence on many fields of human activity, among others on medicine. This influence on human being has not always been direct one, something like mediated effect can be occasionally observed. It seems to be the case of the medical side of alchemy, which developed in Europe as a later branch of this science. The whole picture, however, is not as clear as it appears to be. The reasons are multiple. On the most important,

if not the first place, problems of the evaluation of the role and activities of alchemy arising from the deep secretness of this science should be mentioned. Especially in the later epochs complicated language of alchemy with her bizarre vocabulary makes it often difficult to distinguish between healing of metals and of humans in physical or spiritual sense. Secondly, when the question is focused on medical side only, then during the whole existence of alchemy it is not easy to draw a distinct line between alchemists, physicians, barber-surgeons and other occupations, all of whom had or could have

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something in common with curing of illnesses. Just alchemists did not often take part in this activity directly and their ideas concerned with medicine remained then on solely theoretical basis. Extremely important was the influence of surroundings, in the case of Europe it was Christian church, because any medical theory or practice should not collide with ruling religious dogmas. Not negligible is the fact that the development of any idea stood under the pressure of economy and politics. Position of alchemy in Europe and the mutual interaction of this science with medicine appears thus as a multifaceted problem solution of which is or can be sometimes controversial and it is in place to express some of conclusions rather hypothetically. In the following paragraphs an attempt is undertaken to draw the picture of medical aspects of European alchemy in rough counters only, because there are still more questions than answers.

## **II Medical alchemy in Europe**

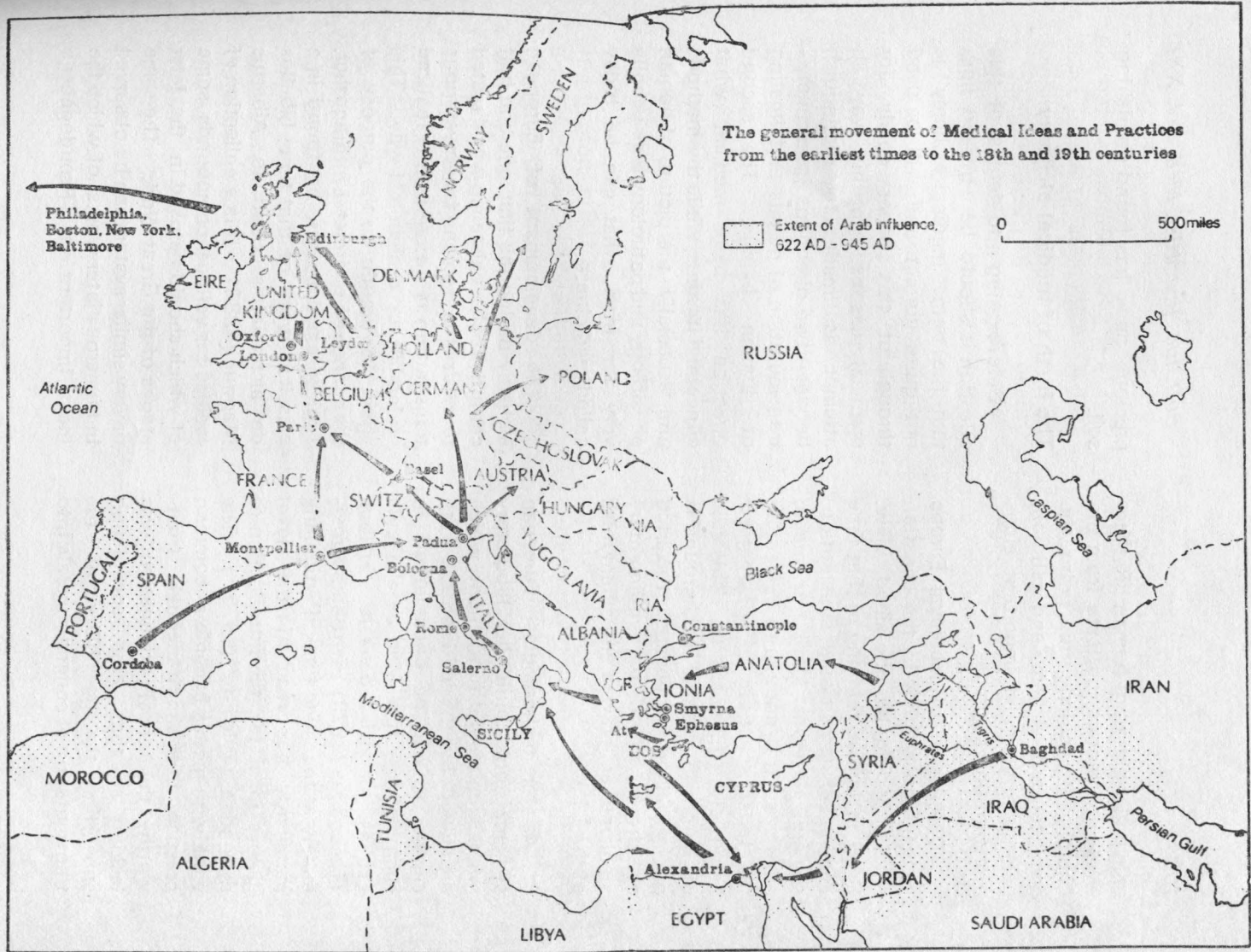
### **Roots and objects**

As for sources the origin of European alchemy is clear, they were the Arab works translated into Latin language (the history of European alchemy is thoroughly described by many authors, for example by Holmyard (1957), Stillman (1960), Kopp (1971), Sherwood Taylor (1976),

etc.). Not as clear is the date in spite of seemingly precise timing (Stavenhagen (1974) ) so that the middle or the second half of the 12th century is usually accepted. The appearance of alchemy in Europe is connected with two basic conditions—one concerning the state of practical knowledge, the other cultural background of the population. Evidently both of them proved to be suitable otherwise this new science would hardly be as successfully accepted as she was. Rather than acceptance the term assimilation gives a true picture of this process.

Let stop at both points in their turn. Cultural background was on the official plane determined by the christian religion, which attained the top of influence on spiritual and political life just in the late medieval Europe. Surprisingly at the moment introduction of alchemy these two ideologies did not collide, and did not do it even later, in spite of the fact that the claims of alchemy to be able to achieve in the laboratory the same what proceeds during much longer time in the nature, was in obvious contradiction to the teaching of the Church. Because, in other words, alchemists pretended on something what was an activity reserved exclusively to God himself. It is interesting to note that even later when medical effects of alchemical preparations became more popular, either in healing of diseases

The general movement of Medical Ideas and Practices from the earliest times to the 18th and 19th centuries



or in prolongation of human life there were no serious protests from the Church. Particularly this point, the coexistence of alchemy and religion, belongs to the most important sides of evolution of Europe.

Description of medieval Europe as being ruled solely by the christian religion would be one-sided view. Deep in human thinking of that time ancient beliefs persisted, superstition, sorcery, different kinds of magic practices. It is enough to remember the broad spectrum of supernatural beings of myths and tales. This side of European cultural background is not less important, because it exerted as strong effect on rudimentary medicine as prayers and ceremonies of the Church.

As for technologies European alchemy could build her laboratory practice on a solid fundament which developed by the mid of the 12th century as can be documented in such sources like *Mapae clavicula* (1974) or *De diversis artibus* (Theophilus (1979)) written approximately at the same time. Particularly metallurgy has reached the level almost ideal for the introduction of new idea (Tylecote (1976)). The work with metals became a common practice, but simultaneously trustworthy theoretical explanation was lacking so that any speculation supporting the possibility of the transmutation of common metals into

precious ones has found nourishing soil.

### **The birth of medical alchemy**

Before going into details of this question it should be stressed here that the term "medical alchemy" is not quite correct and will be used throughout this paper solely for practical reasons. In this way an attempt is made to distinguish between two directions in alchemy - transmutation of metals and healing of human beings. The second direction has been medical what concerned its aims, while the methods and especially the picture of human physiology and pathology was usually very far from what can be today called medicine.

The development of European alchemy during the first one and half centuries of her existence was directed towards the search for mysterious transmuting agent, what was realized preferably in a chemical way. This agent was sought for the purpose of the change of one metal into another. Typical example can be found in a classical work of that time, *Libellus de alchimia*, ascribed to Albertus Magnus (1983). It is a collection of recipes for various compounds some of which should be used in the later stages of the Great Work. The same or very similar system can be observed in numerous later works, of which the most important is Pseudogeber's

collection (Darmstaedter (1922) ). But none of important sources of that time contains to a significant extent any allusions on a possibility to reach a possitive effect on human health. The story of Nicholas Flamel (Federmann (1964) ) is a later fabrication and cannot be taken seriously. The same goes for similar fables, which appeared through the whole existence of alchemy. Thus in the first period of European alchemy attitude towards transmutation of metals is markedly prevailing.

Just on this basis the only conflict with ruling ideology has arisen as is documented by the decree *Spondent quas non exhibent* issued 1317 by the Pope Johannes XXII (Partington (1937,8) ) which supports once more the fact that alchemy worked at that time almost exclusively with metals. This prohibition issued by the Pope, but never strictly followed, concerned only the production of artificial gold and false money. Obviously the economic danger of possible overproduction of gold, which could have decreased its value, led the Church to such a step. On the other side the idea that in the laboratory the same could be achieved as in the nature, expressed even in the works of clergy (Albertus Magnus (1983) ), was passed over by the Church in silence. Strange as it may be, even certain very old fusion of alchemical and religious teachings occurred as is shown by "The Book

of The Holy Trinity", which in contrary to the title is an alchemical work (Ganzenmüller (1967) ). When did then medical alchemy appear?

### **Arnald from Villanova, the way towards human health**

Contrary to Europe in Chinese alchemy the idea of longevity of human life achieved by means of the use of artificial gold or another preparations has been expressed very pregnantly from the very beginning of this science (Ware (1966) ). This cultural region of the world followed own independent path of development, while in Europe alchemy appeared as the product of the ancient Hellenistic culture mediated through the stage of Islamic alchemy. In all these cultures alchemy passed through more or less the same evolutionary steps - initiation, culmination and eventually termination usually accompanied by growing mysticism. And in all three cases the transformation of metals was the main goal of alchemists in the initial period of their science, while later, and particularly in the terminal period goals of alchemy became more nebulous. Sometimes between more or less serious attempts have been undertaken to exert an influence on human health through preparations or practices from the arsenal of alchemy.

The question of the beginning of medical alchemy in Europe cannot be



Arnald from Villanova introduced as Frenchman chemist, astrologist and physician is watching the conjunction of the King Sol and the Queen Luna, representing in the cryptic language of alchemy gold and silver respectively.

(collected from the book *Viridarium Chymicum* 1624, Frankfurt by Daniel Stolcius, Czech poet and Scientists).



answered with definitive validity. There are at least two possibilities, which will be discussed in more detail.

The first explanation can be called a classical one, according to which medical aspects of alchemy developed on the basis of the observation that gold is extremely stable metal, seemingly immortal. Then it was expected quite conceivably that it could have produced similar effects on human health and life. Health could be restored and life prolonged through the proper action of gold or its compounds. It is what appeared in Chinese alchemy (Dubs (1947,1961)) and in European medicine can be similar way of thinking traced out. As late as 1685 King Charles II (1630-85) was given portable gold in an unsuccessful attempt to save his life. The idea of medical use originated with gold but gradually became dispersed on more compounds and along with the Philosopher's Stone for the transmutation of metals European alchemists were seeking for the Elixir of Life, not less mysterious substance which was said to produce dramatic effects on human beings. So far in brief this theory, which was a product of observations and chemical properties of gold have been falsely generalized on living beings.

In Europe this point of view could be supported to a not negligible extent by another influence. The evolution of European alchemy is

marked by several prominent key figures one of them being Arnald from Villanova (for his life see Kopp (1971), Federmann (1964)). With this personality medicine entered European alchemy and Arnald is usually presented either as a successful healer or as an alchemist, but very often as a representative of both occupations. But was he? Some authors (Stillman (1960)) suppose him to be a physician only so that alchemical works attributed to him should be latter forgeries. This possibility cannot be ruled out, because in the history of alchemy there are many such examples, suffice it to mention Pseudogeber, or the whole Lullian corpse of alchemical treatises. But whether was Arnald only physician or not, it appears not to be decisive for the final effect - his name and medical fame was eventually joined with alchemy. On this basis then medical alchemy could have evolved not solely from the idea of immortal metal, but inspired by true successes of the personality widely accepted as an alchemist.

It should be stressed here that Arnald from Villanova was, compared to the level of the medicine at his time, surely an excellent physician (see for example Diepgen (1922)), but was influenced by his surroundings so that besides quite reasonable thoughts he used and recommended magical amulets as well (Holmyard (1957)). It was a reflection of the

way of thinking of the late medieval Europe and just this mystical aspect of Arnald's work could have made it attractive to alchemists. Mysticism appears in this light as the best way how to join alchemy with early medicine.

### **The crisis of European medicine in the 14th century**

If the hypothesis is accepted that Arnald's successes as a physician contributed significantly to the development of medical alchemy it would be interesting to trace out the spreading of these thoughts in alchemical literature. Unfortunately it is a complicated task because of the nebulous language of these works which was intended to keep secret alleged knowledge of Masters of the Art (for discussion of alchemical terminology see Crosland (1962), Schneider (1962)). It was Arnald from Villanova who wrote that "Our medicine...has power to heal all infirmity and diseases, both of inflammation and debility, it turns an old man into a youth. If the illness be of one month's standing, it may be healed in a week. Hence this medicine is not without reason prized above all other treasures that this world affords" (Read (1961)). This sentence became a classic, was repeated with various changes in later alchemical literature, but usually remained as general as this original statement and, anyway, passages concerning the transmutation of

metals were incomparable more factual. This orientation, on the transmutation of metals, appears to be significantly prevailing.

It looks at least strange, because one's interest in his own health is surely as strong as in his material property so that we are arriving at conclusion that something happened what has cast serious doubts as to the real possibilities of engendering medical alchemy. Arnald from Villanova lived approx. 1235-1311/14 and thirty years after his death epidemic of plague broke out in Italy. Within a couple of years this disease overrun the whole Europe and returned then repeatedly during following centuries (McEvedy (1988)). Extremely high mortality rate and inability of medicine and alchemy to treat successfully this illness must have shattered the faith in medicines as well as in elixirs. The faith in Elixir of Life persisted until the end of alchemy, but the question remains how strong this faith was, when for centuries its parallel substance, the Philosopher's Stone, did not demonstrate markedly its alleged qualities.

Dramatic outside intervention into the development of medical alchemy could have been the reason why this science has never become as important as it was in ancient civilisations of India and China. In this region, of course, the evolution ran on quite different cultural and philosophical basis.



In Europe facing repeated failures a question must have arisen necessary what was incorrect - alchemical theory or practice? This question was not expressed as pregnantly as it is in preceding sentence, but it was in an unspoken form.

In the light of the above said reasons it is easier to understand the success of Paracelsus (1493-1541). He introduced the theory of tria prima, of three basic principles (Coudert (1980)), which lent new support to alchemical experimentation, and, at the same time, he stepped out with a new medical practice. It happened when after two centuries the epidemics of plague had weakened and through this lucky coincidence medical successes of Paracelsus became more obvious and turned the attention of public. Further evolution led then to iatrochemistry and eventually modern pharmacology.

In spite of the positive acceptance of Paracelsian ideas alchemy adopted almost exclusively his theory of matter, where the third constituent, salt, influenced later the last flourish of European alchemy. Michal Sendivogius (1567 -1636) focused his attention just on the salt and from this substance in a generalized view as it has been originally formulated by Paracelsus he arrived at the conclusion that 'sal centrale' as he called it is nothing else as what is today Potassium nitrate. In this connec-

tion it is worth noting that he even observed the importance of a gas given off by this compound at higher temperatures for living creatures. But this allusion on Oxygen (Sendziwoj (1978)) remained unnoticed and exerted no influence on medical theories.

Medical teaching of Paracelsus has been adopted to some extent by European medicine while his alchemical thoughts became the property of alchemists. It is not too far from the truth to say that his work was split into two parts which remained separated. The adoption of Paracelsian three basic principles did not change alchemy considerably, only instead of previous four Aristotelian elements and the pair mercury-sulphur there was the third escape way how to explain repeated failures. Alchemical literature did not in principle differ from earlier works. Besides occasional allusions on miraculous powers of the Stone or Elixir on humans chemical experimentation continued towards fulfilling of the centuries old dream of transmutation.

It was an epoch when alchemy flourished in Bohemia reaching her peak by the end of the 16th century during the reign of the Austrian Emperor Rudolf II (1552-1612, reign 1576-1611). The most important contemporaneous works of Czech authors, *MS III H II and I, G 22* (both of them in the Library of the National Museum, Prague, Czechoslovakia;



Paracelsus (1493-1541)

see Wrany (1902), *MS III 11 H* briefly discussed in a footnote Karpenko (1987) are concerned with chemical experimentation only. Some of less important sources contain passages about the properties of the Stone on human health, but they are expressed in the style of fairy tales. These facts support the view that Paracelsian works had substantially deeper influence on what can be called "chemical alchemy" concerned with the transmutation that on medical alchemy. One of the reasons could be that these theories appeared too late when medicine became gradually independent.

### **Mysticism of the 17th century**

Theories of Paracelsus were given seventy years to spread in Europe and then strong concurrence surfaced in the shape of Rosicrucians (for details see Frick (1973) ). The first work, "Chymische Hochzeit Christiani Rosenkreutz" from year 1616, attributed to Johann Valentin Andreae (1586-1654), although taken by some historians as a joke, exerted immeasurable influence on certain groups of the society, particularly on alchemists.

Rosicrucians among them became leading figures in the evolution of mysticism in alchemy, which had roots in the past in personalities like Cornelius Agrippa (1485-1535). Prominent Rosicrucians of Central

Europe. Michael Maier (? 1568-1622, life see Read (1961) ) and Daniel Stolcius (died between 1640 and 1660, Karpenko (1973) ), stood at the threshold between deep mysticism and that what remained of the original alchemy. In this atmosphere medical alchemy had no place left. The attention was focused on the healing of human soul what is quite understandable taking in consideration the situation in Europe torn by the Thirty Years War (1618-48). It is interesting that just at that time an account on healing properties of the Stone has been written by J. B. van Helmont (1577-1644). This story describes the effect (in this case allegedly on erysipelas) but, as was usual in similar circumstances, not the preparation of the substance (Sherwood Taylor (1976), p. 134).

Mysticism in alchemy led in the 17th century again to magic practices in healing so that even impression could arise that evolution of medical alchemy followed a circular path returning back to amulets of Arnald from Villanova. It would be not correct picture, because magic never died out, but in the 17th century under the influence of Rosicrucians became again prominent. Excellent example of this specific field is the collection of medals kept by the Germanisches National museum (Nürnberg, Germany). These medals are registered as alchemical, but on closer examination they should be

rather considered to be talismans or amulets (Karpenko (1985/86)). Their purpose is not clear, may be they have been used for improving of the state of somebody in a general sense, not only for treatment of any particular illness. Typical features of these medals are numerical magic squares. Similar undated medal made of lead which is in possession of Staatliche Münzsammlung (München, Germany) bears on the obverse badly damaged German inscription: "These metallic and mercurial materials [? are worn as a protection] against rheumatism and erysipelas." The origin of all of the medals is not known. They are attributed to alchemists rather traditionally, but equally well they could have been products of any miraculous healer, who were quite common in Europe for centuries.

### III Conclusions

During her whole existence European alchemy kept preferable orientation on the transmutation of metals. Attempts of the medical application of this science have never reached the level comparable with that observed in the civilisations of the Far East. While Chinese alchemists claimed immortality to be the final goal of their efforts, their European counterpart remained rather unpretending in this respect and medical alchemy did not develop here to such extent.

Some points are easily understandable. In Christian Europe it would be extremely dangerous to claim openly that any science or technique could lead to immortality, because such claim would be in opposition to the philosophy of the ruling church. Especially latter the Inquisition persecuted cruelly even for small signs of activity which was considered to be heretic.

This situation supported then materialistic side of alchemy, the production of artificial gold. Two personalities who could have introduced medical aspect into alchemy did not exert the expected influence. Arnald from Villanova brought fresh ideas, but the following epidemics of plague in Europe appear to be the most serious reason, why any idea of healing effects of even alchemically produced substances could hardly succeed. The second prominent figure, Paracelsus, came too late for alchemy. While this science was in a slow but continuous decline, medicine developed as a science. As the result the work of Paracelsus was absorbed separately by medicine and alchemy.

Mysticism of the 17th century was then hardly able to contribute significantly to medical alchemy, its effect was rather opposite.

It is not quite clear yet to which extent medicine was performed by European alchemists. Not what

concerns various magic potions, but rather practical doing is of interest. Elixir of Life existed more or less on the boundary between reality and fiction, and although there are sometimes records of its use, like van Helmont's testimony, it is not quite sure how seriously they have been accepted by public. It seems that belief in its power gradually died out as can be documented by the appearance of talismanic medals. During the whole existence of European alchemy the allusions on medical properties of different mysterious substances are rather nebulous and the recipes are often pure sorcery.

Nevertheless, the Philosopher's Stone as well as Elixir of Life have kept their attractive force for six centuries. During six hundred years no demonstrable success has been observed, but in spite of it the story that life of alchemist Seton could have been saved provided that some Elixir was left was taken as the full truth. (Read (1947) ). The faith in miraculous effects of different substances on human health and life existed in all cultures nourished by deep human fears of illness and eventual death. But in European alchemy it stood rather in a shadow of the transmutation of common metals into gold.

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सारांश

## धातुओं से मानव तक—यूरोपीय रसायन विद्या का चिकित्सा सम्बन्धित पक्ष

— व्लाडिमिर कार्पेन्को

चिकित्सा सम्बन्धित रसायन विद्या का विकास, मानव स्वास्थ्य पर अनुस्थापित कीमियाई अभ्यास, यूरोपीय इतिहास की पृष्ठभूमि का अनुसरण किया है। अनेक निर्णायक क्षणों का अवलोकन किया जा सकता है— (१) यूरोपीय रसायन विद्या में धातु रूपान्तर पर अनुस्थापन मुख्य था। (२) चिकित्सा सम्बन्धी पक्षों की महत्वपूर्ण सीमा तक समावेश की दो गुनी सम्भावना का दिखाई देना; यह विल्लानोवा के आर्नाल्ड और पेरासेल्सस के नामों से सम्बन्धित है, (३) इन दोनों प्रयासों की असफलता, अथवा केवल सीमित सफलता की और भी जांच यूरोप में सांस्कृतिक, राजनीतिक, धार्मिक तथा महामारी सम्बन्धी स्थिति के व्यापक परिप्रेक्ष्य में करना चाहिये।

