Arend Heyting about the relationship science-religion

The 1971 meeting of the International Academy of the Philosophy of Science, devoted to science, philosophy and faith, gave the famous Dutch logician Arend Heyting the occasion to briefly express his opinions about the relationship between religion and the sciences. His main reference was Julian Huxley’s humanism, but he also presented contributions stemming from other scholars. In this paper, I will try to obtain a picture of Heyting’s religious thought as rich and articulated as possible, by confronting his thought with that of the authors quoted by him, i.e. Julian Huxley, Bertrand Russell, Ian Ramsey, Gerrit Mannoury and L.E.J. Brouwer.

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Introduction

It is unusual that academic scholars whose main subject is not theology express in a detailed way their opinions about it. ‘God’ is perceived as a subject that belongs to the intimacy of people. Therefore, they refrain from walking on what is felt as a minefield, because there is always the risk of hurting the different sensibilities. In addition, they have a certain restraint to open their hearth and unveil their opinions. The participation to the ‘Colloque de l’académie internationale de philosophie des sciences’ in 1971, devoted to ‘science, philosophie, foi’, allows us to have a direct witness of the Dutch logician Arend Heyting. His talk is contained in a few pages due both to the restricted time that he had at disposal and to the fact that some parts of his thought had already been expressed by other authors in a way that satisfied Heyting. Nonetheless, I will try, by confronting his thought with that of the authors quoted by him, to obtain a picture of his religious thought as rich and articulated as possible.

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1 The French translation of the talk appeared as A. Heyting, Science, croyance, foi, in S. Dockx (ed.), Science philosophie foi. Colloque de l’Académie internationale de philosophie des sciences, Beauchesne, Paris 1974, pp. 197-212. Quotations here come from this edition. The Dutch version of it appeared in 1977 in «De Gids» and was reprinted in A. Heyting, Collected papers, ed. by A. Troelstra - J. Niekus - H. van Riemsdijk Henk, Mathematisch Institutum, Amsterdam 1980, pp. 756-764. There the last part referring to philosophy and to Mannoury’s relevance does not appear any longer. Still, it is interesting that on p. 764 in a footnote he specified: «omdat ik meende dat over dit ontwerp ook een humanist aan het woord moest komen, hield ik er een voordracht onder de titel “science, croyance, foi” [because I thought that also a humanist had come to speak about this subject, I held a lecture entitled “science, croyance, foi”]: he clearly qualified himself as a humanist.
1. **Arend Heyting: science and religion**

Heyting’s talk concerns the relationship between science and religion. In order to better understand his specific target, we should notice that he considers immediately necessary, inside religion, a distinction between «faith» and «belief», specifying that: «Dans la religion on distingue clairement des éléments de vie intérieure et des éléments d’apparence scientifique. Je veux les indiquer par les mots “foi” et “croyance”» ². During the talk Heyting will find some space for faith in human’s life (even in the life of the rational man), because faith is the expression of the deepest and fruitful human emotions, while he keeps a very critical attitude towards «belief», because belief attributes to itself the dignity of a realistic account of the universe, and in this way it supports fundamentalism. Believes have no scientific ground, and Heyting intends to point out the pseudo-scientific branch of what is usually simply labeled as «religion», in order to diminish the arrogance of such branch that acts in a dehumanizing way. Therefore, the continuous comparison between religion and sciences developed throughout the talk is directed towards keeping them well distinguished from each other. This requires that Heyting gives a definition of natural sciences and human sciences. Heyting decides for a unique definition, and points out four common characteristics:

1. «premier principe de la science: la science introduit une structure dans l’expérience en se servent des mathématiques»³;
2. «deuxième principe de la science: la structure scientifique comprend plus que l’expérience directe»;
3. «troisième principe de la science: la science vise à l’unité»;
4. «quatrième principe de la science: sa liberté. Elle est une condition absolue de son existence, qui se présente sous deux aspects: liberté de choisir son sujet et liberté de méthode» ⁴.

The author stresses that science makes all efforts to embrace the widest amount of experiences through a unique structure, and, by doing so, it moves away from the direct experience: by unifying discrete structures into a superior structure, it necessarily allows the entrance to elements that do not correspond to any experience. In any case, we do not have a unique science yet, and we must avoid forcing. Heyting does not appreciate physicalism: «Un certain group de philosophes positivistes a voulu forcer l’unité en érigeant la méthode de la physique en méthode universelle de la science (physicalisme). Leur faut était de considérer comme absolue une phase temporelle de la science»⁵. It still takes time to be able to unify physics, psychology, biology and history. But this will happen. As for the fourth principle, it requires some specifications: «En étudiant un certain sujet on ne sait jamais d’avance où l’on abordera et quels sujets surgiront à l’horizon de la recherche. La science devient impossible quand elle est gênée par la defense d’aborder certains sujets»⁶. In science it is not possible to

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² **Heyting**, *Science, croyance, foi*, p. 205.
³ *Ibi*, p. 199.
⁴ *Ibi*, p. 200.
⁵ *Ibidem*.
⁶ *Ibi*, p. 201.
build walls to protect some zones to be considered unsearchable: it is not possible to label ‘off-limits’ some research areas (like human soul).

It is true that the science of the soul won’t ever reach the bottom of the soul, but this is not a problem. No natural science reaches the essence of nature. Science is done about any subject, being conscious that it «doit se borner à imaginer une structure convenable pour le sujet qu’elle etudie»7. Furthermore, science must be free when choosing its hypotheses: only its successes can decide about the scientific value of a hypothesis. This entails the openness of the science8: every hypothesis can be rejected and replaced by a more efficient one, always. Heyting stresses that, by doing science, the target is not to obtain a mirror-image of reality: «Son but est plus modeste»9, it is the efficiency of the obtained image10.

Heyting specifies that science has value but does not give either norms of action or ends, because they are beyond rationality: «Nous employons la raison, et spécial-ement la science, pour poursuivre des buts qui en dernier ressort échappent à la rai-

son»11. Here he opens a parenthesis about ethics, by stating that he shares Russell’s opinion of the subjectivity of values, and specifies that there is concretely the fundamental problem of finding a balance between egoism and altruism, but that there is no ready-made recipe. «L’éthique peut seulement donner quelques indications»12.

Then, Heyting addresses the issue of his talk, by specifying in detail the difference between faith and belief. «Par “foi” j’entends l’état d’âme qu’on essaie d’exprimer dans les rites et dans l’art religieux»13. It includes a variety of sentiments ranging from

8 The subject of openness of sciences was present in the philosophy of Ferdinand Gonseth, that participated to the ‘colloque’, by opening it. Heyting does not quote him, therefore we simply recall here in the footnote this aspect of Gonseth’s thought. According to him, science is a horizon of experience; it tries to approximate reality aiming to solve certain problems, like a map of a city highlighting (only) streets and squares. It has to check its ideas against experience: when new problems arise, the science must be open to modify its ideas in order to become more suitable for reality. In this way the map of the city becomes richer and richer, although it will never be an exact picture (see F. Gonseth, Mon itinéraire philosophique, «Revue international de philosophie», 24 [1970], pp. 398-434; P. Bernays, Grundsatzzliches zur “philosophie ouverte”, «Dialectica», 3 [1948], pp. 193-199 and Id., Überlegungen zu Ferdinand Gonseths Philosophie, «Dialectica», 31 [1977], pp. 119-128).
10 Here Heyting inserts a parenthesis about the notion of existence, both in the science and in everyday life: «En général nous disons qu’un object existe quand il est associé à une entité abstraite de la structure dans laquelle nous organisons notre expérience et quand il y remplit certaines conditions que je ne peux pas préciser ici, mais qui correspondent en grandes lignes à la syntaxe du substantif» (ibidem). «Le physicien est convaincu de l’existence de l’électron tant qu’il fonctionne bien dans la théorie. Pour que nous disions qu’un object existe, il faut et il suffit que cet object fonctionne dans une structure qui est bien adaptée à l’expérience» (ibidem). There are some authors – Heyting recalls – like Ramsey, that attach to religious notions (like «miracle», «God») a kind of existence very different from what is meant to in everyday life and in scientific contexts, i.e. as «disclosures», as limit-notions: «Si la notion de Dieu est une notion-limite au sense de Ramsey, alors cette notion ne satisfait pas au critère, donc je ne peux pas dire que Dieu existe. On peut étendre le sens du mot “exister” de manière à faire exister Dieu, mais alors on donne à ce mot une signification très différente de celle qu’il a dans la vie de tous le jours, et il faudra bien distinguer ces deux significations» (ibi, p. 208).
11 Ibi, p. 204.
12 Ibidem.
13 Ibi, p. 205.
extreme humility till mystical ecstasy. It includes emotions that are specifically religious, like those defined as «sacred» by Huxley. «Elles sont parmi les émotions les plus profondes et les plus fécondes dans l’âme humaine». By «belief» he means accepting as true events in the existing world, like, for instances, the tales of the Bible. Not only there is a difference in praying between those who do it for faith and those who do it for belief (for the formers prayer is a condition of the hearth, for the latter prayer is something trivial – it is a request, for instance the request of winning upon enemies), but the larger belief grows, the less space is left to faith: religious intolerances come from this, and this makes belief dangerous.

As for faith, he considers it as independent from science: it is faith that can suggest us ends that we can later reach with the help of the science. On the contrary, regarding belief, Heyting states that either it is subjected to the control of science (and belief becomes a part of the science) or it is freed from science (but then they come into conflict with each other). There is a scale of beliefs: it ranges from the miracles to the tales of the Bible, the theory of the salvation, the eternal life, the existence of God. They have in common the fact of not being subjected to the control or to the systematization of science. They do not have links with other facts: they do not fit into a scientific structure. Belief shapes a piece of existence but then it remains isolated from the rest: «Il est vrai qu’en croyant à certains faits il introduit une structure dans un certain champ de son expérience, mais ce champ reste isolé, il est même difficile de décider s’il appartient à la réalité matérielle ou à la vie intérieure du croyant». Hence, belief keeps the first principle of the science (the principle of structuration of reality) and satisfies the second «d’un manière excessive», because it does not limit itself to what is strictly observed but it also welcomes fantastic tales. It clearly violates both the third and the fourth principles, i.e. unity and freedom: science cannot ever unify into a unique structure both religious beliefs and experimental facts, because, otherwise, beliefs would reveal as illusions; furthermore, in case of contrast with experimental facts, while science is open and can improve itself continuously, belief, as such, should be «définitive et insensible à la critique» (a scientific theology seems to him a contradictio in terminis).

Hence, belief is not scientific and must be well distinguished from science. The biblical tales have been imagined by the man or, if they have some historical grounds, the latter have been adapted in order to express some theories about salvation. The eternal life materializes our wish of freeing from fault and death. Still, Heyting is convinced that it is better to accept these aspects of life that are less agreeable than others, instead of negating them. As for God, Heyting shares Huxley’s humanistic thought (although, he does not publicize an affiliation to the group): «même un humaniste sera heureux

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14 In his unpublished papers (F1-A), Heyting wrote: «Men can do so that they live completely in a state of ecstasy, when all intellectual considerations are put aside. This state has been thought of in the most beautiful and pure way in the buddhist Nirwana (De mensch vermag zijn leven nog alleen voluit te leven in en toestand van extase, wanneer alle verstandelijke overwegingen terzijde gesteld zijn. Het mooist en zuiverst is deze toestand gedacht in het Boeddhistische Nirwana)».

15 Id., Science, croyance, foi, p. 205.

16 Ibi, p. 206.

17 Ibi, p. 207.

18 Ibi, p. 208. Namely, he states: «Je souligne que je ne parle au nom d’aucune organisation; je formule mes convictions personnelles sous une forme apodictique, parce que le temps me manque de les éclaircir» (ibidem).
de pouvoir se servir de cette image pour exprimer ses sentiments les plus chers, sans tout de même l’associer avec un être existant»

The humanists are convinced that no belief in a revealed truth is necessary for an interior life to be rich and variegated: «L’humaniste estime la Bible comme une œuvre d’art dont beaucoup de récits expriment, souvent par des métaphores, des sentiments qu’il connaît»

Love for neighbor and mercy are not a Christian prerogative from an historical viewpoint. There is no difference between a humanist and a religious man as for faith «considérée comme état de l’âme»: sacred is what allows us the contact with our deepest interiority, therefore a church is sacred because it allows to a lot of people to perceive their very soul; a marriage is sacred because a man and a woman feel deep emotions to each other. Belief is not necessary for a rich interior life, and a catholic who loses his belief does not necessarily lose his faith. Humanists and believers share the deepness of their emotions, still the believers have more means to express them: the expression of religious emotions is easier through a general system of symbols accepted inside a group. The members of the group support each other through those symbols. The humanist cannot use them because he sees them as linked to beliefs that are absurd at his eyes but he would need something similar to express common emotions and re-enforce them (as religious groups do).

2. Julian Huxley’s contribute

Heyting’s main reference for his talk was Julian Huxley, whose humanist thought he mostly shares, while keeping for himself the task of analyzing more in detail the relationships religion-science that Huxley had limited to the case of biological sciences. He even refers directly to Huxley’s texts to find expressed with more rhetorical «pathos» the content of the humanism advocated by them both.

What then Heyting takes from Huxley? In general, he takes Huxley’s evaluation of religion, provided a previous terminological change, because Heyting calls «faith» what Huxley calls «religion».

As for faith, Huxley presents firstly faith on its lower level of meaning, i.e. as belief in certain propositions or acquiescence in the commands of certain kinds of authority. It is grounded on suggestibility, that could be seen as «a partial disregard of our mental

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19 For Huxley, a god-person is an obstacle to the conciliation between a religious approach and a scientific approach to reality: «For my own part, the sense of spiritual relief which comes from rejecting the idea of God as a supernatural being is enormous. I see no other way of bridging the gap between the religious and the scientific approach to reality» (J. HUXLEY, Religion without revelation, Parrish, London 1957, p. 32). The earn that can be gained is the following: «the mental life of humanity is no longer a civil war but a corporate civilization. Within it there will be conflicts but these are inevitable, and probably necessary for full vitality, and if they take place within a whole which is organized for unity and production instead of duality and strife, there will be advance» (ibidem).

20 HEYTING, Science, croyance, foi, p. 206.

21 Ibidem.

22 Heyting states: «Cependant citer ce livre ne suffit pas pur ma conférence, car Huxley ne traite qu’en passant les relations entre la science et la religion, et alors du point de vue d’un biologiste et en partant de la théorie de l’évolution» (ibi, p. 205).

23 «Malheureusement je n’ai ni le talent littéraire ni l’éloquence qu’il faudrait pour parler de la foi d’une manière adéquate» (ibidem).
watch-dog, rational experience»\textsuperscript{24}, but it is necessary for any community, even for the scientific community. «To take the scientific sphere alone, it is quite impossible today for any one man, however brilliant and hard-working, to master the main evidence in all fields of scientific knowledge. […] This means that many of the ideas of sciences must either be taken on trust or else not accepted at all»\textsuperscript{25}. «Suggestibility and its results, obedience or faith, irrespective of logical reasoning, are characters of the human species», still the mind will employ it ill if «it allows the dissociation between suggested idea and rational experience to remain totally unbridged. It will employ it well if it does its best to test the irrational suggestions against its store of reasoned knowledge»\textsuperscript{26}. There is a higher level of faith, that faith «which has power to remove mountains, inspires steadfastness unto death, and is indeed a passion of the soul and not mere assents»\textsuperscript{27}. It has a vital role in life, but «its passionate certitude carries with it the danger to the individual of self-delusion, the danger to others of intolerance and persecution»\textsuperscript{28}.

As for religion, Huxley inherites the thought of his grandfather, Thomas Huxley, a convinced evolutionist and agnostic in the theological field. Julian shares his evolution approach to the history of the universe and, inside it, to the history of the man; still, Julian believes that the religious side of men should not be put aside by condemning it as childish, superstitious and ungrounded: one should realize the authentic meaning of «religious», how its manifestations were born and, possibly, keep what precious can be in its core. If one considers religion by combining the contributions stemming from psychology on the one side and from the evolution theory on the other side, one notices that at the basis comes the stage in which the main object of religious feeling is a mysterious or supernatural power, not usually personified, but conceived as residing in particular objects and events. The next main level is one on which the mysterious power is generally conceived of as residing not inside but behind objects and events. This is almost always combined with the representation of its different aspects as supernatural but in any case like to man or to animal beings. «The further personification proceeds, the more rites of propitiation, sacrifice, prayer, and worship will come to overlie the more primitive rituals based upon magic»\textsuperscript{29}. Whilst the relation of religion to morality is at this level very feeble, at the next level a sort of «reasoned morality» comes to the world and is linked to religion. Furthermore, pure logical reason (that develops in parallel with the evolution of religion) begins to complete the intellectual side of belief, attempting to sweeping away self-contradictions inside mythology: this is a transitory period that ends with a unified religion. A further period of transition is that of Western civilization today, due to the rise of the scientific spirit. In this new stage it is clear that religion is a way of life founded upon the apprehension of sacredness in existence and that man has in himself the sense of the sacred (or of sanctity – Huxley uses them as synonyms):

\textsuperscript{24} HUXLEY, Religion without revelation, p. 149.
\textsuperscript{25} Ibidem.
\textsuperscript{26} Ibi, p. 150.
\textsuperscript{27} Ibi, p. 151.
\textsuperscript{28} Ibidem.
\textsuperscript{29} Ibi, p. 126.
Human love and marriage can possess this sanctity, can be a sacrament, just as well to two complete atheists as to two devout Christians. [...] leaving the sanctity where it belongs, namely, in the possible beauty of the relationship itself, and therefore welcoming all attempts to adapt the institution to human needs and aspirations\textsuperscript{30}.

The normal man has an innate capacity for experiencing sanctity in certain events, just as (on a lower and more determinate plane) he has for experiencing red or blue, fear or disgust or desire, or as he has for experiencing beauty, or the validity of logical proof, or for feeling love or hate, or judging good or evil\textsuperscript{31}.

Now it is possible to satisfy the religious feeling outside organized churches\textsuperscript{32}. Namely, once it is realized that the sanctity that inheres in places or buildings, in ritual or ceremonial, comes from the human beings who have felt them as sacred, «worship itself will be seen as an opportunity for a communal proclaiming of belief in certain spiritual values; for refreshment of the spirit, through that meditation guided by pure desires which alone deserves the name of prayer, and through the sense of contact with spiritual mysteries which disappear in the rush of practical life; for expressing in music emotions of praise, contrition, aspiration, etc.»\textsuperscript{33}.

The high sense of sacredness and transcendent value may be perceived in poetry or in the nature; it may come through art, music, love, the pursuit of pure truth, a life devoted to the service of humanity. Furthermore, anybody can understand the human destiny simply by considering nearer the theory of evolution, that «makes it clear that the developed human individual personality is, in a strictly scientific sense, the highest product of the cosmic process of which we have any knowledge»\textsuperscript{34}. Consequently, «a rich and full personality, in moral and spiritual harmony with itself and with its destiny, is the highest creation of which we have knowledge»\textsuperscript{35}. Still, this cannot lead to the supremacy of the individual, because human individuals cannot realize their possibilities excepts as members of social groups, and through means which only organized societies can provide. «There is inevitably some conflict between the interest of individuals and those of society, but it is transcended in this conception of man as an evolving psycho-social organism, that inhabits a world of ideas which he has created, and of social institutions and achievements which those ideas have generated»\textsuperscript{36}. On this basis, it is possible to build a humanistic religion and a humanistic ethic. However, Huxley does not describe in detail his humanistic projects, because this would be intrinsically impossible. Namely, it evolves like any other thing in the world. Still, he can state: «the primary function of any system today must be to utilize all available knowledge in giving guidance and encouragement for the continuing adventure of human development. The contribution that science can give to religion is two-fold.

\textsuperscript{30} Ibi, p. 34.
\textsuperscript{31} Ibi, p. 102.
\textsuperscript{32} In the past «the church building [...] as a place for the exhibition of sacred and natural rarities served as a museum: it was usually the only approach to an art-gallery; as stage for the mystery plays it was a theatre, as place of plain-song and chanted mass a concert room; the reading of the Bible stories in the lessons was half the average man’s chance of literature» (ibi, p. 154).
\textsuperscript{33} Ibi, p. 34.
\textsuperscript{34} Ibi, p. 194.
\textsuperscript{35} Ibidem.
\textsuperscript{36} Ibidem.
It can provide an enormous body of organized knowledge, a spirit of disinterested devotion to truth and a willingness to apply this spirit to any problem, irrespective of prejudices or possible consequences. In the humanism, the various «beliefs» of the religions will be perceived as particular aspects of a more general schema so that «intellectual barriers, in the form of creeds and dogma, should not prevent a religiously minded man from worship in a church not of his own sect, just as a lover of art is not compelled to make a profession of belief in impressionism before being allowed to enjoy an exhibition of paintings.» It is to this way of seeing religion that Heyting alludes when saying the positive expressions that we read in paragraph 1.

3. Bertrand Russell’s influence

Heyting quotes Russell’s *Science and religion*, by stressing that the British philosopher pointed out a series of cases of conflict between science and religion, and complaining that Russell did not explain the cause of such conflicts. He himself intends to fill the gap. Actually, Russell presents some historical episodes of conflict between science and religion: Copernicanism, theory of evolution, scientific study of the human body, psychology, and, by reading his text, one finds also an explanation of each reason of contrasts between science and religion. For instance, in the chapter devoted to Copernican revolution, Russell explicitly says that such theory was problematic for religion because, even if nothing in Copernicus’s astronomy proves that men are of little importance in the universe, the divestiture of our planet from his central position suggested a similar divestiture of its inhabitants and made therefore less believable the theories of incarnation and redemption: they would be more believable in a world where the man is the most important of the created beings. Hence Russell did not simply expose the stages of conflict between Copernican scholars and fighters in favor of the Christian «creed». Analogously did he in the other case studies that he presented. What then could seem unexplored or insufficiently explained to Heyting’s eyes? I’d hypothesize the permanent potentialities of an essential conflict between science in general and religion. About this more general issue, Russell only affirms that faith pretends to embody eternal and absolutely certain truths, while science is always tentative and that in so far as religion consists in a way of feeling, rather than in a set of beliefs, science cannot touch it. Russell concludes: «Now the fight is languid.» The scholars admit that there are fields outside the science and the liberal theologians admit that they would not negate what can be proved scientifically. There are no longer many oppositions between science and theology, but there are some between science and governments (because science tries to be a free search for truth).

To Heyting the situation did not seem so good. For this reason, he had considered necessary his detailed analysis of the differences between science and religion, that

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37 *Ibi*, p. 190.
38 *Ibi*, p. 35.
42 *Ibi*, p. 17.
43 *Ibi*, p. 173.
we have seen in paragraph 1. There, Heyting fully shared Russell’s viewpoint about the subjectivity of values. Russell had stated that science has nothing to say about values\textsuperscript{44}, because questions of value cannot be intellectually decided and lie outside the realm of truth and falsity\textsuperscript{45}. Even the cosmic project cannot be said to finish with the man\textsuperscript{46}. Desires exist: ethics is an attempt to give universal importance (and not merely a personal importance) to certain of our desires\textsuperscript{47}. When our desires refer to things which we can all enjoy in common, it does not seem unreasonable to hope that other people would cooperate; hence, «the philosopher who values Truth, Goodness and Beauty seems to himself to be not merely expressing his own desires»\textsuperscript{48}. Science can debate the causes of desires and the means to realize them, but it cannot express any ethical judgment, because it would refer to the truth of other statements, while ethics does not consist of statements but of wishes. «When you meet a man with whom you have a fundamental ethical disagreement – for example, if you think that all men count equally, while he selects a class as alone important – you will find yourself no better able to cope with him if you believe in objective values than if you do not. In either case, you can only influence his conduct through influencing his desires: if you succeed in that, his ethic will change, and if not, not\textsuperscript{49}. At the end Russell was optimistic: «Our desires are, in fact, more general and less purely selfish than many moralists imagine […] It is, in fact, not by ethical theory, but by the cultivation of large and generous desires through intelligence, happiness, and freedom from fear, that men can be brought to act more than they do at present in a manner that is consistent with the general happiness of mankind»\textsuperscript{50}.

4. Ian Ramsey’s influence

The bishop Ian Ramsey, in Religious language of 1957 and in Religion and science of 1964, considered the issue of interpreting sacred texts in order to reply to the logical empiricists’ criticisms concerning the possibility itself of metaphysics: «Now it is true that philosophers do not claim as vigorously as they might have done even five years ago, that all the ultimate problems of metaphysics have been created by confounding logics; that these ultimate problems are just category blunders. Nevertheless it is plain that contemporary philosophy lays on us an urgent task and duty, viz. to elucidate the

\textsuperscript{44} Ibi, p. 175.
\textsuperscript{45} Ibi, p. 243.
\textsuperscript{46} It’s worthy to stress that, in Religion and science, Russell also expresses his viewpoint about mysticism: mystical emotion, if it is freed from non-validated beliefs and if it is not so appealing to separate a man from his daily business, can give a contribution of a great value, a contribution of the same type of that coming from contemplation, although in a more elevated shape. He states: «Breadth and calm and profundity may all have their source in this emotion, in which, for the moment, all self-centered desire is dead, and the mind becomes a mirror for the vastness of the universe. Those who have had this experience, and believe it to be bound up unavoidably with assertions about the nature of the universe, naturally cling to these assertions. I believe myself that the assertions are inessential, and that there is no reason to believe them true. [...] Through association with false beliefs, they have led to much evil as well as good; freed from this association, it may be hoped that the good alone will remain» (ibid, p. 189).
\textsuperscript{47} Ibi, p. 232.
\textsuperscript{48} Ibidem.
\textsuperscript{49} Ibi, p. 241.
\textsuperscript{50} Ibi, p. 242.
logic of theological assertions, and this book may be seen as an endeavor to face and
to measure something of the challenge of contemporary philosophy; to state a case for
religious language; to try to elucidate the logic of some of its characteristics claims»51.

He specifies that the language that expresses religious statements is not realistic, but
it contains some words (called «models») referring to a realistic domain of reference,
accompanied by «qualificators» contrasting to the realistic meaning of models. For
instance: «God is eternal (qualifier) father (model)». The qualifier lets us under-
stand that we should not look for the meaning of the following word in a realistic domain:

The religious language is not the kind of language where we test the results of deductions to ex-
perimental verification, like in the scientific language. Instead, it is the kind of language, in which we
check the validity of an empirical point of view in the broad sense, to see how it interprets, glob-
ally, the world and the human experience [Il linguaggio religioso non è il tipo di linguaggio in cui,
come nel linguaggio scientifico, assoggettiamo la deduzione alla verifica sperimentale. È invece il
tipo di linguaggio in cui controlliamo la validità da un punto di vista empirico in senso lato, per
vedere come esso interpreti, globalmente, il mondo e l’esperienza umana]52.

Qualificators have a role also in mathematics: «What now of a regular polygon with
an “infinite number” of sides? […] If we increased the sides without limit, but kept
the area approximately constant, there may suddenly dawn on us at a certain point
the outline of something quite different: a circle. At this point there would be evoked
what we might call “mathematical insight” – something akin to the disclosure of a
characteristically religious situation»53. In general, there are various situations in the
sciences where such insight takes place: when «invariants» like points, force, mass
are pointed out. What characterizes a religious context is that the qualifier leads us,
through histories, i.e. developments of situations slowly approaching an ideal point, to
the final insight54, where men «realize» something requiring also a life membership.
It is a context where men believe in something (like in mathematics) that, on its side,
requires men to put their life at stake (unlike what happens when men believe in math-
ematical axioms). Let’s take as example the words «first cause»: the word «cause»,
gives us a «model», a situation with which we are all familiar (for instance: with a
human being we think at once of causal ancestors and causal successors). In relation
to such models the word «first» presses us to move backward and still backward until
at some point a characteristically different situation is evoked. «For when the situation
breaks in on us, the word “first” has another function. When “first cause” leads us to
posit “God” according to the procedure we have so far been describing, it claims at the

52 Ibi, p. 9. The statements in brackets are present only in the Italian edition of the book.
53 Ibi, pp. 61-69.
54 «It has been said that my reference to “insights” made “purely subjective” the religious and even
the same religion language. But the expressions with which I described these situations show that in these
situations we are really passive, and we find ourselves faced with something active: the glow of the light,
the ice cracking, the taking of something [These statements are present only in the Italian edition of the
book: «Si è detto che il mio riferimento alle “illuminazioni” rendeva “puramente soggettivi” il linguaggio
religioso e addirittura la stessa fede religiosa. Ma proprio le espressioni con le quali ho descritto queste
situazioni mostrano che in tali situazioni noi siamo realmente passivi, e ci troviamo di fronte a qualcosa di
attivo: il brillare della luce, lo spezzarsi del ghiaccio, lo scattare di qualcosa» (Ibi, p. 8).
same time that the word “God” “completes” causal stories; is “logically prior” to such stories, is the “first” of them. [...] The word “God” is placed “first” at the head of all causal stories, presiding over and unifying all causal explanations [...] despite grammatical similarity, “first cause” is not at all logically parallel to either “proximate cause” or “remote cause”. Analogously in the case of miracles: «a miracle-story in general tells of a “disclosure”; of a characteristically theological situation; of a situation which has “depth” and “mystery”; a situation which is more than “what is seen”. About such situation, a miracle-story makes a special and particular claim, viz. that in it is exhibited a “personal intervention” [...], a “power” which is a “personal concern”. [...] In a miracle the Universe declares itself personal at a point where persons are not».

Heyting comments this viewpoint, by recalling that, according to Ramsey, «les notions religieuses comme “miracle”, “Dieu” ne doivent pas être pris dans le sens scientifique».

Still, Heyting believes that, considering miracles and gods as limit notations to approach means «que nous nous servons d’images pour exprimer approximativement les sentiments associés avec ces notions. Il n’y a aucune raison pour attribuer à ces images une existence qu’on n’accorde pas à d’autres images. Par exemple, en disant que la misère au Pakistan a cause une vague de compassion, je n’ai pas l’intention de considerer cette vague comme existante». The scientific criterion of existence and the daily criterion of existence that he found out was «pour une entité de figurer d’une manière spéciale dans une structure du sens commun ou de la science». According to this criterion, God does not «exist». It is possible to accept further meanings of existence, in addition to that given by the science and the daily life, still it is necessary to keep each meaning well distinguished from the other.

It is interesting to point out that, in his unpublished writings now kept at the Rijksarchief Noord-Holland in Haarlem, Heyting will reconsider the subject «existence» and hypothesize a whole scale of graduations for entities:

Every man lives in different worlds, corresponding to different levels of language. At each level there exist other things for him, and the word «existence» is used with a different meaning.

1. The immediate environment. Within this, people.
2. Representations of the environment and where I can go from there.
3. The levels partially melt into each other. They overlap each other.
4. Memories of environments, where I have been before (here the concept of other men plays a role).
5. Communications from other people (only at this stage the distinction dream/reality can be made clearly).
6. Space-relations among represented environments.
7. Systematization of these relations by means of maps and globes.
8. Fitting of all structures into a spatial generalization reaching till infinity.
10. Microscopically small objects.

55 Ibi, pp. 61-65.
56 Ibi, pp. 149-150.
57 Heyting, Science, croyance, foi, p. 207.
58 Ibi, pp. 207-208.
59 Ibi, p. 208.
11. Theoretical physics. Particles of a second fraction exist. Here «existence» has all become «fitting into the theory»

He also will give a scale of abstraction for existence:

3.10.78. Each of our abstract concepts begins with something simple and evident. So does «evidence»: First there are the objects of my direct environment, which exist; last there are stars and mesons. How many steps are there between these and how does the concept change as it passes from one to another? God, real numbers and large cardinal numbers are at the top of such steps. At which step do the rules for the existential quantifier hold?

This scale is analogous to that of mathematical concepts written in 1949 as a reply to the criticism to the notion of negation put by G.F.C. Griss, inside intuitionism, where he listed a series of concepts proposed as evident by the founder of intuitionism, L.E.J. Brouwer, but that had raised doubts. Heyting presented them in a decreasing order (referred to the evidence), starting with small natural numbers to get to great ordinals through choice sequences. In the meeting, where he aims to a well fixed limit between what is scientific and what is not, it is comprehensible that Heyting considers only a unique concept of existence, common to both science and daily life, as something fitting into a structuration of reality, to be strictly distinguished by an existence «at the limit», realized through insight.

In Religion and science Ramsey had proposed a kind of interplay between science and religion, given that science has the problem of providing one map of the universe, and religion has the problem of finding empirical relevance. Religion can give to science the single map for which it searches; but science then pays the price of having in the end categories, theological categories which elude empirical verification. Science gives to theology the broad empirical relevance that it needs. «It provides theology with a contemporary culture and moral problems on which it can bring its insight to bear; but theology then pays the price of talking about the world by using a language that, like the language of science must be, is tentative, reformable, and without guarantee». Heyting does not mention this aspect of Ramsey’s reflections, although he lists the book among the references of his talk.

5. Gerrit Mannoury’s influence

Heyting quotes Gerrit Mannoury, very positively, at the end of his talk, to praise his research program: pointing out the informative and the emotional components present in all languages. Mannoury had been inspired by the so-called «signific» studies about

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60 F11.5
61 F5, p. 21
64 I. Ramsey, Religion and science, Society for the promotion of Christian Knowledge, London 1964, p. 84.
language made by Lady Victoria Welby at the turn of the nineteenth century\textsuperscript{65}, introduced into the Netherlands by the poet Frederik van Eeden. Mannoury carried forward a research project aiming at distinguishing, inside texts of various origins (philosophical, political, scientific), the indicative and the emotional aspects in each linguistic act, that he described as follows: «Insbesondere wird dabei die Aufmerksamkeit der Unterscheidung des sogenannten *indikativen* von den *emotionellen* Bedeutungselementen eines Sprachaktes (oder, annähernd gesagt: der Unterscheidung des Einflusses unserer *Erinnerungen* und unser *Erwartungen* auf die in Betracht gezogene sprachliche Erscheinung) zugewandt und auf graduelle Abstufung unseres Sprachbestandes gegen den nichtsprachlichen geistigen Phänomena hingewiesen»\textsuperscript{66}. «In diesem Sinne definieren wir die *indikativen Bedeutungselemente* eines Sprachaktes als die im Geiste des Sprechers oder Hörers wirksamen Assoziationen mit von der Wahrnehmung äußerer Gegenstände oder Ereignisse herrührenden Erinnerungsbildern oder aus solchen zusammengesetzten Phantasiebildern und die *emotionellen Bedeutungselemente* als die anderweitigen, also hauptsächlich auf Affekte und Impulse bezüglichen Assoziationen»\textsuperscript{67}. Mannoury joined van Eeden, the sinologist Henri Borel, the social worker H.P.J. Bloemers and L.E.J. Brouwer that, at the end of the first world war, had founded the International Academy for Practical Philosophy and Sociology in the spirit of significs. They assigned to the Academy the following task:

«1. To coin words of spiritual value for the languages of western nations and thus make spiritual values enter into their mutual understanding […] 2. To detect and combat such elements in the present system of law and in the productive activity growing under its protection, as chiefly repress or dim spiritual tendencies […] 3. To point out and brand those words of the principal languages, which falsely suggest spiritual tendencies for ideas ultimately originating in the desire for material safety and comfort, and in so doing to purify and to correct the aims of democracy towards a universal commonwealth with exclusively administrative function»\textsuperscript{68}. Their activities resulted unsatisfactory. «Soon after it became evident that even for the constituent assembly of the Academy financial resources failed»\textsuperscript{69}. In 1922 they formed a «signific circle», because «the only thing left was the continuing of the personal intercourse of the founders». The linguist Jacques van Ginneken joined them, and at the end the divergences of opinions among the members of the circle became so deep that also that experience ended. Mannoury «thought signific philosophy had to draw attention to the outstanding tendencies of this time, which on one side showed a mighty development of natural science and on the other side a powerful revival of social feeling; signific philosophy had to aim at balancing these two tendencies. To this end it would have to discover and show the flaws and faults of the indicative language of natural science


\textsuperscript{67} Ibi, p. 292.


\textsuperscript{69} Ibi, p. 468.
as well as of the emotional language of social feeling and bring those languages into interaction with each other»\textsuperscript{70}. He went on his analysis by himself outside the circle\textsuperscript{71}.

Heyting states that his talk, in distinguishing between faith and belief, is inspired by Mannoury’s distinction between indicative and emotional aspects of the language. This distinction can also be applied to philosophy, in order to distinguish between rational argumentation and «philosophie emotionelle», that are often mixed in texts of the same authors (for instance in Heidegger e Sartre): Heyting does not like such mixture and wishes that scientific philosophy (= the science that studies the hypotheses hidden in intellectual activities), that works through formalization, could be useful: «On pourrait ainsi découvrir les dogmes, indiquer les changements subtils de signification et localiser les explosions de sentiment sans structure logique»\textsuperscript{72}.

Heyting does not quote Mannoury’s religious thought, based on a general Weltanschauung that was relativist-gradualist-polar: namely, according to Mannoury there is a basic unity of everything that is experienced or expressed, and gradual transitions which link up the clear-cut and unambiguous formulae of mathematics and formalised sciences to the fluid and evocative expressions of poetry and religious language. There is an interrelation between the most divergent phenomena. Human mind has a polar nature, involving contrariety and connectedness: «Contrariety is that which urges one to ask the most radical questions, connectedness is that which makes these questions impossible to answer and even to ask»\textsuperscript{73}. It is on this basis that Mannoury considered the question of the existence of God by stating in \textit{Mathesis en Mystiek}: «Is there a God? [...] Is there something which really is inexpressible, but still liable to experience, undefinable, but still presumable, uncountable and unmeasurable and unknowable but still real, living and existent? [...] The question, which I asked, or rather: which I vainly tried to ask, is not liable to response; it cannot be answered by yes or no, neither can it be by “maybe” or by “I do not know”»\textsuperscript{74}.

\begin{itemize}
\item \textsuperscript{70} Ibi, pp. 468-469.
\item \textsuperscript{74} G. Mannoury, \textit{Mathesis en Mystiek}, Maatschappij voor geode en goedkoope lectuur, Amsterdam 1924; French ed., \textit{Les deux pôles de l’esprit}, Librairie du travail, Paris 1933, p. 556. Always on the basis of his gradualist \textit{Weltanschauung}, Mannoury came to say: «Mathematics leads to mysticism and mysticism to mathematics» because already in the minimal reference that could be thought of in mathematics, i.e. the unity, we are referred to all of things (and hence to mysticism), by starting with the asssertainment that «nothing in nature presents us with clear-cut units, so that we have to look for the foundations of units in our inner world (our mind). Still, however hard we try to isolate one single sensation, which would then seem indivisible to us, the numerous and manifold relations which link up this sensation to other similar or dissimilar ones, always impose themselves upon us. [...] It is only insofar as we are able to forget or disregard the imperfection of the concept of unit, that we shall be able to attribute an appearance of exactness of mathematics» (ibi, p. 555) Therefore, mathematics shows the tight network of connections of our world.
6. L.E.J. Brouwer’s influence

Brouwer was Heyting’s ‘Doktorvater’ and, what is most important, his master of intuitionism. Heyting welcomed his teaching in an autonomous way: he did not simply repeat or follow what Brouwer taught, but he judged every aspect of the intuitionistic proposal and accepted only those that seemed acceptable to him, by specifying which aspects he refused and possibly why. He separated Brouwer’s mathematical intuitionism from Brouwer’s mystical Weltanschauung and proposed intuitionism as an autonomous research program, aiming to performing new mental experiences (the building of mathematics). Furthermore, he was always very sensitive towards other mathematicians: he always felt the need to communicate with them, even if they were not akin to intuitionism. He always believed that communication was possible, by pointing out formal language as a very good means for a better understanding among scientists (although he was conscious of the possibility of its failure at any moment). In the talk at issue he mentions differences between himself and Brouwer about science but he does not list them in detail. It is up to the reader to try to point them out.

Brouwer had his own thought about God, the man and the universe that saw a unique possibility for the man to be calm if he remains closed in his interiority, by trying to avoid as much as possible to manipulate the will of other people and to modify the natural environment. Each man can avoid this kind of actions in a measure that varies according to the natural disposition that he has. The exit out of the interiority takes place due to the intellect that points out an «Ego», by separating it from a not-Ego, by distinguishing objects and by linking them to each other through causal relationships:

Consciousness in its deepest home seems to oscillate slowly, will-lessly, and reversibly between stillness and sensation. The initial phenomenon is a move of time. By a move of time a present sensation gives way to another present sensation in such a way that consciousness retains the former one as a past sensation, and moreover, through this distinction between past and time, recedes from both and from stillness, and becomes mind. As mind it takes the function of a subject experiencing the present as well as the past sensation as object [...] In the world of sensation experienced by mind, the free-will phenomenon of causal attention occurs. It performs identifications of different sensations and of different complexes of sensations, and this way, in a dawning atmosphere of forethought, creates iterative complexes of sensations [...] there are iterative complexes of sensations whose elements are permutable in point of time. Some of them are completely estranged from the subject. They are called things. For instance individuals, i.e. human bodies, the home body of the subject included, are things [...] The whole of egoic sensations indissolubly connected with an individual, is called the soul of the corresponding human being75.

As soon as the man separates himself from the rest, he feels the wish of possessing the nature and the other men: «In measure of the irreversibility with which the subject has receded from an element of the object, this element loses its egoicity, i.e. gets estranged from the subject, and in measure of this estrangement, mind becomes disposed to desire

As for mysticism, Heyting, in his unpublished papers wrote: «Het besef dat zowel de stoffelijke wereld als de geestelijke verstandhouding met anderen in mijn geest besloten zijn is de grond van het mystieken beleven (the realization that both the material world and spiritual understanding are linked to each other in my spirit is the foundation of mystical beliefs)» (F3.1)

75 Brouwer, Collected works, p. 480.
and apprehension»76. The intellect, through science, gives him the possibility of satisfying his wish: «Causal attention allows the development of the conative activity of the subject from spontaneous effort to forethinking enterprise by means of the free-will – phenomenon of cunning act»77. After a first, fleeting satisfaction, the former wish will be replaced by a new one. This results in disastrous consequences on a large scale:

Mankind, possessed by the delusion of causality, will slide away in a deteriorative process of overpopulation, industrialization, serfdom, and devastation of nature, and that when hereby first its spiritual and then its physiological conditions of life will have been destroyed, it will come to its end like a colony of bacteria in the earth crust having fulfilled its task78.

The serenity is achieved by interrupting the cycle of desires: «If you succeed in overcoming all inertia passions will be silenced, you will feel dead to the old world of perception, to time and space and to all other forms of plurality. Your eyes, no longer blindfolded, will open to a joyful quiescence»79.

On the contrary, Heyting, as we saw in paragraph 1, fully appreciates the sciences and also their applications, and does not consider them as «free» if they are not applied to the real word but if there are no constraints on their subject-choice and on their research methods. Furthermore, Heyting appreciates the contribution given by formalization both to the sciences and to philosophy, while Brouwer doubted in general of the efficacy of any language and, in particular, of the efficacy of formal language:

Never has anyone been able to communicate his soul by means of language […] Language becomes ridiculous when one tries to express subtle nuances of will which are not a living reality to the speaker concerned, when for example so-called philosophers or metaphysicians discuss among themselves morality, God, consciousness, immortality or the free will. These people do not even love each other, let alone share the same subtle movements of the soul. Sometimes they do not even know each other personally80.

Because the usual spoken or written languages do not in the least satisfy the requirements of consistency demanded of this symbolic logic, formalists try to avoid the use of ordinary language in mathematics. How far this may be carried is shown by the modern Italian school of formalists, whose leader, Peano, published one of his most important discoveries concerning the existence of integrals of real differential equations in the Mathematische Annalen in the language of symbolic logic; the result was that it could only be read by a few of the initiated until one of these has translated the article into German81.

Nun gibt es aber für Willensübertragung, insbesondere für durch die Sprache vermittelte Willensübertragung, weder Exaktheit, noch Sicherheit. Und diese Sachlage bleibt ungeschmälert bestehen, wenn die Willensübertragung sich auf die Konstruktion reinmathematischer Systeme besitzt. Es gibt also auch für die reine Mathematik keine sichere Sprache, d.h. keine Sprache,

76 Ibidem.
77 Ibid., p. 481.
78 Ibid., p. 487.
80 Ibid., p. 401.
81 Id., Collected works, p. 126.
It may be interesting here to realize also the differences between Brouwer and Heyting about religion. Brouwer does not distinguish between faith and belief, but only considers religion as one block, and criticizes it (together with art), by stressing the inconsistency between what is proposed as a way of life and what is actually done by ministers of religion (or by the artists): «The Bible condemns the Tower of Babel and with it, all building and human creation. Yet religion glories in its wonderful temples, a crystallization of man’s creativeness and his high aspirations [...] Art, which should have been a liberation from the fixed form, has taken on fixed forms everywhere»83.

Furthermore, he condemns the exploitation of fear that they both adopt: «Art and religion in this world are only great morphine industries: the yearning for a better life is lulled into sleep and reduced to a state of torpidity»84.

In addition, Brouwer has a constant reference to mysticism by Boehme but also that coming from Eastern Europe. For example, we find in Leven kunst en Mystiek (his 1905 pamphlet) numerous quotes from the Bhagavad-Gita85 that invite to the control of passions and to mysticism: «He who, with self-detached from contacts without, finds happiness in self, enjoys imperishable happiness, his self controlled by contemplating Brahman»86. «Therefore, without attachment ever perform the work that thou must do: for if without attachment a man works, he gains the highest»87. Also in Brouwer’s 1948 talk Consciousness, philosophy and mathematics (and not only in his first writings) we find a reference to oriental spirituality of Bhagavad-Gita as a clear example of wisdom88. Even the openings of Brouwer towards the concept of free will and miracle are to be understood in this light of suspension of causal links that keep the man in the web of his continuous desires:

You will recognize your free will, free insofar that it can withdraw from the world of causality and remain free; it is only then that your will find a definite direction, which it follows freely and reversibly. [...] The phenomena succeed each other in time, bound by causality because your colored view wills this regularity; but through the walls of causality «miracles» continue to glide and flow, visible only to the free, the enlightened89.

As a conclusion of this comparison between Brouwer and Heyting about human relationships, it can be noticed in the above texts that Brouwer advocates a «non-intervention» on other humans to assist the overall maintenance of equilibrium in the interiority: «His attitude is the same toward friend and foe. He is indifferent to honour

82 Ibi, p. 421.
83 In., Life, Art and Misticism, p. 398.
84 Ibi, p. 398.
85 Ibi, p. 421.
86 Ibidem.
87 Ibi, p.424.
89 Id., Life, Art and Misticism, p. 394.
and insult, heat and cold, pleasure and pain. He is free from attachment\textsuperscript{90}. In general, Brouwer kept a very suspicious attitude towards the relations between human beings. During adolescence, on the occasion of the profession of faith in a christian community, he had declared: «As regards the world of men, I can hardly call this love of my neighbor, for I detest most people; [...] the shadows of men around me are the ugliest part of my conceptual world. So, in theory, I will never sacrifice myself for another person; God has, however, given me feelings such as compassion, which sometimes force me to act in that direction»\textsuperscript{91}. In the above mentioned 1948 talk, he proved the impossibility to assert the existence of a plurality of minds (besides his own) and the impossibility of an exchange of thoughts: «In default of a plurality of mind, there is no exchange of thought either. Thoughts are inseparably bound up with the subject. [...] By so-called exchange of thought with another being the subject only touches the outer wall of an automaton. This can hardly be called mutual understanding. Only through the sensation of the other’s soul sometimes a deeper approach is experienced»\textsuperscript{92}.

On his side, Heyting welcomes Huxley’s sense of the sacred, who located in the interiority deep feelings such as love of neighbor. In his unpublished papers, Heyting will specify that we perceive that other people exist through a «feeling of fellow people (medemens-gevoel)». It «consists of a feeling of concordance (Het bestaat in een gevoel van overeenstemming)\textsuperscript{93} and differs from the feeling of the outer world because «in the fellow-man feeling a representation is contained of a life of feelings and thoughts analogous to mine (in het medemensgevoel is een voorstelling bevat van een aan het mijne analoog gevoels-en gedachtenleven)\textsuperscript{94}. The picture of the differences between Brouwer’s viewpoint and his will be completed by the following statement: «In my opinion the notion of other minds is more primitive than that of an outside world. (I am afraid that very few people agree with this.) As long as he does not physically attack me (there are other exceptions) another man’s mind is to me more important than his body. (Even if he [threatens] to attack me I try to change his mind not his body)\textsuperscript{95}."

\textsuperscript{90} Id., Consciousness, philosophy, and mathematics, p. 487.
\textsuperscript{91} W.P. Van Stigt, Brouwer’s Intuitionism, Elsevier, Amsterdam 1990, pp. 390-393.
\textsuperscript{92} Brouwer, Consciousness, philosophy, and mathematics, p. 485.
\textsuperscript{93} F7.8.
\textsuperscript{94} F6.6.
\textsuperscript{95} F19.2.